

## RESEARCH ARTICLE

Lost in transition? Capturing the impacts of conservation and development interventions on relational values and human wellbeing in the forested tropics

# Motivational crowding effects in payments for ecosystem services: Exploring the role of instrumental and relational values

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## Abstract

1. Nature is perceived and valued in many different ways. Often, the types of values that are the most important to people depend on how they cognitively frame desirable human–nature relations. For instance, the value of nature can be seen through a utilitarian lens, for example, as providing ecosystem services for humans. Alternatively, it can also be considered valuable for non-instrumental reasons, for example, for its sacred or spiritual significance.
2. In this paper, we use a framed field experiment to test how people belonging to three distinct communities in Colombia (Indigenous, Afro-Colombian and Campesino) respond to different ways of framing payments for ecosystem services (PES) schemes, so as to assess potential motivational crowding effects of pro-social/intrinsic motivations for forest conservation.
3. The experimental results indicate that crowding-in of intrinsic motivations for forest conservation occurred in participants from the Indigenous community when the PES scheme was framed in a way that highlighted the relational values of the forest.
4. By contrast, motivational crowding-in took place for participants in the framed field experiment from the Campesino community when the PES scheme was introduced in a way that highlighted instrumental values instead.
5. Participants from the Afro-Colombian community did not show the evidence of motivational crowding under either framing.
6. Together, these results suggest that PES schemes that are framed in a way that harmonizes with locally salient human–nature relational models and associated values are more likely to cause motivational crowding-in, and thus encourage the higher rates of environmental conservation, even after payments are discontinued.

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**KEYWORDS**

Afro-Colombian, framed field experiment, Indigenous peoples and local communities, instrumental values, motivational crowding, payments for ecosystem services, relational values

## 1 | INTRODUCTION

Payments for ecosystem services (PES) have become an increasingly popular policy tool used to drive conservation efforts around the world (Salzman et al., 2018). Although this popularity is clearly supported by the fact that PES rely on rewards (rather than punishments) to promote pro-environmental behaviour, concerns have been raised that monetary payments may erode pre-existing social or moral motivations to conserve nature. This phenomenon—dubbed ‘motivational crowding-out’ (Midler et al., 2015; Rode et al., 2015)—can be problematic once PES schemes come to an end. Specifically, when the sudden removal of extrinsic rewards leads to post-PES conservation levels dropping below pre-PES levels, something that may happen if intrinsic pro-environmental motivations have been replaced by pecuniary ones.

However, some studies have revealed that depending on how PES programmes are designed, they may sometimes lead to the opposite phenomenon: ‘motivational crowding-in’ (Agrawal et al., 2015; Andersson et al., 2018; Grillos et al., 2019; Midler et al., 2015; Moros et al., 2019; Narloch et al., 2012). Motivational crowding-in refers to situations in which intrinsic pro-environmental motivations and values are reinforced (rather than replaced) after the introduction of an external incentive. When PES schemes that cause motivational crowding-in come to an end, it is expected that, *ceteris paribus*, conservation levels will be higher than they were before the PES scheme was introduced.

To explain the mechanism through which motivational crowding may occur, we provide an overview of the conceptual framework put forward by Ezzine-de-Blas et al. (2019), which builds on the past work from the field of psychology such as self-determination theory (SDT; Ryan & Deci, 2000). Figure 1 provides a synthesis of this framework. It shows how a combination of the characteristics of external interventions (e.g. the way a PES scheme is framed) and contextual factors (e.g. socio-demographic characteristics of PES beneficiaries) will interact with a set of cognitive ‘moderators’ (e.g. feeling of autonomy). The outcome of this interaction will determine whether the level of psychological satisfaction (akin to the concept of utility in economics) derived from performing a given task (e.g. pro-environmental actions) changes. Increases in internal satisfaction derived from performing an activity have been shown to lead to motivational crowding-in, and decreases to motivational crowding-out. While a PES scheme is in operation, it is difficult to observe whether pro-environmental motivations have changed in response to extrinsic incentives, given that the ongoing payments may provide sufficient motivation to carry out pro-environmental

actions regardless. However, as soon as the PES scheme ends and payments cease, any motivational crowding will become apparent when comparing post-PES conservation levels to the pre-PES baseline: Motivational crowding-out will lead to lower levels of conservation, while the reverse is true for motivational crowding-in.

A growing body of research is looking at different interactions between PES designs, contexts, moderators and their effect on motivational crowding (Agrawal et al., 2015; Andersson et al., 2018; Ezzine-de-Blas et al., 2019; Grillos et al., 2019; Midler et al., 2015; Moros et al., 2019; Narloch et al., 2012; Rode et al., 2015). One design feature whose importance is increasingly becoming apparent is the framing of PES programmes. For example, Clot et al. (2017) showed that using the notion of ‘compensation’ rather than ‘payment’ can have a significant effect on individual's perceptions about PES. More recently, Grillos et al. (2019) highlighted the importance of a ‘reciprocity framing’ for the success of a PES scheme in Bolivia. However, the experimental evidence linking PES framing and motivational crowding is still relatively sparse.

In this paper, we contribute to this literature by exploring whether framing the value of nature in different ways during the introduction of a PES scheme interacts with a specific ‘moderator’ (i.e. environmental relatedness), in turn contributing to motivational crowding. To measure environmental relatedness, we use the concept of human-nature relational models (HNRMs). HNRMs are the ‘cognitive frames that give shape to relationships between people and nature’ (Muradian & Pascual, 2018, p. 4). HNRMs help describe the different ways in which people interact with and position themselves with respect to nature. We focus on HNRMs due to the fact that PES schemes have traditionally emphasized a *utilization* HNRM in particular, in which nature is conceived of as a separate entity whose importance is based on the instrumental (ecosystem service) values it provides to people. Concerns have been raised, however, that framing the relationship between humans and nature in utilitarian ways in some cases may crowd-out non-instrumental motivations, attitudes and values (Ezzine-de-Blas et al., 2019; Rico García-Amado et al., 2013; Rode et al., 2015). Yet, despite the emphasis that PES theory places on a *utilization* HNRM, in practice the use of PES is resulting in a diverse set of institutional arrangements to try to fit with a spectrum of different HNRMs (Engel, 2016; Muradian et al., 2013; Wunder et al., 2018). This is particularly the case in contexts where PES schemes are targeted at Indigenous peoples and local communities (IPLCs) which have different ways of conceiving human's relationships with nature (Arias-Arévalo et al., 2018; Lliso, Mariel, et al., 2020; Lliso, Pascual, et al., 2020; Smith et al., 2019). Here, alternative framings such as those highlighting relational values—rather than instrumental values—may resonate more

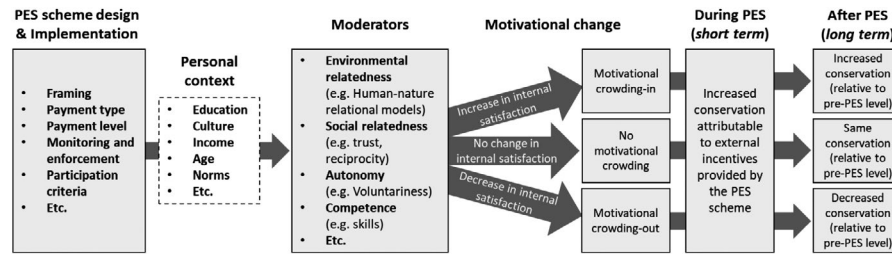


FIGURE 1 Conceptual framework representing motivational crowding pathways in PES. (Adapted from Ezzine-de-Blas et al., 2019)

with PES participants (Bremer et al., 2018; Chan et al., 2017). Relational values are those encompassing aspects such as care, reciprocity, identity, heritage and kinship, among others (Chan et al., 2018; Himes & Muraca, 2018).

Some PES schemes in the past have had their effectiveness compromised due to being misaligned with the ways in which local communities relate to and value nature (e.g. Ibarra et al., 2011; Muller, 2008; Pascual et al., 2014; Reed, 2011; Zander et al., 2013). As such, the objective of our study is to foresee ways in which PES schemes can be designed to better align with locally grounded desirable human-nature relationships with the ultimate goal of increasing their sustainability. To this end, we conduct a framed field experiment in three different ethnic communities in Colombia: one Indigenous, one Afro-Colombian and one Campesino (small-holder farmers). The aim of the experiment is to explore the interaction between local HNRMs and two alternative PES framings: one based on the *utilization* and *domination* HNRMs (emphasizing instrumental values of forests), and another one related to the *devotion* and *stewardship* HNRMs (emphasizing relational values of and about forests). Through this approach, we discuss how relational values can be operationalized within PES schemes to enhance their effectiveness in contexts where these values may be prominent. In doing so, we also contribute to clarifying the role of relational values for conservation policy and practice.

## 2 | CASE STUDY BACKGROUND

Colombia is one of the most biodiverse countries of the world; despite covering only 0.7% of the global land area, it hosts approximately 10% of the planet's biodiversity (Sierra et al., 2017). Colombia also has great cultural and ethnic diversity (Hernández Romero, 2005), often granting semi-autonomous rule to ethnic communities throughout the country. About 90% of the land area in Indigenous and Afro-Colombian territories (ca. 40 m/ha) are still covered by native forests (DANE, 2015). In rural areas, small-scale farmers (*Campesinos*) also play a relevant role in ecosystem conservation (Dietz, 2018). Thus, to design effective conservation interventions in Colombia, it is key to acquire a better understanding of the HNRMs of these three distinct ethnic groups whose livelihoods are based in rural areas.

For more than half a century, many rural communities have had to live with the burden of the armed conflict between the government,

guerrillas and paramilitaries. Evidence is emerging that after the signing in 2016 of a peace agreement between the Fuerzas Armadas Revolucionarias de Colombia (FARC) guerrilla and the Colombian government, deforestation rates and environmental degradation may be quickly worsening in areas with weak PES governance (Armenteras et al., 2019). In this complex context, PES have been proposed as a policy instrument that can target both social and environmental goals in Colombia (Armenteras et al., 2019; Morales, 2017). It is expected that the use of PES-based approaches for conservation—with the participation of Indigenous, Afro-Colombian and Campesino communities—could expand in the near future (MADS, 2017). Consequently, our case study is focused on an area that includes all three ethnic groups in close proximity in order to compare how they may respond to alternative designs of new PES schemes.

The study area is part of the Pacific Forest Reserve, located in the Valle del Cauca department (Figure 2). Although the Reserve is not a strict conservation area, it does aim to promote the development of forest-based economies while protecting biodiversity (MADS, 2013). The three selected ethnic communities for the case study neighbour the protected areas of Río Bravo Regional Protective Forest Reserve, the Páramo del Duende Regional Natural Park and the National Protective Forest Reserve of the Escalarete and San Cipriano watersheds (Figure 2). Despite only being 16 km apart in a straight line and 60 km away by road, getting from one community to another one can take more than 2 hr by car due to the difficult terrain.

The three communities where we conducted our study are: (A) Consejo Comunitario de Alto y Medio Dagua (Afro-Colombian community), (B) Resguardo Nasa Kiwe Embera Chamí (Indigenous community) and (C) Vereda Río Bravo (Campesino community; Figure 2). As could be expected, despite the three study sites being similar in terms of the ecological context, they have different sociocultural backgrounds. Below we present an overview of the communities' worldviews regarding nature and their predominant HNRMs (see Supporting Information Section S1 for additional information on each community).

### 2.1 | Alto y Medio Dagua Afro-Colombian community

The HNRM of Afro-Colombians in the Pacific region is mostly defined by how they conceive of the Universe as containing multiple

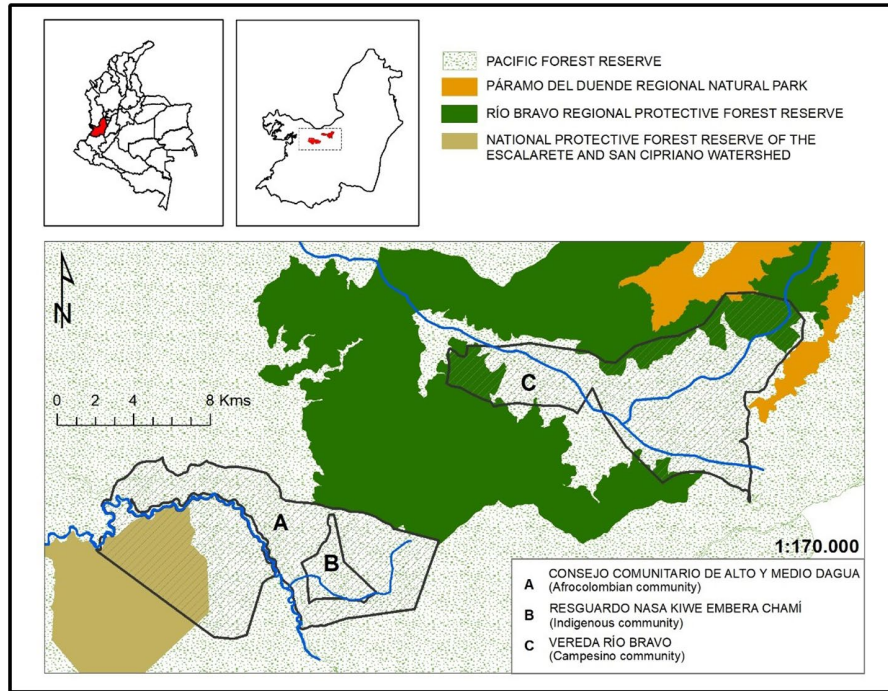


FIGURE 2 Location of case study

and interconnected worlds (i.e. biophysical, human and supernatural) and by the use of complex classification systems of their surroundings (Escobar, 2008). Their predominant HNRM expresses the elements of an ecological ethic of reciprocity aimed at warning humans not to abuse nature, for example, the existence of forest spirits that aim to scare away the forest's colonizers (Escobar, 2008). Afro-Colombian communities have also established the relationships of kinship with non-human beings and the daily symbolic, ritual and economic relationships that these communities establish with non-human nature have become central to their identity and culture (Contreras Arias, 2009). For instance, in the *Omb ligada* ritual, when a child is born, the local midwife buries the placenta and the umbilical cord under a tree (Escobar, 2017) and the newborn's navel is cured with a natural substance (i.e. animal, plant or mineral) so that the properties of the substance can be transmitted to the child (e.g. fishbone, animal nails, gold; Escobar, 2008; Quintero Barrera, 2012). In this ritual, the navel is seen as a door that connects worlds, and through it, properties from the natural world are transferred to the human world (Escobar, 2008). On an economic level, many Afro-Colombians adapt their livelihoods to the dynamic biophysical environment (Contreras Arias, 2009), changing their activities throughout the year (e.g. fishing, agriculture, mining) depending on environmental factors such as lunar cycles, rainfall and tides (Escobar, 2008).

## 2.2 | Nasa Kiwe Embera Chamí Indigenous people

The word Nasa means 'people of water' and 'people of life' (Gómez Valencia, 2000). The Nasa conceives of the world as a series of

smaller houses within a 'Great House' (*La Gran Casa*) (Orozco et al., 2013): There is the House of the Cosmos (*Uma and Tay*), the House of the Spirits (thunder), the House of the Nasa (i.e. plants, animals, minerals, human beings) and the House of the *Yu'kijpmenas/Tapanos*, a type of human being that dwells underground. All entities, including those of non-human nature, are considered to have agency, spirit and life. Within their territory, everything is seen as having an influence on everything else; nothing is separate. The HNRM of the Nasa people places life at the centre of the universe (Molina Bedoya, 2015). For the Nasa, their territory allows the possibility of existence and social re-creation. For this reason, the founding principle of life is the reciprocal relationship between humans and nature. To guarantee the well-being of the community, rituals are performed to please and thank the *Ks'a'ws* or the Spirits of Nature. For example, when entering certain designated sites to obtain natural resources, authorization is requested from the Spirits of Nature through the use of certain plants and rites performed by traditional doctors. The community also makes offerings to *Kiwe* (Mother Earth), who told her children to remember that she provided them with a place to live and that all beings are kin. The concept of solidarity is deeply embedded in the Nasa economy, which aims at self-sufficiency and is carried out collectively for the benefit of all members through practices such as barter and the exchange of labour (Molina Bedoya, 2015).

## 2.3 | Campesino communities

Unlike the Afro-Colombians and Indigenous communities, Colombian Campesinos are not recognized by the State as an

ethnic-political-legal group, and therefore, they do not have the same rights in terms of political-administrative autonomy and access to land as the former two groups (Montenegro Lancheros, 2016). Research on the Campesinos' identity and culture provides some insights into their HNRM (Montenegro Lancheros, 2016; Velasco Olarte, 2014). Although Campesino communities are quite heterogeneous, their shared identity comes from their experiences as small-scale farmers. Their agricultural activities are often framed in a non-capitalistic manner (i.e. not motivated by the objective of capital accumulation) with a strong emphasis on community and family ties. Campesinos favour associative organization structures and have frequently led local social movements for the conservation of natural resources. Territory and land are two key concepts for Campesinos. Their territory includes not only the physical space and the natural resources within it but also the processes, stories and feelings that take place there (Velasco Olarte, 2014); it is the material and symbolic space where the Campesino life, culture and economy are reproduced. The importance of land for a Campesino is reflected in the following statement: 'For the peasant, land is life, if they take away the land, they take away our life' (Velasco Olarte, 2014, p. 151). Campesino identity is associated with the concept of 'care of life', since they work the land while serving as its stewards for producing food that is fundamental for sustaining human life (Velasco Olarte, 2014). Campesinos are thus intricately bonded to their territory in a way that highlights their material dependence on natural resources. This is reflected in Campesino social movements and struggles for control over territory and land have been historically linked to opposition to extractivist development models (Tobasura Acuña, 2007).

## 3 | METHODS

### 3.1 | Research approach

The framed field experiment consisted in a game which simulated the introduction and eventual removal of a PES scheme to observe participants' behaviours. As part of the game, participants were allotted six tiles representing hypothetical hectares of forest, and asked to decide how many hectares they wanted to conserve and how many they wanted to convert to farmland instead (see Section 3.4). The game was played over the course of three phases: (1) pre-PES (without monetary incentives to conserve forests), (2) PES (introducing monetary incentives to conserve forests) and (3) post-PES (removing monetary incentives to conserve forests). Participants in each community were randomly allocated to one of two groups. In each group, the PES programme was framed as targeting a different set of values. By randomly allocating participants across two different treatments, the experimental approach allows us to establish causality in the impact of these treatments on motivational crowding, while controlling for other potential confounding factors.

As usual in economic experiments, we use incentivization, that is, participants' decisions in the game have real financial consequences in terms of affecting the payoffs obtained at the end of the experiment. This avoids the potential hypothetical bias that is common in studies using non-incentivized approaches. Depending on the decisions they made during the forest management game (Section 3.3), participants received between COP\$15000 and COP\$28000 (approx. USD\$4 to USD\$8) at the end of the session.

The framed field experiments were held in community halls or school buildings and lasted approximately 3 hr, including a break during which participants were offered food and drinks. The steps followed in each session were: (i) introducing the activity; (ii) obtaining written informed consent, (iii) completing the HNRM survey, (iv) conducting the forest management game and (v) concluding with a socio-demographic survey. Table 1 provides an overview of the approach used in the framed field experiment. Sections 3.3 and 3.4 further expand on the HNRM survey and the forest management game respectively. Further details can be found in Supporting Information Section S2, which includes the script that was used during the experiment.

Before the implementation of the experiment in the field, the methods were piloted with students in the Universidad del Valle in Cali. The design of the experiment was approved by the Basque Centre for Climate Change's Research Ethics Officer.

### 3.2 | Sampling process

An important question motivating this study was whether simply changing the way that a PES scheme was framed (leaving all else equal) was sufficient to generate motivational crowding effects in different groups of participants. If this were the case, it would highlight the relevance of getting the framing of PES schemes 'right' for each context, a factor that has received comparatively less attention than other PES design characteristics (e.g. payment type and level, or participation criteria) (leftmost box in Figure 1). To explore this question, we approached the 'Corporación autónoma regional del Valle del Cauca' (CVC), which is the environmental agency responsible for the Valle del Cauca region in Colombia. The CVC is in charge of managing all PES schemes under their regional jurisdiction, and with their help we selected our three case study communities: one Indigenous, one Campesino and one Afro-Colombian. These communities were ultimately selected because of how culturally distinct they are from one another, while being similar in other regards. For example, they all border the same natural reserve and farming plays an important role in all three, allowing us to maintain factors (such as the source of livelihoods or the permitted use of nearby forests) comparable. Another shared similarity across participants is a relatively high level of social capital, as they are all part of community-based organizations. The Río Bravo Campesino community is organized in productive associations that have actively contributed towards environmental projects such as the creation of protected areas and agroecological

Steps	Objectives	Link to conceptual framework (Figure 1)
1. Introduction	<ul style="list-style-type: none"> <li>To introduce the researchers and moderators to the participants;</li> <li>To provide an overview of the activity to be carried out and the goals of the research</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
2. Informed consent	<ul style="list-style-type: none"> <li>To obtain written informed consent from participants</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
3. Human–nature relational model (HNRM) survey	<ul style="list-style-type: none"> <li>To characterize the ways in which the participants relate to nature by measuring their agreement with a set of statements illustrating different archetypical HNRMs</li> </ul>	<ul style="list-style-type: none"> <li>Measures the environmental relatedness moderator</li> </ul>
4. Forest management game	<ul style="list-style-type: none"> <li>To measure experimentally how the level of forest conservation changes before, during and after participating in a PES programme;</li> <li>To test whether framing the value of nature in different ways when introducing PES affects the level of conservation</li> </ul>	<ul style="list-style-type: none"> <li>Measures the effect of different framings on the levels of conservation during a PES programme to test whether motivational crowding took place</li> </ul>
5. Socio-demographic survey	<ul style="list-style-type: none"> <li>To collect basic socio-demographic data of participants</li> </ul>	<ul style="list-style-type: none"> <li>Measures personal context</li> </ul>

**TABLE 1** Overview of the framed field experiment

projects (Salgado, 2006). In the case of the Alto y Medio Dagua Afro-Colombians and Nasa Kiwe Embera Chamí Indigenous communities, they are constituted as *Consejos Comunitarios* and *Resguardos*, respectively, which are local political-administrative figures that encompass collective land rights and the autonomy to carry out their own ethno-development plans.

Something that had to be contended with was the relatively difficult access to these communities. Geographically, they are remote and road access is limited. Additionally, there is a palpable mistrust of outsiders stemming from the challenging history in the region associated with the Colombian armed conflict and a legacy of insecure land tenure. For these reasons, local leaders act in the role of gatekeepers, and as such, random sampling was not feasible. Instead, after explaining the goal of our research to the three communities' leaders and obtaining their permission to conduct our study, we asked each of them to convene two groups of 30 people of all ages (who were at least 16 years old), with gender parity, and limited to one person per household. We describe the sample characteristics in Section 4.1.

### 3.3 | The survey on human–nature relational models

In order to help us characterize the ways in which the three communities relate to nature, we tested the level of agreement of participants with a set of archetypical HNRMs identified by Muradian and Pascual (2018; Table 2). To do this, we asked participants to sort seven statements representative of each of the HNRMs into a normally distributed pyramidal layout (Figure 3). The statements were printed on physical cards, which provided a more hands-on

experience that encouraged participants to move the cards around until they arrived at a final ordering that they felt confident about.

Rather than using a traditional Likert scale survey, we used a pyramidal response format (Figure 3) approach—which is favoured by other social science methods that are quickly growing in popularity such as the Q-Methodology.<sup>1</sup> Using a pyramidal response format limits the number of responses on either end of the distribution (i.e. 'strongly agree' or 'strongly disagree'), and thus encourages participants to more carefully contemplate their answers, rather than simply dividing statements into two extreme clusters showing general agreement or disagreement (Webler et al., 2009). This clustering behaviour is to be avoided where possible as it provides little useful information to the researcher. The main reason it may happen is due to a commonly observed phenomenon known as 'social desirability bias', whereby respondents answer questions in a way that paints them in a positive light, rather than in a way that is reflective of their true thoughts or feelings (Grimm, 2010). By using the pyramidal format for their responses rather than a conventional Likert scale, participants must instead think more carefully about the order of their preferences as they can only say they 'strongly agree/disagree' with a limited number of statements. Consequently, it also has the advantage that it makes it less costly (from a social desirability bias standpoint) to provide a more faithful ordering of the statements. A limitation of this approach, though, is that the ordering of the statements is best interpreted in relation to one another rather than in isolation, as the removal of a statement that was 'strongly agreed' with might bump up another statement into its position. However, given the past experience of the authors running into social desirability bias when using Likert scales to measure environmental attitudes, this trade-off was considered worthwhile. To

TABLE 2 HNRMs and associated statements (adapted from Muradian &amp; Pascual, 2018)

HNRM	Goal orientation	Positioning of nature with respect to humans	Proxy statement used in the 'HNRM survey'	Primary value type associated with HNRM
<i>Detachment</i>	Nature perceived as not important. Preference for urban and technological spaces	Nature is invisible to humans	'I have more pressing concerns than protecting nature'	No value
<i>Utilization</i>	Nature perceived as a source of goods and services. Preference for optimizing cost-benefit ratios	Nature as a separate entity with no intrinsic rights	'The main reason why we must protect nature is for the materials and services it provides to us'	Instrumental value
<i>Domination</i>	Nature perceived as threat. Preference for human control over nature	Nature is subordinate to humans	'I am willing to alter nature in whatever way is needed to increase my wellbeing'	Instrumental value
<i>Devotion</i>	Nature perceived as sacred. Preference for situations that are believed to be favourable for the deities	Nature as deity (superior)	'Nature has a religious, sacred or spiritual value to me'	Relational value
<i>Stewardship</i>	Nature perceived as a comprehensive system that also encompasses humans. Preference for human restraint in order to respect nature	Humans as part of nature	'Humans are a part of nature and nature is a part of us'	Relational value
<i>Ritualized exchange</i>	Nature perceived as an interactive agent. Preference for equality and reciprocity	Nature as equal to humans	'We have a debt towards nature for all it gives us'	Relational value
<i>Wardship</i>	Nature perceived as a separate entity to be protected. Preference for pristine spaces or conditions	Nature as separate from humans and with intrinsic rights	'Nature has a right to exist without being harmed by people'	Intrinsic value

analyse the results of the HNRM survey, we test differences in the median response using a non-parametric Mann-Whitney-Wilcoxon test.

### 3.4 | The forest management game

In order to test how differently framed PES schemes can affect motivational crowding, we used an incentivized forest management game similar to that used by Kits et al. (2014) and Kaczan et al. (2019). This type of game allows us to simulate the introduction and subsequent removal of a PES scheme, and to observe how this affects participants' forest conservation behaviours. As shown in Figure 1, if a PES scheme with a specific framing led to motivational crowding-out (i.e. it eroded intrinsic motivations to conserve nature), then we would expect to see the lower levels of conservation after the PES scheme had ended than those seen before. The opposite would be true for a PES scheme that causes motivational crowding-in (i.e. higher levels of conservation post-PES than pre-PES).

The forest management game simulates a hypothetical (though plausible) decision faced by the participants of our study: How much forested land to conserve, and how much to cut down in order to cultivate crops. The game takes place over the course of three phases with five rounds each: (1) pre-PES, (2) PES and (3) post-PES (Table 3). In each of the 15 rounds, participants receive six tiles representing hypothetical hectares of forest (Figure 4). Each tile represents one hectare and has an associated monetary value which represents the market value of crops that could be grown on it if were converted to farmland. The total sum of the monetary value of the six hectares in each round is always the same, although their individual value varies slightly in order to provide variation between rounds (see Table S2). In each round, participants had to make a single decision: how many of the six forested hectares they would convert to farmland, and how many they would conserve as forest. For each hectare that was farmed, a participant would receive the monetary value indicated by the tile, which represented the market value of the crops. For each hectare that was conserved as forest, the monetary value indicated on the tile would instead be donated to a well-known forest conservation programme operating in the region. Thus, hectares converted to farmland would provide a real private monetary benefit to the participant, while conserved hectares in the game translated into a real public environmental benefit, as the funds would instead be donated to an NGO that would invest the donation into the conservation of local forests. Participants were informed that the decisions they made throughout the game would be anonymous and private.

'Phase 1: pre-PES' of the game was played as described above for five rounds. After completing this phase, all participants faced one of two treatments (cf. Table 3) depending on what group they were randomly assigned to. Both treatments consisted in a 5-min presentation by a moderator followed by a group discussion that lasted between 10 and 15 min. The script that was read by the moderators can be found in Supporting Information Section S2.

In the first treatment (i.e. instrumental values-based framing of PES), participants were given a presentation about the instrumental

Strongly disagree	Disagree	Neutral	Agree	Strongly agree

FIGURE 3 Pyramidal response format used in the HMNR survey

values of nature in the form of forest ecosystem goods and services (e.g. provision of clean water, wood, medicinal plants, natural pollination of crops and local income from ecotourism). This treatment invoked primarily a *utilization* HNRM (Muradian & Pascual, 2018) with some elements of a *domination* HNRM, by framing the value of nature through a utilitarian ecosystem services lens (Rode et al., 2017). After the presentation, participants were split into small groups and asked to discuss all the benefits they personally obtain from nature which they would alternatively have to obtain from the market if the forests were gone.

Participants in the second treatment were also given a 5-min presentation, but in this case, it focused on the relational values of the forest (e.g. how the forest provided a sense of place and identity, its role in generating shared experiences and spiritual connections to nature). This treatment invoked primarily the *devotion* HNRM, with some elements of the *stewardship* HNRM. After the presentation, participants were also split into small groups and asked to share with each other 'a beautiful memory or experience they associated with the forest'.

Before resuming 'Phase 2: PES', participants in both treatments were told that there would be a change in the rules of the game. In recognition of the important value that nature provides, they would receive a financial reward of COP\$4000 (approx. USD\$1) for each hectare of forest they conserved. Thus, while farming a hectare would continue to provide the same private benefit as in 'Phase 1: pre-PES', conserving the forest of a hectare would provide a donation to the local forest conservation programme in addition to a private benefit of COP\$4000 (i.e. the PES incentive).

After playing five rounds with the 'PES-rules', participants were informed that the conservation programme had ended and they would no longer be rewarded monetarily for conserving the forest in subsequent rounds. In 'Phase 3: post-PES', the experiment reverted to the original rules for the final five rounds in order to see whether conservation patterns changed with respect to the 'Phase 1: pre-PES' behaviour (before participants ever received a payment).

We use a random effects model to analyse the impact of the treatment on the share of the endowment that they chose to allocate for forest conservation. Following Salk et al. (2017) and Andersson et al. (2018), we used the pre-PES phase (first five rounds) as the baseline to measure the changes in conservation decisions in later rounds.

### 3.5 | Ethics approval

This research was approved by the Basque Centre for Climate Change's Research Ethics Officer. Participants in the study signed a written informed consent form before participating. This form was also read aloud to help those with more limited reading skills.

## 4 | RESULTS

### 4.1 | Sample characteristics

Of the 180 participants that were invited (60 people per community, split into two groups of 30), 157 showed up, representing a participation rate of 87%. In each community, participants were randomly assigned to one of the treatments.<sup>2</sup> As shown at the top of Table 4, five of the six groups had at least 26 participants. However, a large storm took place during the Campesino-Instrumental treatment which meant that only 16 participants arrived for that particular session. Our sample includes 3% of the total population of the Afro-Colombian community, 10% of the Campesino community and 14% of the Indigenous community.

We draw attention to the main differences across the samples from the three communities. The samples in the Afro-Colombian and Indigenous communities had more women (77% and 75%, respectively) than men, contrary to the Campesino community which had 39% women. The level of education of the Campesino and Indigenous participants was relatively low in both cases, with approximately half of the participants not having attended secondary school. By contrast, almost half of the Afro-Colombian sample had gone to technical school or university. Due to lack of available baseline data on the socio-economic characteristics of the three communities, it is not possible to say whether the socio-economic differences are attributable to underlying differences between communities or due to a sampling bias. We attempt to control for them by including gender and education in our random effects model.

### 4.2 | Human–nature relational models

Figure 5 shows the level of agreement expressed by the participants from the three communities with the HNRMs. The second column in the figure shows the results of a Mann–Whitney–Wilcoxon test, which tests whether there is a statistical difference in the median response. We find that the participants from the Afro-Colombian community expressed relatively more agreement with the *stewardship* HNRM than the other two communities. Participants from the Campesino community expressed relatively more agreement with the *detachment* HNRM than the other two communities, and relatively more agreement than the Afro-Colombian participants with the *domination* and *ritualized exchange* HNRMs. Participants from the Indigenous community expressed relatively more agreement with the *devotion* HNRM than the other two communities. There are



TABLE 3 Forest management game design

Round number:	Phase 1: pre-PES (baseline)					Treatment	Phase 2: PES					Phase 3: post-PES				
	1	2	3	4	5		6	7	8	9	10	11	12	13	14	15
Game rules	<p><b>Basic rules:</b>  <b>For each cultivated hectare:</b>                      (a) Monetary value associated with the tile is kept by the participant  <b>For each forested hectare:</b>                      (b) Monetary value associated with the tile is donated to a local forest conservation programme</p>					<p><b>Treatment 1—Instrumental values-based framing:</b>                      Presentation and discussion about the instrumental values of nature akin to ecosystem goods and services (e.g. clean water, wood, medicinal plants, natural pollination of crops, local income from ecotourism)  <b>Evoked HNRMs:</b> Utilization and domination  <b>Treatment 2—Relational values-based framing:</b>                      Presentation and discussion about relational values about nature (e.g. landscape beauty, sense of place, shared experiences, local identity, spiritual value)  <b>Evoked HNRMs:</b> Devotion and stewardship</p>	<p><b>PES RULES:</b>  <b>For each cultivated hectare:</b>                      (a) Monetary value associated with the tile is kept by the participant  <b>For each forested hectare:</b>                      (b) Monetary value associated with the tile is donated to a local forest conservation programme;                      (c) Participant receives a payment through the PES scheme</p>					<p><b>Basic rules:</b>                      Same as phase 1</p>				

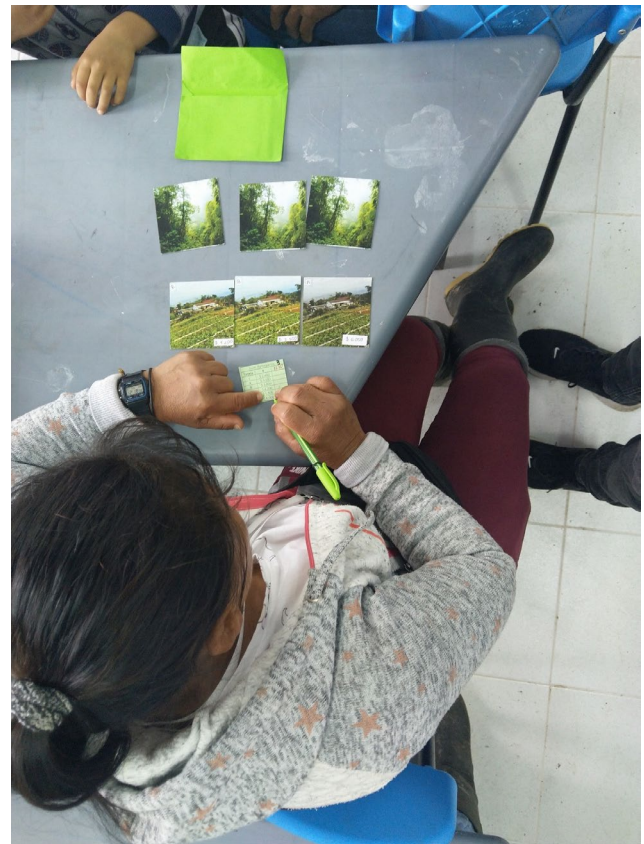


FIGURE 4 Participant completing phase 1 of the game. Note: The participant has chosen to conserve three hectares as forest (top row) and to farm three hectares (bottom row). The monetary value of the conserved hectares is donated to a conservation programme, and the monetary value of the farmed hectares is kept by the participant

no statistically significant differences with the level of agreement expressed by the participants of the three communities with the utilization and wardship HNRMs.

### 4.3 | Forest management game

#### 4.3.1 | Overview of results

Game theory would predict that a ‘rational self-interested actor’ would maximize their ‘individual utility’ (i.e. private benefit) by farming all six tiles (i.e. keeping the financial value of the tile for themselves), rather than conserving any of them as forest (i.e. donating the value of the tile to a forest conservation programme). Our data, however, do not support this prediction. We find that only 2.5% of the participants farmed all of their units of land in the five pre-PES rounds (baseline). In fact, participants conserved on average more than 40% of their forests, thus foregoing a considerable amount of their potential private benefit in order to instead donate this amount to the local forest conservation programme (Figure 6). As would be

expected given the introduction of an extrinsic incentive, in the PES phase, the average percentage of forest conserved increased even further, up to more than 55%.

Figure 6 also shows that in all three communities, the instrumental values-based PES framing (blue line) led to higher conservation in the PES phase compared to the relational values-based PES framing (red line). When PES were removed in Phase 3, conservation dropped back to their original levels in all but two treatment groups: in the Campesino community under an instrumental values-based PES framing and in Indigenous community under a relational values-based PES framing. The increase in the levels of conservation in Phase 3 in these two groups (relative to baseline established in Phase 1) suggests a motivational crowding-in effect.

#### 4.3.2 | Random effects model

In order to test whether these differences are statistically significant, we used a random effects model (Table 5). Given the differences in gender composition and education levels between the samples from the three communities (c.f. Table 4), we included these variables as covariates in the regression to see if they would have any effects on conservation levels. However, they do not appear to have any consistent effects. Table S3 includes another model in which we interact education with the 'PES phase' and 'Post-PES phase' to test this relationship further, but no significant differences appear and so we only present the model without the interaction for the sake of parsimony and ease of interpretation.

The coefficients in Table 5 can be interpreted as percentage changes in conservation relative to the baseline established in 'Phase 1: pre-PES' for a one-unit increase in the explanatory variables. As would be expected given the introduction of an extrinsic incentive for conservation, during 'Phase 2: PES', there is a statistically significant increase in conservation in all three communities under both treatments. When looking at the percentage change in conservation in 'Phase 3: post-PES', we can see that only two treatment groups experienced a statistically significant change with respect to the 'Phase 1: pre-PES' baseline: the 'Indigenous-Relational Values' (model 4) and the 'Campesinos-Instrumental Values' (model 5) treatment groups. This is also confirmed in Figure 6. In both of these cases, we therefore find evidence for motivational crowding-in.<sup>3</sup>

## 5 | DISCUSSION

We structure the discussion around four main findings: (1) conservation levels before the introduction of PES are relatively high, (2) the instrumental values-based PES framing induces additional conservation during the PES phase compared to the relational values-based framing, (3) there is no evidence of motivational crowding-out in any of the treatments after PES is phased out and (4) we find evidence of motivational crowding-in effects in two different communities under two different PES framings. We then close the section with

the implications of our findings for PES design, acknowledging the limitations of our approach and potential future avenues of research.

### 5.1 | Conservation levels before the introduction of PES are relatively high

The fact that during the pre-PES baseline participants donated a substantial part of their endowment to the local forest conservation programme despite having the opportunity to keep it all is not unique to this study (Figure 6). In a meta-analysis of more than 130 studies that used a similar type of experiment (known in the literature as 'dictator games'), Engel (2011) found that on average participants offered about 28% of their endowment rather than keeping the entirety for themselves. In our study, the average donation is higher than 40% in 'Phase 1: pre-PES', which is in line with the study by Kaczan et al. (2019), who found pretreatment donations of more than 35%. Furthermore, other studies that incorporated the use of PES in public good games found that in the pre-PES stage, the contributions to conservation were greater than 35% (Midler et al., 2015; Moros et al., 2017). The high levels of pre-PES conservation that we see in the experiment reflect what we find in the HNRM survey (Figure 5), which showed that participants from all three communities identified closely with HNRMs that position nature as being worthy of respect and care (e.g. *devotion, stewardship, wardship and ritualized exchange*).

### 5.2 | The instrumental values-based PES framing induces additional conservation during the PES phase

Other experiments have observed that relatively small changes in framing may have a significant impact on people's perceptions and behaviour (Chapman et al., 2019, 2020; Clot et al., 2017; Grillos et al., 2019; Liberman et al., 2004; Salk et al., 2017). In our case, the average level of conservation in all three communities during 'Phase 2: PES' was higher for the treatments with the instrumental values-based framing than the relational values-based framing, despite all other elements of the game being equal. This may be the case because the instrumental framing synergized better with the cash payments offered by the PES scheme, which are based on an instrumental value logic that commodifies ecosystem services. It is conceivable that an alternative PES design which offered in-kind rewards or social recognition rather than cash payments or rewards would have alternatively synergized better with the relational values treatment (Asquith et al., 2008; Drews et al., 2020; Grillos et al., 2019).

### 5.3 | No evidence of motivational crowding-out after PES is phased out

Despite the evidence of motivational crowding-out being frequently reported in the recent literature about PES (Rode et al., 2015), none of our six treatment groups exhibited reductions in conservation

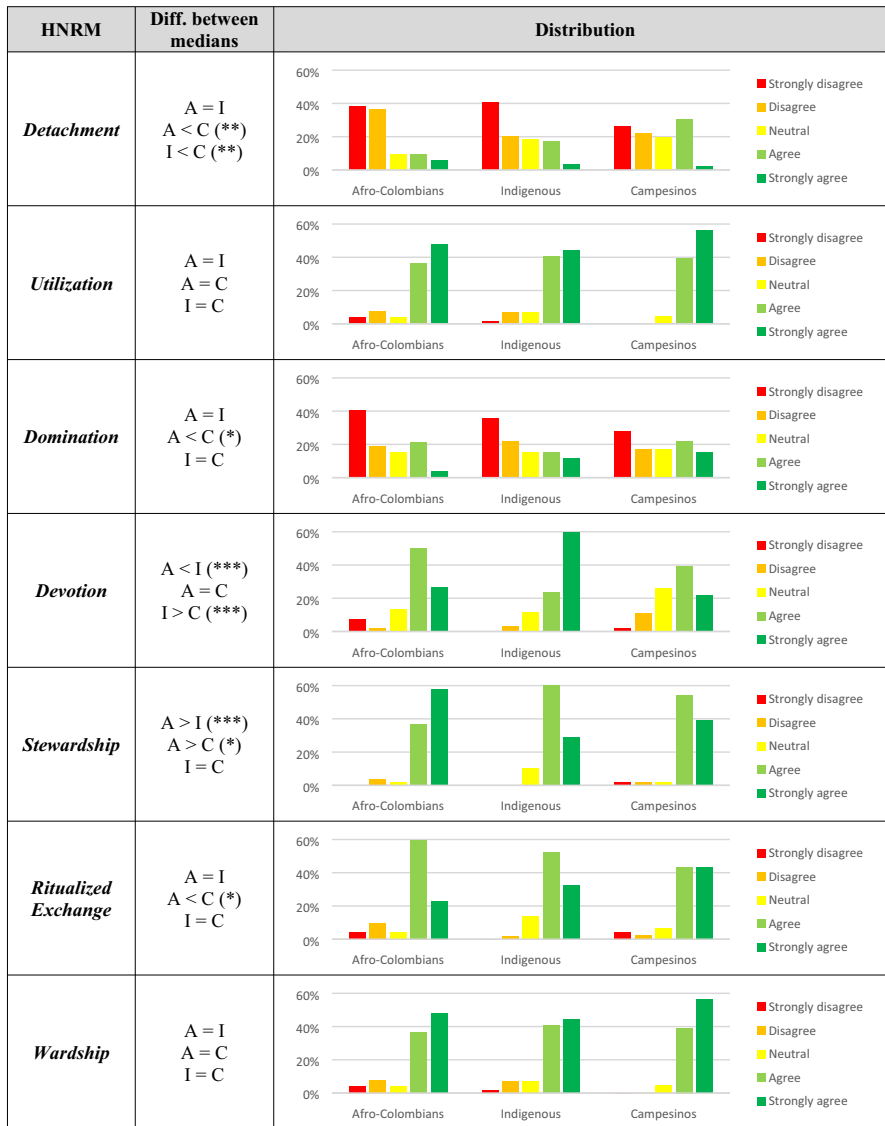
**TABLE 4** Socio-demographic characteristics (number or percentage of participants)

	Afro-Colombians	Campesinos	Indigenous
Num. participants per treatment			
Instrumental values	26	16	29
Relational values	26	30	30
Age			
<20	4%	13%	12%
20–29	29%	11%	24%
30–39	27%	18%	14%
40–49	15%	16%	24%
50–59	15%	22%	9%
60–69	8%	11%	10%
>70	2%	9%	7%
Gender			
Men	23%	61%	25%
Women	77%	39%	75%
Education			
Primary school not completed	13%	43%	36%
Up to primary school completed	10%	13%	14%
Up to secondary school completed	29%	35%	36%
Up to technical school or university	48%	9%	15%
Relative subjective income <sup>a</sup>			
0 (Poorest household in the community)	4%	4%	17%
1	8%	11%	15%
2	10%	11%	8%
3	6%	9%	10%
4	18%	11%	24%
5	29%	40%	17%
6	14%	7%	5%
7	4%	0%	3%
8	4%	7%	0%
9	0%	0%	0%
10 (Wealthiest household in the community)	4%	0%	0%

<sup>a</sup>Participants' monthly household income was elicited, but given that it was highly variable as it was tied to the varying market prices of the crops and to harvests which did not take place every month, a large amount of participants stated that they were unsure. However, when asked about their relative income compared to the other members of their community, they answered a lot more confidently, and so we opted to use this variable instead.

levels in 'Phase 3: post-PES' relative to the baseline established in 'Phase 1: pre-PES'. The absence of motivational crowding-out can be attributed to several factors. First, unlike more 'Wunderian' framings of PES (Wunder, 2005) which portray farmers as suppliers of ES for downstream ES users, both of our treatments framed conservation as benefitting the farmers themselves (either in relational or instrumental terms). As such, reminding participants of the different ways in which conserving forests was beneficial, not only for ES users

downstream, but also to themselves, may have incentivized continued conservation even when the PES was phased out. This could indicate that framing PES schemes in a way that effectively communicates to 'ES providers' that they too are 'ES users' could potentially safeguard against motivational crowding-out effects. This hypothesis could be tested in the future by comparing the effectiveness of a PES framed as benefitting downstream users to one framed as benefitting the ES providers themselves.



**FIGURE 5** Agreement with the Human-Nature Relational Models (HNRM). Notes: Difference in medians tested using the Mann-Whitney-Wilcoxon test. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ ; A = Afro-Colombian, I = Indigenous, C = Campesinos. '<' and '>' indicate that the median level of agreement is significantly smaller and greater, respectively, than that of another group. '=' indicates that there is no statistical difference between the two

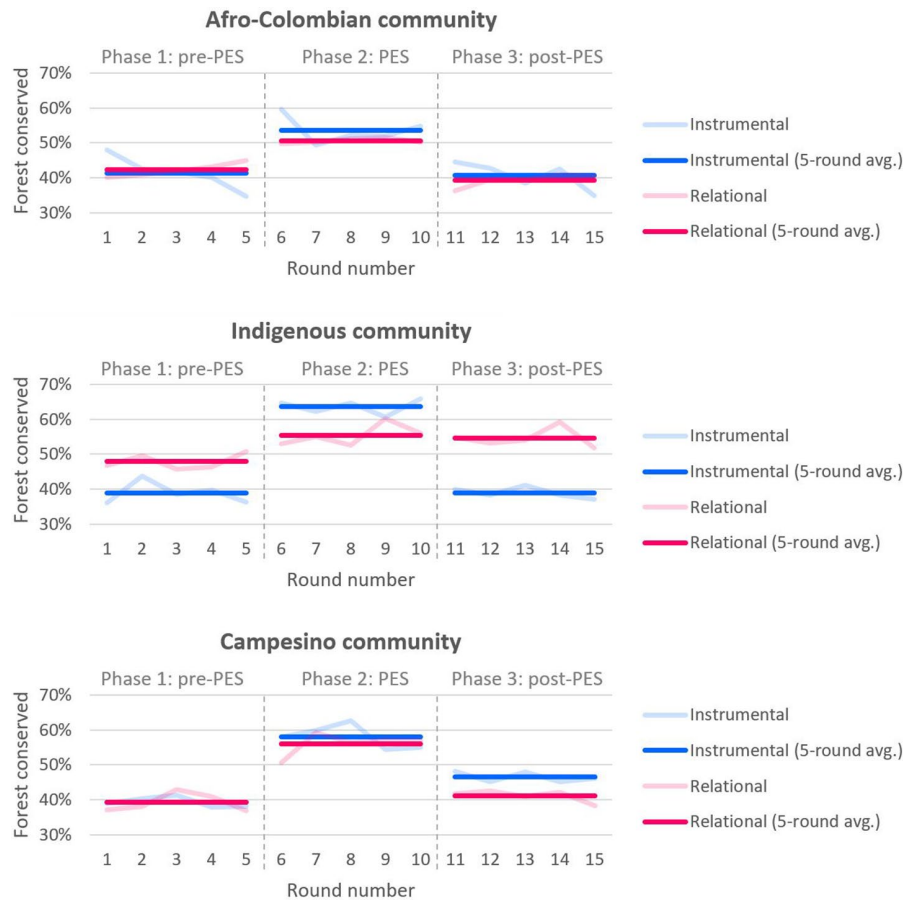
Second, all three communities expressed more agreement with the HNRMs of *stewardship*, *wardship*, *devotion* and *ritualized exchange* than those of *utilization*, *detachment* or *domination* (Figure 5), reflecting deeply rooted positive relationships of care with their respective territories, something which is unlikely to change in the short term, and which we hypothesize may also grant a certain resilience against motivational crowding-out, although this too should be further tested.

Third, given that all participants are the members of community-based organizations meant that the level of 'bonding social capital' (e.g. via social trust) and 'bridging social capital' (e.g. via networks) present in all three communities to address commons problems is relatively high (Ishihara & Pascual, 2009; Lang & Hornburg, 1998; Rodríguez & Pascual, 2004). This concurs with other experimental studies on motivational crowding which have found that it is possible to implement PES schemes without affecting pre-existing social capital and pro-social behaviour, as relationships of trust between PES participants can mediate the motivational crowding effects (Alix-Garcia et al., 2018; Andersson et al., 2018).

### 5.4 | Evidence of motivational crowding-in effects under two different PES framings

We observe the evidence of motivational crowding-in under the relational values-based framing in the Indigenous community and under the instrumental values-based framing in the Campesino community. We do not observe any effect of PES on motivational crowding-in in the Afro-Colombian community under either treatment. We use the framework in Figure 1 (adapted from Ezzine-de-Blas et al., 2019) to interpret these results. We attribute the motivational crowding-in effects, where it occurs, to the fact that these treatments framed<sup>4</sup> the values of and about nature in a way that activated pre-existing HNRMs and associated values,<sup>5</sup> thus leading to an increase in the satisfaction derived from conserving nature, and ultimately making the task more intrinsically rewarding (Fehr & Falk, 2002).

During the relational values-based framing treatment, we highlighted the cultural, spiritual and aesthetic values of nature as well as humans' connection to nature and their role in people's identities and sense of place. Additionally, during this treatment, we used



**FIGURE 6** Average percentage of forest conserved in each game round

several metaphors that highlighted the notion of humans as part of nature and collective/shared values such as *Buen Vivir* (good living), Territory and *Pachamama* (Mother Earth). As others have noted, these types of relational values may resonate quite closely with Indigenous communities' discourses and worldviews (Christie et al., 2019; Gould et al., 2019; Himes & Muraca, 2018). For example, the concept of *Buen Vivir* is rooted in the worldviews of many Indigenous peoples across Latin America (Escobar, 2011). Consequently, it is not surprising that the PES framing that highlighted these foundational relational values of nature had a greater effect specifically on the participants from the Indigenous community. In the results of the HNRM survey (Figure 5), we observed that the HNRM that received the highest score in the Indigenous community was that of *devotion*, an HNRM that emphasizes spiritual and sacred relationships between people and nature (Muradian & Pascual, 2018).

One might also expect that the relational values-based framing would lead to a similar motivational crowding-in effect in the Afro-Colombian community as they attributed the highest level of agreement with the *stewardship* HNRM of any group. We interpret the absence of a motivational crowding-in in the Afro-Colombian community as a result of the socio-demographic changes (see Figure 1: 'Personal context') taking place in the community, and the consequent loss of some of their ancestral customs and practices. The Alto y Medio Dagua Afro-Colombian community is located very

close to a national road that easily connects it with two important regional cities (Buenaventura and Cali). This, along with the presence of some local spas and water parks, contributes to the high levels of tourism in the area, which may have somewhat weakened community's traditional customs and ancestral cultural values (CCAMDA y Fundapav, 2012). This is reflected, for example, in the relatively low agreement expressed with the *devotion* HNRM compared to the Indigenous community. The relatively higher levels of education in the community may have also lessened the effect of our relatively short intervention.

The other treatment group in which we observed motivational crowding-in was under the instrumental values-based framing in the Campesino community. This framing may have resonated more closely with this community because it was centred around all of the tangible benefits that forests provide (e.g. wood, food, water, soil retention), including products that they would have to alternatively buy in the market if they were not available in the forest. The salience of instrumental values in the Campesino community is expected given the relative remoteness of their community compared to the other two (e.g. the nearest town with a market is an hour away). As such, the potential to lose access to the goods that forests provide may have carried an especially large cost for the Campesino community. Furthermore, the instrumental values-based framing of PES highlighted the potential gains associated with ecotourism development, a

TABLE 5 Random effects model showing changes in the percentage of forest conserved

	Afro-Colombians			Indigenous			Campesinos		
	Instrumental values-based framing (Model 1)	Relational values-based framing (Model 2)	Instrumental values-based framing (Model 3)	Relational values-based framing (Model 4)	Instrumental values-based framing (Model 5)	Relational values-based framing (Model 6)			
Phase 2: PES phase	0.122*** (0.021)	0.086*** (0.015)	0.239*** (0.025)	0.075*** (0.023)	0.187*** (0.025)	0.166*** (0.019)			
Phase 3: Post-PES phase	-0.007 (0.021)	-0.027 (0.015)	0.008 (0.025)	0.067** (0.023)	0.072** (0.025)	0.025 (0.019)			
Age	0.0002 (0.002)	0.007 (0.004)	0.001 (0.003)	0.0003 (0.002)	0.002 (0.003)	0.003* (0.002)			
Gender (1 = female)	-0.122 (0.089)	-0.051 (0.091)	-0.031 (0.076)	-0.079 (0.086)	0.012 (0.084)	-0.038 (0.057)			
Relative subjective income	0.027* (0.012)	0.004 (0.021)	-0.051** (0.018)	-0.023 (0.020)	0.022 (0.031)	-0.001 (0.013)			
Education	0.059 (0.034)	0.100* (0.042)	-0.032 (0.044)	0.118** (0.037)	0.063 (0.053)	0.086*** (0.026)			
Constant	0.265 (0.139)	-0.054 (0.240)	0.537** (0.171)	0.475** (0.154)	0.172 (0.243)	0.162 (0.130)			
Observations	390	375	405	450	240	420			
R <sup>2</sup>	0.134	0.164	0.258	0.056	0.205	0.194			
Adjusted R <sup>2</sup>	0.120	0.150	0.247	0.044	0.184	0.183			
F statistic	59.289***	72.181***	138.439***	26.475***	60.025***	99.552***			

Note: Standard errors in parentheses.

\*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001.

relevant economic prospect for the Río Bravo Campesino Community (CEPF et al., 2017). The results of the HNRM survey may also help to explain why this treatment resonated more with the Campesino community, as the instrumental values-based treatment partly highlighted the *domination* HNRM, which the Campesinos scored relatively higher than the other two communities.

## 5.5 | Implications for PES design

Framed field experiments represent a useful and relatively low-cost approach to explore how different types of policy designs may affect and alter people's behaviours. Any conclusions drawn should, of course, be contrasted with those derived by more resource-intensive methods (such as randomized control trials) given the inherent limitations of our methodology—for example, the unavoidable simplification of real-world complexities or the limited duration of the simulated PES programme in the game. Nevertheless, these experiments provide a valuable opportunity to gain on-the-ground insights that can inform policy design.

The overarching lesson derived from this study is the importance of tailoring PES design characteristics to the specific context where they will be implemented. In practice, the sustainability of many PES programmes continues to be constrained by top-down regulatory frameworks that seek to apply a one-size-fits-all approach across socially heterogeneous regions. As we see in this study, even within a small geographic area, we find three culturally distinct communities (Section 4.2) who react in different ways to the same PES design (Section 4.3). This study only offers a glimpse of the complex HNRM of each community given the limited time and resources that were available; however, many PES practitioners possess a wealth of knowledge about the communities in which they operate, which they can leverage to create bespoke PES designs that are adapted to and capable of synergizing with local cultures and worldviews. As shown by the growing motivational crowding literature, such tailoring is critical because PES have the power to fundamentally change people's intrinsic motivations and the ways in which they relate to their environment.

In this study, we demonstrate how relatively simple changes to the PES design, such as how the programme is framed when first introduced to participants, may have significant impacts on how they respond and modify their behaviour. We thus recommend that national and regional PES frameworks embrace the inherent flexibility of PES as a policy instrument (Engel, 2016) and allow on-the-ground practitioners to adapt PES designs to the particularities of participating communities. Engaging in co-creative processes with communities during the design stages of PES may help align these programmes with local worldviews, values and HNRMs, reinforcing rather than eroding pro-environmental motivations. Much can be learned through these participatory processes to inform PES design, including whether PES is the most appropriate tool for the situation in question. For example, in our experiment, all three groups of participants had high levels of social capital stemming from their

membership in community-based organizations. As we discussed in Section 5.3, we surmise that the high levels of trust among participants may have provided some resilience against the motivational crowding-out effects observed elsewhere in the literature (Rode et al., 2015). However, this also implies that PES may not be particularly well suited for communities with lower levels of social capital or where PES may lead to mistrust.

## 6 | CONCLUSION

Our results highlight that there is no single 'ideal way' to frame the values of nature in the context of designing PES schemes. Rather, we find evidence that suggests that PES schemes that are framed in a way that harmonizes with the ways in which local communities value and related to nature are more likely to cause motivational crowding-in, and thus to encourage higher rates of environmental conservation even after payments come to an end. We also find evidence that the effects of PES on motivations may depend on multiple factors such as personal characteristics (e.g. education), the presence of institutions that strengthen trust and pro-social behaviour (e.g. community-based organizations) and socio-economic considerations such as the high dependence of local livelihoods on nature. In this sense, PES should not be seen only as neutral policy instruments, but rather as institutions that are imbued with multiple meanings and that promote specific ways of relating to nature which unavoidably interact with pre-existing values, motivations and socio-economic contexts.

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### CONFLICTS OF INTEREST

U.P. is an Associate Editor for People and Nature, but was not involved in the peer review and decision-making process. The authors have no other conflicts of interest to declare.

### AUTHORS' CONTRIBUTIONS

All authors conceived the ideas and designed methodology; B.L. and S.M.-M. collected the data; B.L., P.A.-A. and S.M.-M. analysed

the data; B.L. and P.A.-A. led the writing of the manuscript. All authors contributed critically to the drafts and gave final approval for publication.

## DATA AVAILABILITY STATEMENT

Data deposited in the Dryad Digital Repository <https://doi.org/10.5061/dryad.1g1jwstxv> (Lliso, 2021).

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## ENDNOTES

- <sup>1</sup> For more information on the use of Q-Methodology in environmental research, see Zabala et al. (2018) and Sneegas et al. (2021).
- <sup>2</sup> In Table S1, we test if there are any socio-demographic differences between those assigned to the instrumental versus relational treatments in each community. We find no differences in any socio-demographic variables for the Afro-Colombian and Campesino communities. The only statistical difference we find is that the Indigenous participants in the Relational treatment perceive they have a somewhat higher income than those in the instrumental treatment. Otherwise, there are no age, education or gender differences between the treatments.
- <sup>3</sup> Table S4 includes the results of a separate Mann–Whitney–Wilcoxon test used to further confirm these results.
- <sup>4</sup> ‘PES scheme design and implementation: Framing’ in Figure 1.
- <sup>5</sup> ‘Moderators: Environmental relatedness’ in Figure 1.

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