



Coffee and Potato Agroecosystems: Social Construction of Spaces as a Concept to Analyse Nature's Contributions to People

Liliana Bravo-Monroy*

Independent Researcher, Bogotá, Colombia

OPEN ACCESS

Edited by:

Marie Stenseke,
University of Gothenburg, Sweden

Reviewed by:

Hannes Palang,
Tallinn University, Estonia
Mohammad Imam Hasan Reza,
Independent Researcher,
Chittagong, Bangladesh

*Correspondence:

Liliana Bravo-Monroy
libravo@yahoo.com

Specialty section:

This article was submitted to
Conservation and Restoration
Ecology,
a section of the journal
Frontiers in Ecology and Evolution

Received: 16 September 2020

Accepted: 03 February 2021

Published: 26 February 2021

Citation:

Bravo-Monroy L (2021) Coffee and
Potato Agroecosystems: Social
Construction of Spaces as a Concept
to Analyse Nature's Contributions to
People. *Front. Ecol. Evol.* 9:607230.
doi: 10.3389/fevo.2021.607230

Achieving goals for conservation and sustainability using nature, decision-making, and policy planning requires accurate modes of description to understand the relationship between society and the environment. Despite most planning strategies being constrained by policy objectives, planning is expected to be more participatory and inclusive of the plurality of values and all types of socio-spatial relationships. Based on Lefebvre's social theory, the objectives of this work are to propose a triad of spaces as a helpful framework to analyse nature's contributions to people (NCP), describe different spaces socially constructed by coffee and potato farmer communities in Colombia, and explore the implications for various kinds of decision-making. Using qualitative research methods, this manuscript describes three spaces: *lived spaces* as intangible spaces based on local, religious, and ceremonial values of NCP; *perceived spaces* include farmer spatial organization according to the ties of kinship and the downward course of streams, the incidence of negative NCP, such as plant diseases, and types of management crops; and *conceived spaces* as the overlapping of different spatial views of territorial planning. Given that NCP has great potential to integrate diversity of values about nature and cultural contexts into decision-making, the triad of social spaces offers a spatial dimension to the analyses of NCP. Lived spaces make non-material NCP and non-instrumental values more visible. Perceived spaces highlight material NCP and regulating NCP with the view that maintenance of NCP in the future is essential for relational and instrumental values, e.g., how material NCP and regulating NCP of landscapes are perceived and by whom. Conceived spaces emphasize the predominance of the intrinsic biophysical values of NCP. Thus, the triad of social spaces as a conceptual framework can be useful in the operationalization of NCP in environmental management, the governance of schemes, and the implementation of land-use plans at the local scale. By thinking of these spaces relationally, such insight can inform and enhance decisions and policymaking about the value of places toward the priorities of meeting management. The results of the study emphasize the important policy implications of recognizing *lived* and *perceived* spaces in decision-making and highlight the role of NCP in facilitating the communication of these spaces to support spatial management of land use.

Keywords: farmer constructs of nature, Lefebvre's spatial triad, land-use planning, local scale, mountain landscape, nature's contribution to people, plural values of NCP, socio-spatial relationships

INTRODUCTION

An important and yet unresolved question in land-use planning is how best to manage nature and their associated contributions for individuals and society to ensure a good quality of life. One key issue seems to lie in the need for more plural and grounded ways of understanding landscapes and land uses in environmental policy and management. Nature's contributions to people (NCP) have emerged as a framework for integrating a range of values, benefits, and occasional losses that people obtain from nature (Pascual et al., 2017), i.e., the contributions, both positive and negative, of living nature (diversity of organisms, ecosystems, and their associated ecological and evolutionary processes) in terms of the quality of life of people (Díaz et al., 2018). There is potential to mainstream NCP through integration into planning approaches to enable fairer and more effective societal engagement in sustainable land management and biodiversity conservation, but these have not yet been fully analyzed in either research or practice. This study demonstrates how NCP may contribute to building a more holistic and heterogeneous view of decisions about land use by including diverse, even divergent, instrumental and non-instrumental relational values about nature beyond allocating land to various uses. To do this, this study integrates the NCP framework with Lefebvre's conceptual triad of social spaces (1991) to examine how the space acquires meanings and values and disentangle the importance of multiple "living relationships" that people maintain with places (Basso, 1996), including power relations among people. Thus, it highlights how land is imbued with cultural values (Turner, 2005) and the dynamic, changing, historical, and dialectical people-place relationships (Cronon, 1985).

The NCP framework parallels Lefebvre's conceptual triad on ensuring broader inclusiveness in terms of scientific knowledge, including humanities and social sciences, and other knowledge systems, such as those held by indigenous peoples and local communities. Briefly recapitulated, the three dimensions of the triad are the following: *Perceived space* (physical) is the real material space of geographic locality, which is seen, generated, and used; *Conceived space* (mental) refers to conceptualizations linked to theories, knowledges, mental concepts, and abstractions about space; and *Lived space* (social) is an experienced space, i.e., emotional sensations, stories, and cultural expression, and it is lived through associated symbols and images.

In the context of addressing NCP in land-use systems at global and continental scales, global modeling of NCP (Chaplin-Kramer et al., 2019) have shown for water quality regulation and crop pollination that up to 5 billion people will face higher water pollution and insufficient pollination for nutrition under future scenarios of land use and climate change by 2050. In the case of global land and agri-food sectors (McElwee et al., 2020), 40 different options were examined, implemented through land management, value chains, or risk management, for their relative impacts across 18 NCPs and 17 sustainable development goals (SDGs). For instance, the use of local seeds benefitted 11 NCP, such as the regulation of organisms detrimental

to humans, learning and inspiration, pollination, supporting identities, etc. Interventions, such as agroforestry, integrated water management, and improved cropland management, showed positive synergies with both SDGs and NCP with no significant adverse trade-offs. On the other hand, by analyzing the IPBES Europe and Central Asia Assessment, a set of social-ecological indicators associated with the relational values of NCP were identified as contributing to a meaningful life, e.g., security and sovereignty, health, equity and justice, heritage, identity, and stewardship (Schröter et al., 2020). Furthermore, policy implementation of NCP was examined by conducting a survey with IPBES European national delegates (Keller et al., 2018), and results showed policy areas where uptake and implementation of NCP concepts has been included at a national level: these were mostly protected area (PA) management and land-use planning and occasionally community planning.

At regional and subnational levels, NCP have been examined in diverse land system processes. Regarding forest landscape restoration, land sparing and land sharing have been considered as complementary strategies and have embraced the concept of NCP as a broader and inclusive approach by their intrinsic biophysical and socio-cultural values. This broadens the possibilities for quantifying the benefits of landscapes (Latawiec et al., 2018). Furthermore, combining social media and Earth observations has been proposed to aid in the cost-efficient monitoring of NCP, e.g., cultural contributions relying upon landscape variables according to the natural and cultural values of two biosphere reserves (Vaz et al., 2020). On the local scale, the need to make conservation fairer is argued for in the belief that the equity of PA management and governance could shift focus from greater NCP of PA and towards human well-being and improved conservation (Franks et al., 2018). Thus, addressing land-use systems requires us to analyze social-ecological trade-offs and synergies by focusing on the perspective of NCP in cases where the worldviews of stakeholders are highly diverse and where relational values are important guiding principles of land use (Ellis et al., 2019).

Given the above statement, those studies show that despite the growing popularity of NCP, there is an implementation gap between NCP as an objective to support a good quality of life and the capacity to influence the decision-making by addressing broader core values of local people relevant to land planning, management and governance. There is a growing community of scientists advocating for more plural valuation that integrates the diverse values of (and about) nature into decision-making and action (e.g., Zafra-Calvo et al., 2020). In such situations, determining what constitutes a place and the identifying those related to a place (locals) have been proposed as key issues in the field of relational values in landscape research (Stenseke, 2018). This study expands on previous research by analyzing the plural values of NCP into local farm spaces and determining the crucial role of values guiding the way farmers make sense of their places. While there is a large body of literature that discusses cases from indigenous people, our focus is on farming communities with long-term, place-based relationships (Altieri, 2004), which demonstrates that the issue of landscape planning at a local scale is far more complex than the usual envisage of planners.

Given that the framework of NCP has the great potential of integrating diversity of values about nature and cultural contexts into decision-making, the objectives of this work are to propose the triad of spaces as a helpful framework to analyse NCP and their associated values; describe the spaces socially constructed by coffee and potato farmer communities in Colombia, based on values people assign to NCP, namely relational, instrumental, and intrinsic values; and explore the implications for decision-making. In doing so, this study seeks to offer a new perspective on the spatial view of NCP for use in landscape planning of rural areas, as well as communicating the values of NCP for increasing public awareness and action among various kinds of decision-makers.

METHODS

Case Studies

Colombia is the world's second richest country in species and the first one in birds and orchids (Biodiversity Information System of Colombia, 2020). The Andes mountain ranges of Colombia are a part of the most diverse hotspots in the world for species richness and endemism (Conservation International, 2020). Two cases were analyzed in two mountain villages on the eastern range, namely Ocamonte (coffee producer zone, Santander area) and San Pedro de Iguaque (SPI) (potato producer area, Boyacá area). The reason for selecting cases from two different rural settings is 2-fold. The first reason involves including contrasting and complementary NCP in order to capture diverse social groups and agroecosystems. The second reason involves cases that would represent a variety of key actors, community leaders, agricultural technicians, and smallholder farmers, which enables us to develop a better understanding of how the values of a range of farmers influence the landscape practice of farmers involving different NCP.

Coffee from Santander has become recognized for distinctive flavors related to its growth under a canopy of shade trees (Federación Nacional de Cafeteros de Colombia, 2020a). These agroecosystems are important as a refuge for biodiversity and the provision of relevant NCP, such as pollination, habitat maintenance, and supporting identities. Colombia is the world's third largest producer of Arabica coffee after Brazil and Vietnam (International Coffee Organisation, 2020a). More than 540,000 coffee farming families depend on this crop for their household income, of which 95% have <5 ha (Federación Nacional de Cafeteros de Colombia, 2020b). While coffee farming is highly vulnerable to market volatility, the spread of coffee pests, and weather events, the COVID-19 pandemic seems to have aggravated the price fluctuations of coffee (International Coffee Organisation, 2020b). The second case study was conducted in SPI, a place that consists predominantly of a tropical high mountain ecosystem (*Páramo* ecosystem). *Páramo* plays a fundamental role in maintaining high levels of biodiversity and the lives of people, providing essential NCP, such as regulation and the supply of water. Boyacá area covers the highest number of *Páramos* in Colombia. Potato agricultural expansion, livestock, and mining are regarded as a serious risk to *Páramo* conservation (Morales et al., 2007). Boyacá covers 20.7% of national potato

land use, while Santander comprises 6% of national coffee land use. Small-scale farming (farms with <5 ha) represents 73.2% of farms in Colombia (Departamento Administrativo Nacional de Estadística, 2014). Villagers are non-indigenous, and most have lived in the same area for generations. Family is the primary source of labor, although most small-scale farmers employ day laborers at harvest time. More than cash crops, coffee, and potato represent the production schemes of familiar economy around which rural communities have developed identities, knowledge systems, and strong sociocultural ties.

Data Collection—Ethnographic Methods Semi-structured Interviews

The empirical data were collected through intensive fieldwork in the years 2005 and 2010 in SPI and Ocamonte as part of two research works involving smallholder farmers. Two groups of semi-structured interviews were conducted with 37 key informants. About 23 potato smallholders were interviewed in SPI and 14 coffee smallholders in Ocamonte. Given the territorial organization of the countryside in *veredas* (several farms are grouped into *veredas*), respondents were chosen according to their belonging to similar *veredas*. Farmer selection did not seek representation by people in each community. Rather than representing the whole population, the selection of coffee farmers was based on farms with usual agricultural management in the zone (i.e., organic and conventional coffee farms). Regarding potato growers, interviewees were selected according to the location of their farms on *veredas* belonging to a watershed with a common set of lagoons, streams, and rivers that drain into a larger river. However, the saturation of diverse viewpoints was not reached during dialogues. Despite differences in time (2005–2010) for conducting the respective field works, both study sites show commonalities in terms of Andean farmer communities and the values and meanings associated with land spaces. Both fieldwork phases were part of the Master and PhD theses of the author, respectively. Informed verbal consent was obtained from all participants before the study began. This work did not undergo a full ethics review carried out by an ethics committee because the research conformed to the ethical standards set out by the respective university, and the issues were not particularly complex or high-risk.

The interview protocol was designed to collect detailed qualitative information on themes related to beliefs and attitudes about farms and agroecological practices, their daily routines, and the role of institutions (i.e., Coffee Grower Federation, certification agencies, cooperatives of farmers, the National Park) in promoting specific practices by providing incentives. Questions were flexible in the sense that farmers could provide further explanation in the case of in-depth information. The questions were comparable across different local contexts, while also accommodating site-specific differences. From 14 interviewees in Ocamonte, 6 produced organic coffee and were members of a cooperative, whereas 6 were non-members and grew conventional coffee by using agrochemicals. Two further organic producers were interviewed for their leadership role in the history of organic coffee farming. In contrast, the totality of potato farmers interviewed and applied conventional methods

of crop yield. It was the predominant agricultural system in SPI. To triangulate institution-related data reported by farmers, two agronomists of the Colombian National Coffee Growers Federation were also interviewed. The sample of interviewees ranged in age from 18 to 80 years old with 23 male and 14 female respondents (15 male and 8 female interviewees in SPI; 6 female and 8 male interlocutors in Ocamonte), who were interviewed in Spanish.

Participant Observation

Participant observation entails a form of ethnographic observation, one of several qualitative field methodologies used to understand the culture and structure of farmer communities (Fine, 2015). It involved the first-hand observation of daily activities related to crop management practices, farmer meetings and purchases at sale points. Several meetings of the cooperative of farmers were observed in Ocamonte. In these meetings, notes were taken about the positions, discourses, and discussions regarding the management of crops. Furthermore, informal dialogues were conducted with farmers, agricultural technicians, and local market agents. Close attention was paid to keeping and analyzing field notes describing the relationship between the sociocultural behavior observed and the biophysical environment. Field notes were the primary way of capturing the data that was collected from participant observations. Notes taken to capture data included records of what was observed, including informal conversations with participants, records of activities, farming practices, and ceremonies (Guber, 2001).

Data Analysis—Content Analysis

After collecting and transcribing the data, content analysis (Páramo, 2018) was undertaken to understand the spaces socially constructed by coffee and potato farmer communities. The interview texts and observations were qualitatively categorized into different groups based on objectives. Thus, each cluster of information was coded to identify key themes related to the people-environment interface and potential cognitive relationships between data variables.

A complete reading of each text was carried out through the characterization of farmer—space relationships. Based on that characterization, reading themes and topics were identified, which seemed to be common across the texts. A coding sheet was developed based on those themes, which were used to analyse the entire information. The written material was accordingly coded by the use of terms or phrases, facilitating a systematic analysis of text to interpret data about human thought and behavior related to social agricultural spaces and values that people assign to NCP. Thus, content analysis rapidly identified co-occurrences of different concepts (Ekstrom and Young, 2009) and connections between them.

A deductive analysis of information was also performed to examine the research questions by searching all forms of the words “farm,” “coffee,” “potato,” “land,” “water,” “organic,” “conventional,” “landscape,” “importance of,” “benefit of,” “meaning of,” “beliefs,” “experiences,” “personal and collective events,” “community,” “utility,” and related words. Data were organized into matrix tables by groups and themes, offering a

detailed examination of the data. It allowed the identification of key subjects and looking for ideas about new hypotheses and themes that could emerge, as well as an examination of potential links between topics. **Figure 1** sums up the ethnographic methods and the way of collecting and analyzing information.

RESULTS

Coffee Social Spaces

Lived Spaces

The local history of coffee growers is localized and revealed in their land use since the 1960s and 1970s when land transformation took place from forests to shaded coffee. Non-material NCP from farms are experienced by growers since then as sacred spaces where production modes cohabit with religious symbols of Christianity (e.g., crosses of different size with or without flower ornamentation). These material signs are usually put on the coffee fields in order to entrust prosperity to God, especially at the early phases of growth. The following quotes refer to relational values as emotional attachments attributed to land: [Coffee is] “*The best future we have sown...*” “*That is the art we know...*” Land is considered sacred by farmers: “*land is a great God blessing,*” “*land is primordial, is everything,*” “*is our life,*” “*is like a woman, a mother who has to be cared for,*” and “*the biggest treasure.*”

Farm-lived spaces also embody the social relations of production. During coffee harvest time, farmers express relational values based on principles of reciprocity and solidarity to fill the labor shortage. Farmers engage in reciprocal labor exchanges between family members and neighbors. An example of this would be an entire household helping to pick coffee by hand in the plot of a relative, such as a nephew, over the course of a week. The following week that nephew and his folks return the same time of work to the head of the household. On the other hand, the economic roles of men and women differ from day to day and are motivated by instrumental values. Off-farm employment is common for husbands and any children that are now adults, whereas wives work in their own farms, administer home finances with coffee profits, and ensure care and food provision for family members and coffee workers. Thus, communal work relations are the norm, and according to farmers, coffee has generated equity in terms of benefits to everybody, owners and workers included.

Perceived Spaces

The size of production spaces is dynamic and changing due to family inheritance and the purchase and sale of land. Family groups are neighbors with different ties of kinship. Here, regulating NCP such as the formation of soils are perceived by farmers: “*A good coffee land does not require the use of synthetic fertilizers*” whereas a “*deteriorated land has become accustomed to those inputs and therefore is now exhausted.*” Moreover, agricultural institutions played a key role in augmenting the area of coffee land use from the 1960s onwards as well as in the entry into organic production from the year 2000. One of the most important consequences of adopting organic practices was a sharp decline in coffee yield during the period of transition (up to

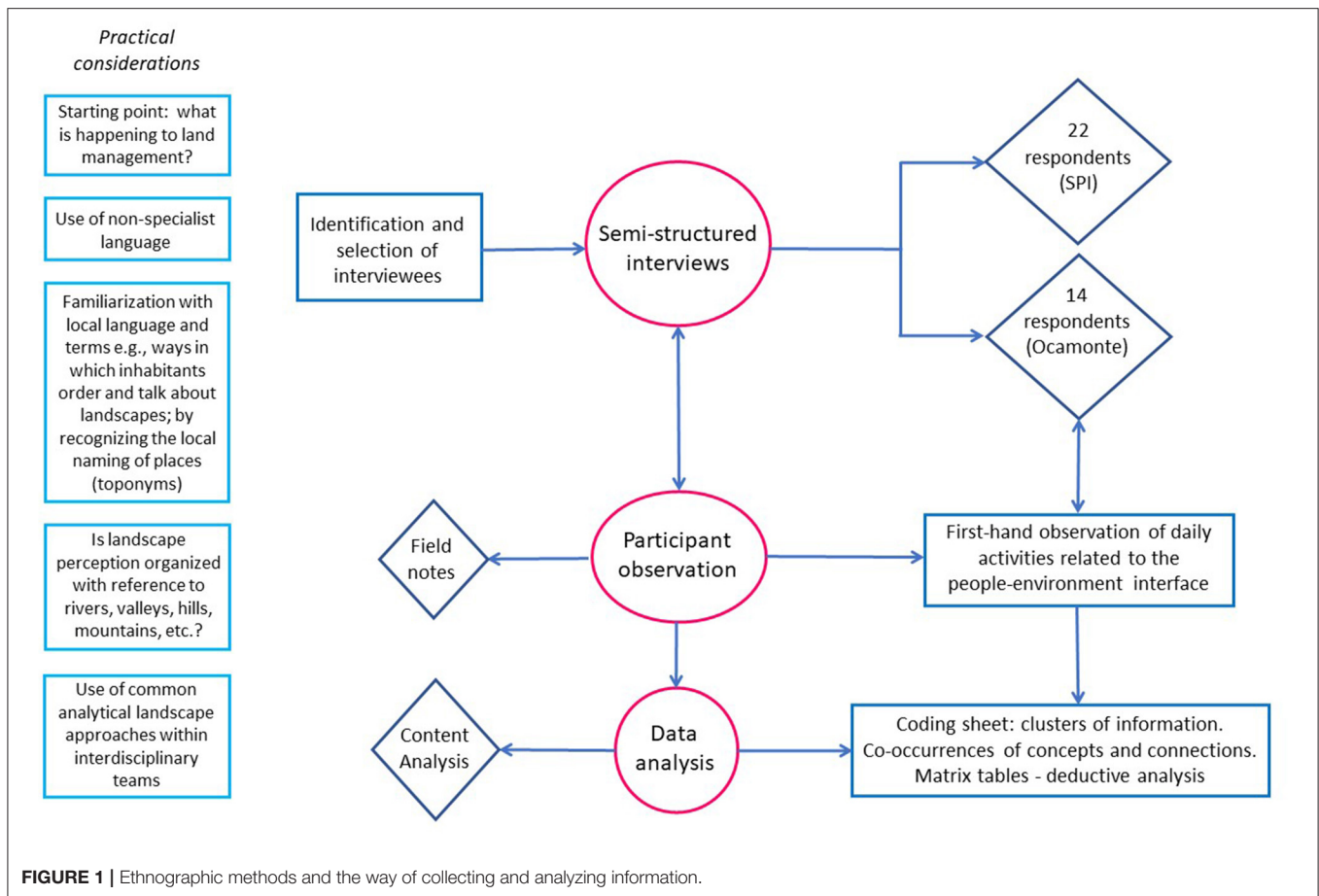


FIGURE 1 | Ethnographic methods and the way of collecting and analyzing information.

3 years) to get the certification. Apart from unsatisfactory benefits received (i.e., discouraging monetary incentives) and several farm requirements, the reduction on coffee yield discouraged many farmers to opt for organic certification. In this regard, one woman elaborated on an interesting metaphor with a more personal sense of relational values: “...As a result of the organic fertilization, there was a steep decline in coffee production: an abrupt change in plant nutrition from chemical inputs to organic materials. A plant that was accustomed to agrochemicals must be now nourished with hen manure. [That situation is comparable to] a baby fed with breast milk and is suddenly fed with solely mineral salts. The child will look skinny. It was similar to coffee plants; they adopted a scrawny aspect before becoming accustomed to organic conditions...” (female respondent, ~45 years old).

In line with the above statement, local knowledge is associated with agricultural practices and regulating NCP. For instance, coffee growers pile leaves and uprooted vegetation (“*majada*”) around their coffee seeds and plants because “*majada cares for seedlings and soil.*” They have accumulated agronomical experience that this practice favors the growth of coffee plants. They do not pursue their representation further to determine if it is indeed a decaying plant material and not some other consequence of their practice that makes the coffee thrive. But the image of representation that they use seems perfectly adequate in motivating their mulching practice

(It parallels a common feature of Barth, 2002). Thus, the notion of care and nutrition of seeds and land emerges as a relational value of what farmers find meaningful about agricultural management.

Conceived Spaces

Farmers assign instrumental values to material NCP in two significant ways, (i) Livelihoods: coffee provides people subsistence and occupation largely because its production supports local familiar economy. The following expression shows it: “Coffee goes down to the market on Sundays and family vital supplies, in turn, go up to home” (female respondent, ~65 years old). (ii) Written and spoken signs: it involves top-down processes in varied forms such as certification scheme regulations; certification seals; conventional management strategies; coffee crop guidelines; certification farm notebooks; organic management campaigns; and rumors related to production levels from certified neighbor farmers and coffee management plans that ignore forested patches on the surrounding area.

Another interesting finding is that, although child labor is banned in coffee farms by Fair Trade standards, it threatens to undermine the relevance of intergenerational learning of coffee tradition. In this regard a farmer states: “...Childs are curious about coffee plants but sometimes we prefer avoiding

their involvement, mainly because cooperative norms...” That prohibition reinforces the idea that next generation of farmers adopt an urban lifestyle by underestimating their own role as coffee farmers. A farmer commented: “... *Our children deserve better future than ours*” (female respondent, ~45 years old).

From the point of view of certification agencies and agronomists, intrinsic ecological values of shade coffee are also important. Researchers have found in the Santander region that coffee plantations with dense shade cover (>80%) favor conservation of night monkeys and other arboreal mammals. It has to do with observations of monkeys spending significant amounts of time in coffee plantations. Certified conceived spaces tend to prioritize a set of values associated with farms and thus can become a source of disagreements with farmers.

Potato Social Spaces

Lived Spaces

The *Páramo* ecosystem regulates the flow and quantity of freshwater used for different purposes. Results also revealed that this NCP embody symbolic relational values with two natural entities. First, the San Pedro lagoon, located on top of the mountain, is considered the birthplace of the Muisca indigenous ancestors. The lagoon also evokes significant memories like the transfiguration of indigenous communities into gilded intangible figures (*Encantos*) as a direct consequence of the Spanish conquest. Establishing interconnections between sites, *Encantos* walked across the landscape and water streams moving either upriver or downriver.

Farmers emphasize that *Encantos* are currently a rare occurrence in the camp due to water scarcity by pollution and the loss of trees on forested watersheds. Additionally, everyone who visits the lagoon must show proper respect for the sacredness of the place, as the lagoon was in earlier times overcome by a feeling of anger against people who “*treated her with disrespect*.” Many years afterwards, the lagoon was tamed by Christian priests. Second, near it, down the mountain, appears in the landscape a second place: “El Molino” stream, where several watercourses connect and flow downstream as a single river. This place is charged with historical tales of personal and cultural values. Here, indigenous ancestors created new settlements and used a big stone pounder to grinding maize (by harnessing water flow as the driving mechanism). There are also vestiges of a catholic church in the same place and an antique site for funerals. A farmer recalled “... *Muisca indigenous people lived therein; they ground maize by using a big stone grinder in order to distribute among families for food and cooking...*”

Crucially, indigenous memory has also survived in the Spanish spoken by rural communities (and urban population) via lexical units derived from Muisca ancestral language. It entails experiential interactions with material NCP guided by immaterial values. The lexicon indicates the names of places, plants and animals such as the following examples: “*Iguaque*” (vigorous mountain); “*chucua*” (swamp or wetland); “*chisgua*,” “*chugua*,” “*cubios*,” “*ruba*” (Andean tubers); “*chiso*,” “*chitacá*,” “*chusque*,” “*curuba*,” “*fique*,” “*gaque*,” “*guaba*,” “*guaca*,” “*guasca*,” “*quiche*,” “*suica*,” “*uchuva*” (plants, trees, and shrubs); “*caica*,” “*chisga*,” “*tingua*” (birds); and “*chuchas*,” “*faras*” (small mammals). Thus,

language connected to the place represents a vital vehicle for humans to elaborate, maintain, and transmit cultural values and linguistically-encoded environmental knowledge about local seed use, which in turn preserves local landraces (which directly leads to the NCP “Maintenance of options”).

Potato lived spaces are also occupied by the division of labor, social practice, and instrumental values. Women play a central role in home economies by administering finances provided by milk production and potato profits as well as ensuring care and food provision. Men tend to specialize in potato crop work and livestock on one or the several nearby farms, and women tend to conduct unpaid work in the family farm.

Perceived Spaces

Potato production and small-scale livestock with a few heads of cattle support familiar economy. Values associated with these material NCP involve utilitarian preferences based on practices such as conventional farming with the use of pesticides, fertilizers, and herbicides, as well as water supply systems. The latter includes communal aqueducts, reservoirs, basic channels of conduction, and hosepipes. A farmer commented: “*When I arrived here, there was not water distribution systems. We had to find water directly into the groundwater reservoir. Adults and children collected water by using bottles and barrels at early morning and the end of afternoons...*”; “... *Several years later we made channels directly on the ground for the flow of the water. We carefully noted a marked decline in water supply in the past 30 years. As a result, people installed pipelines on the ground. Now you can see many pipelines around houses...*” (male respondent, ~70 years old).

Extended family is organized around a nuclear family following a spatial pattern in the shape of a nest. Farmers assign instrumental values to the *Páramo* ecosystem as a source of water and suitable land for potato cropping. Here, their notion of *Páramo* includes broader areas than those considered by planners or scientists. Description of the landscape appears to be primarily topographic (e.g., water reservoirs up/ houses down; *El Páramo* up/farmers down; the river that goes down “*Río Abajo*”; mountain or hilly land “*El Cerro*”), and the naming of places is primary (the river that comes from the mountain “*El río que viene del Cerro*”). Generally, those names differ from terms used by official planning maps. Several farmers ascribed the instrumental values of land for economic exploitation, alluding to some interpretations of Christian Bible. Statements reflecting those values include the following: “*The majority of land used for potato cropping here is for human consumption. That resources can be exploited. According to the book of Genesis [the first book of the Bible], humans have been created to have dominion over this land to till it and keep it.*” These versions have put humans as masters of nature with a profound impact on landscape transformation.

Conceived Spaces

Material NCP and regulating NCP embody different spatial relationships with places. In this way, a range of values can be expressed in the overlap between three institutional spaces in the area. First, intrinsic biophysical values are promoted in decision-making by the National Natural Park; second, instrumental

and biophysical values influencing management decisions are encouraged by a regional government from the perspective of a river basin; and, finally, instrumental and relational values have an influence on governance are conveyed by the municipality based on the groups of farms (*Veredas*).

The spatial overlap of institutions is particularly relevant because it shows different perspectives of *Páramo* and landscapes in practice: first, a conception of *Páramo* larger than that conceived by external officers, namely the top of the mountains; second, a vertical approach to landscape based on the downward course of streams. By contrast, foreign planners and managers are determined by mental constructs of *Páramo* based on the biophysical values with scientific terminology. The latter is focused on horizontal stripes of vegetation layers that occur between the upper limit of closed-canopy forest and the upper limit of plant life. Hence, a horizontal approach to landscapes co-exists with a vertical approach perceived by the view of farmers.

Some institutions (e.g., municipality, banks, and agricultural organizations) have fostered the production of farm spaces through economic values, payment in-kind, and the promotion of agricultural practices, while other institutions (e.g., the National Park) have played a role in allowing and constraining the level of access to natural resources, by emphasizing intrinsic ecological values. Thus, applying the NCP lens can help to foreground potential conflicts between values connected with water. For example, a farmer stated the following: “... *With newer water distribution by pipelines, people say that [the National Park] does not give permission for groundwater extraction. One agrees with the fact that [they] protect forests, hills (...) but... if they ban [water access] ... That [situation] is grave... The National Park is beneficial to the conservation of our woodlands, but if they will prohibit water access, that's terrible!... The hill is ours, of all of us...*” (male respondent, ~65 years old).

Contrast Between Farmer Social Spaces

The above stated sections show how the values of NCP shape the environmental relationships of a farmer, which in turn form lived, perceived, and conceived spaces. How NCP from farms and landscapes are perceived by growers, certification agencies, agronomists, and institutional actors reveal that values play a key role in shaping place-based relationships that ultimately guide local management. As results show, although the same NCP can be valued instrumentally and relationally, those values are the key determinants of the social space. It is important to note that lived spaces make more visible non-material NCP and cultural relational values. Personal events and experiences of coffee farmers converge to give individuals a sense of place and a belonging, which is significant in engendering emotion and affect. In contrast, symbolic values associated with indigenous imagery are noticeable in potato farmers.

Perceived spaces reveal similarities in terms of spatial organization according to the ties of kinship. The predominance of instrumental and relational values of material and regulating NCP is particularly significant in relation to the management of crops and communal aqueducts. Conceived spaces show the prominence of management plans expressing mostly intrinsic ecological and instrumental values. These plans are

often conceptualized by external institutions, whose different spatial views of territorial planning overlap not only between rural institutions but also with a variety of farmer spaces in the same area, with all their concomitant effects and potential conflicts. The space thus embraces a multitude of intersections based on vertical and horizontal approaches to coffee farms and potato agricultural landscapes. For an overview of the core values specific to the relationship between farmers and their spaces, values elucidating the meaningfulness of NCP in the two studied communities (see **Tables 1, 2**).

DISCUSSION

This article analysed two case studies to show how diverse values ascribed to NCP delineate social spaces based on place-based relationships. Three types of themes can be distinguished from the link between NCP, social relations and land systems: (1) landscape, (2) conceptual, and (3) methodological approaches.

Landscape Approach

The findings from this study highlight spatial heterogeneity characterized by the following attributes: vertical and horizontal arrangements of organic coffee farms and potato agricultural landscapes (conceived spaces in **Tables 1, 2**); kinship communities determining a spatially nested structure of several farms; and a vertical approach to landscapes based on the downward course of streams and a “disorderly aspect” of conventional coffee plots (Perceived spaces). Those systems of spatial management are guided by instrumental values (e.g., market-oriented views and coffee yields), intrinsic ecological values (e.g., lists of species diversity, water regulation), and relational values (e.g., equity, place attachment, solidarity, reciprocal labor exchanges, local water sovereignty). In gaining an understanding of the values of NCP underlying a spatial management, this research provides more insight into the way values form the basis of environmental management. Featuring the plural values into spatial planning presents an intellectual challenge to decision-makers and stakeholders in the pursuit of a holistic approach to environmental management (Fache and Pauwels, 2020; Zafra-Calvo et al., 2020).

There is growing evidence for the importance of NCP in mountains (Martín-López et al., 2019) by showing that NCP have become more policy-oriented over time, mainly in relation to institutional responses associated with PAs and market-based schemes, as well as informal institutions, such as community-based management. The consideration of small-scale farming of coffee and potato confirms the relevant role of local communities in mountain land management of South America. Through analysis, this research also identified the key role of reciprocity and redistribution as relational values in perceived spaces of the agricultural systems, concurring with Jones and Tobin (2018) who found that those principles are motivated by either relational or instrumental values that coexist in farming. Moreover, coffee farmers perceive that NCP can take the form of contributions to cultural identity. These results are in accord with relational

TABLE 1 | Coffee farming (*Coffea arabica* L., Rubiaceae).


Lived spaces		Perceived spaces		Conceived spaces	
NCP	Values	NCP	Values	NCP	Values
Physical and psychological experiences	Social cohesion (<i>Rel.</i>) Physical, mental, and emotional health (<i>Rel.</i>) Sacredness and devotion to land (<i>Rel.</i>) Religious value—ceremonial connectedness (<i>Rel.</i>) Emotional attachment (<i>Rel.</i>) Harvesting coffee makes a good life and upholds traditions (<i>Rel.</i>)	Habitat creation and maintenance	Redistribution of equitable outcomes, benefits and tasks (<i>Rel.</i>) Respect and care for the land (<i>Rel.</i>) Relatedness (<i>Rel.</i>) Spatial structure by kinship communities (<i>Rel.</i>) Ways of life: a 'disorderly aspect' of the plot (<i>Rel.</i>)	Habitat creation and maintenance	Ecological and biophysical values: agroecological processes, species diversity, pollinator diversity (<i>Intr.</i>) Commitments and responsibilities to grow coffee trees under organic certification schemes (<i>Rel.</i>) with differences found at different heights in the agroecosystem (vertical structure). Tree boundaries and weeds are found toward the edge of plots, whereas coffee plants and shade trees cover the edge-center area (horizontal structure). Plots are laid out in a grid pattern
Supporting identities	Cultural identity, sense of place, sense of belonging, place identity. Worth of fame and prestige. Reciprocity and solidarity (<i>Rel.</i>)	Food and feed (coffee beans)	Monetary benefits: livelihoods (<i>Inst.</i>) Intergenerational equity (<i>Rel.</i>) Farming occupation (<i>Rel.</i>)		
Learning and inspiration	Values held by individuals and groups as guiding principles and procedures, that dictate conduct and experiential learning over generations about crop management (<i>Rel.</i>). A sense of wellbeing (Relational eudaimonic values)	Coffee leaf rust Formation and protection of soils—Mulch (<i>Majada</i>): piles of leaves and uprooted vegetation around coffee seeds and plants Labor (herd of very few cattle) Maintenance of coffee benefits into the future	A metaphor for disturbed agroecological relationships The notion of care and nutrition of land (<i>Rel.</i>) Farming occupation (<i>Rel.</i>) Reciprocity, cooperation, and solidarity (<i>Rel.</i>) Monetary benefits, income stability Women's role: Family economy (<i>Inst.</i>) Vulnerability to fluctuations in coffee prices: ensuring adaptive capacity and a good quality of life for future generations (<i>Rel.</i>)	Food and feed (coffee beans)	Monetary benefits: treatment of coffee beans as commodities traded at market (<i>Inst.</i>) Income stability (<i>Inst.</i>)

Values of nature's contributions to people (NCP) link people to places by place-based relationships, which in turn, shape social spaces: lived, perceived, and conceived spaces on coffee farming. Perceived spaces (in the center of the figure) often mimicked certain ecological processes that occurred in nature. The agroecosystem tends toward a patchwork of diverse communities arranged randomly on the landscape. In contrast, conceived spaces by technicians (right side) promote a tendency to systematize the patchwork and impose a more regular pattern on it. Lived spaces (left side) show spaces endowed with individual and collective values, and experiences. A cross is placed in the center of coffee seedlings as an experienced space by religious values and symbols of Christianity. *Rel.*, relational values; values relative to the meaningfulness of human-nature relationships. Eudaimonic values contribute to a good quality of life. *Inst.*, instrumental values; the value attributed to something as a means to achieve a particular end. *Intr.*, intrinsic values; the value of something has to be independent of any human experience or evaluation (Pascual et al., 2017). Photo credits: LBM.

TABLE 2 | Potato farming (*Solanum tuberosum*, Solanaceae).


Lived spaces		Perceived spaces		Conceived spaces	
NCP	Values	NCP	Values	NCP	Values
Physical and psychological experiences	Symbolic value: Symbolic associations with gilded intangible figures (“ <i>Encantos</i> ”). Religious value—ceremonial connectedness Emotional attachment: Respect for places with historical significance (Toponyms). Motivational values (<i>Rel.</i>) A gender approach: stability and efficiency of incomes for family (<i>Inst.</i>)	Regulation of freshwater quality and quantity Food and feed	Redistribution of equitable outcomes, benefits and tasks (<i>Rel.</i>) Assigned value: the worth of the <i>Páramo</i> as water source by implementing communal aqueducts and drainage systems (<i>Inst.</i>) Monetary benefits: livelihoods (<i>Inst.</i>) Farming occupation (<i>Rel.</i>) Reciprocity (<i>Rel.</i>)	Regulation of freshwater quality and quantity Habitat creation and maintenance	Ecological and biophysical values: regulation of Andean hydrology; species diversity: the richest high mountain flora of the world; Primary habitat of 41 bird species Moral duty to organisms and ecosystem (<i>Intr.</i>) Underlying values (<i>Instr.</i>): Seeing spaces in terms of lists could mean treating members of high mountain ecosystems as isolated (and extractable?) units
Supporting identities	Cultural identity, sense of place, sense of belonging, place attachment (<i>Rel.</i>): places associated with stories and songs.	Habitat creation and maintenance	Vertical approach to landscapes based on the downward course of streams		Horizontal stripes of vegetation layers in <i>Páramo</i> ecosystems
Maintenance of options	Intangible values transmitted by language (<i>Rel.</i>): knowledge about local seed use and landraces		Spatial nested structure by kinship communities (<i>Rel.</i>) Cooperation and community aid (<i>Rel.</i>) Monetary benefits (<i>Inst.</i>) Income stability (<i>Inst.</i>) Farming occupation (<i>Rel.</i>) Women’s role: Family economy (<i>Inst.</i>)	Physical and psychological experiences	Recreation, leisure, and nature-based tourism (<i>Rel.</i>).
Learning and inspiration	A sense of wellbeing (Relational eudaimonic values) Cognitive enhancement (<i>Rel.</i>)	Labor (herd of very few cattle and sheep) Maintenance of water into the future	Vulnerability to fluctuations in water supply: ensuring wellbeing and health for future generations (<i>Rel.</i>)	Food and feed (potato) Maintenance of options of NCP into the future to support biodiversity conservation and a good quality of life	Responsibilities to mitigate human impact of livestock and upward movement of agriculture into the <i>Páramo</i> (<i>Rel.</i>) Intrinsic ecological values: flow and regulation of the water; species diversity; carbon storage.

Values of NCP link people to places by place-based relationships, which in turn shape social spaces: lived, perceived, and conceived spaces on potato farming. Perceived spaces (in the center of the figure) show a drawing of farmers’ representation of landscapes. Drawing shows the spatial relationship of smallholders with landscape, which is based on the descending course of streams. In contrast to peasant farmers, conceived spaces by technicians (right side) describe places by using horizontal stripes of vegetation layers locating *Páramo* in the crest of the highest mountain ranges above 3,000 meters. Lived spaces (left side) show spaces endowed with emotional sensations, individual and collective values, and experiences. A cross is placed in the center of each plot, as an experienced space by religious values and symbols of Christianity. *Rel.*, relational values; *Inst.*, instrumental values; *Intr.*, intrinsic values. Photo credits: LBM.

values of reindeers in the Saami communities in northern Europe (James, 2020). Potato farmers also recognize water supply and quality as the most important NCP. The latter is consistent with citizen perceptions of upland areas in Chingaza National Natural Park (Colombia) (Pedraza et al., 2020).

Conceptual Approach

Based on the above evidence, it is argued that the triad of spaces is a helpful framework to analyse multiple NCP and their associated values at the local scale. Values of NCP link people to places by place-based relationships, which in turn shape lived, perceived, and conceived spaces on coffee and potato farming (Tables 1, 2). Those findings highlight how landscape is a layering structure wherein three social spaces overlap and accumulate over time. For the purposes of the article, landscape is understood as perceived by people whose character is the result of the action and interaction of natural and/or human factors (European Landscape Convention, 2000). In line with this, Tables 1, 2 illustrate the diversity of values of NCP that include intrinsic, instrumental, and non-instrumental relational values about nature, which in turn shape social spaces.

Given that space embodies social relationships (Lefebvre, 1991), findings show how and why does it do so and what relationships they are. For instance, lived and perceived spaces illustrate relevant values of material NCP related to farm management, autonomy, economic activities, care, and reproduction of life at local scales. Results also reveal the crucial role that women play in the economy of family life by administering home finances and determining which crop varieties are cultivated in the farm. Gendered access to resources in perceived spaces thus show that men and women often use, experience, and value NCP in different ways and may possess different agroecological knowledge, with implications for farm management (Fortnam et al., 2019). Furthermore, how day-to-day economic roles of men and women differ, especially in terms of agriculture, forest products and livestock, indicate human behaviors from household to village levels that affect agroecosystems and the well-being of people (Colfer and Minarchek, 2013). Perceived spaces also demonstrate the gradual transformation from conventional to organic coffee plots in which diverse agroecological communities arranged almost randomly or in “a disorderly way” tend to be systematized and simplified by imposing a more regular pattern on it (Cronon, 1985). In conceptualized spaces, potential environmental conflicts are visible and emerge between stakeholders with differing interests in land areas around land use and management changes (Hanaček Rodríguez-Labajos, 2018). In such systems, the plurality of values and criteria to support management decisions of coffee and potato farmers should be integrated into land-use planning.

Different factors were found as key issues highlighting the suitability of the NCP approach to disentangle the importance of social relations in land spaces, as well as elucidating and addressing core concerns of local people (Ellis et al., 2019). For instance, the following subjects, namely, maintenance of NCP (such as coffee benefits and water quality regulation) in

the future; identification of trade-offs between the instrumental and non-instrumental values associated with land; and a sense of social cohesion and symbolic values of non-material NCP prevailed in lived spaces, and an ecological rationale of the ecosystem service concept was defined by the Natural Park System (conceptualized spaces) with a focus on intrinsic values. On the other side, relational values were highlighted as key insights to characterize who is related to a specific place (who is local) and the meaningfulness of the human–non-human nature relations (Stenseke, 2018). In line with this, different relational values attributed by local people were identified (eudaimonic values perceived as a sense of well-being; place attachment, place identity, and emotional attachment; and intangible values transmitted by language), which in turn allowed for the formation of three relational spaces that ultimately guide local management. Hence, farms, landscapes, and NCP are valued in multiple ways by people who are closely associated with them.

Consistent with the conceptual approaches (Pascual et al., 2017; Díaz et al., 2018) related to the importance of NCP in increasing inclusivity and plurality, the findings of this research highlight the broader set of values and worldviews that exist in local spaces including the incidence of negative NCP, such as plant diseases (coffee leaf rust). The latter is valued as a metaphor for disturbed agroecological relationships. Moreover, the content analysis method applied in this study reveals a more personal sense of relational values (Chan et al., 2018; Goodwin et al., 2019) underpinning non-material NCP, such as sacredness and devotion to land, social cohesion, emotional attachment, reciprocity, cultural identity and symbolic associations.

Through the analysis of information, this research also identified social-ecological trade-offs and synergies between the values of NCP in rural areas (Ellis et al., 2019). For instance, synergies could be developed between different institutions with the influence on farmer agricultural practices. Results show conflicting perspectives and the existence of trade-offs at different levels: trade-offs between users of NCP (e.g., remote beneficiaries of values associated with coffee, local users of paramo ecosystem, and different downstream users of water); among different NCP (e.g., species diversity and carbon storage in *Páramo* ecosystems); as well as spatial (across the watershed or across coffee agroecosystems) or temporal trade-offs (different individuals prefer to manage their farm to deliver material NCP, potentially at the expense of future NCP) and trade-offs between managing for biodiversity conservation on *Páramo* ecosystems and production of feed. Such findings are relevant for land-use decisions by actors in the landscape context.

Drawing on the findings highlighted in this manuscript, NCP could represent an effective communication tool to facilitate dialogue and understanding between a wide range of stakeholders to co-produce knowledge for people and nature relations (Kadykalo et al., 2019). This study notably expands upon that remark by uncovering two elements. First, the importance of local languages as vehicles of value, culture, and identity even through an intergenerational focus from indigenous ancestors. In this sense, the language of ancestors remains dormant and active in current Andean inhabitant

language by several terms as a mark of cultural identity (Rocha, 2012), revealing relationships between language and species richness across spaces (Turvey and Pettoirelli, 2014). That is a language spoken in lived spaces occupied by symbolic golden forms (*Encantos*), which remind us of the early history of indigenous people of worshipping deities by leaving gold figures across landscapes (Lleras, 2016). Second, findings show the relevance of understanding the way that a social group constructs landscape narratives and what people prioritize on their stories of places: for instance, the means by which people order and talk about landscape by recognizing the value and local naming of places (toponyms), e.g., if land perception is organized with reference to rivers, valleys, hills, mountains, country roads, etc.

Methodological Approaches

Communication and collaboration between local stakeholders appear as key facilitators of eliciting the diverse values of NCP and nature articulated by different actors (i.e., plural valuation), concurring with Zafra-Calvo et al. (2020). In this sense, this manuscript broadens procedural dimensions by suggesting that participatory methods at local scales require the use of non-specialist language, ethical listening, informal conversations and familiarization with local language that facilitates community engagement by trying to establish non-hierarchical power relations. Furthermore, it is crucial that interdisciplinary teams of planning professionals agree on using common analytical landscape approaches and language accessible to a broad lay audience. Concerning the ethnographic socio-cultural methods at an individual level, this study emphasizes their importance in eliciting the plural values, as people actively construct and act based on values, cultural meanings, and profound relations with places. Such individual approach can involve the use of semi-structured interviews and participant observations. Thus, depending on the availability of time and resources, methods can combine an individual process with group-based deliberative processes (e.g., Fish et al., 2016; Kenter et al., 2016; Horcea-Milcu et al., 2019) in order to achieve a better understanding of the values underlying a management system or land-use changes over longer periods of time and/or on larger geographical areas.

Through ethnographic socio-cultural methods and content analyses of narratives, this research identified different relational values of NCP categories in coffee and potato farming spaces. For example, worth of fame and prestige, solidarity, cooperation, redistribution of equitable outcomes, benefits and tasks, care and nutrition of land, and instrumental and intrinsic ecological values (Figures 1, 2). This result is in agreement with Arias-Arévalo et al. (2017), who reported 20 articulated values based on three value domains, instrumental, intrinsic and relational values, from narratives of urban and rural people in the Otún River watershed (Colombia). The result is also consistent with Christie et al. (2019), who found that the analysis of narratives provided evidence about relational and instrumental values by reviewing the IPBES Europe and Central Asia assessment.

Implications for Management Decisions and Policy-Making

The findings at the local scale suggest that lived, perceived, and conceived spaces are essential to understanding land systems and different ways in which rural and urban areas interact. We propose the triad of spaces as an appropriate conceptual basis to fully recognize the voices and plural values of a wider range of people. Using small-scale farming, it is argued that land-use planning programmes are unlikely to optimally achieve their goals of social equity and sustainability if they do not account for the numerous and varied interconnections between values, NCP, and social spaces (Tables 1, 2). These insights have important implications for how land-use policy and management decisions can include value-guided choice of NCP that link people to places and social spaces. To better contextualize the potential of this approach, the following topics are proposed to be considered here.

To be effective and efficient, management and policy decisions that seek holistic spatial planning should consider the occurrence of perceived and lived spaces alongside conceptualized spaces. Taking into account the full range of NCP can allow managers to better value NCP and set plural and more inclusive schemes, enhance farmer experiences, and set the criteria for decisions on the use of a particular site by not only promoting intrinsic ecological and instrumental values but also starting with an empirical question: What is happening to land management? On the basis of social spaces, it could be feasible to find the preservation of specific waterbodies in virtue of its symbolic value as a place of ritual for a community as well as a place with significant levels of biodiversity that is threatened with a gradual decline. Likewise, facilitating policy formulation by the co-production of knowledge between local knowledge holders, scientists, and multiple stakeholders according to their identification with spaces. In this way, landscape planning might focus on recognizing the existing relationships and interactions that give rise to any favorable or unfavorable management, as well as encouraging the relationships needed to maintain or transform landscapes as sustainable spaces.

Drawing on the findings highlighted in this manuscript, it is argued that there is a need for a spatial approach of NCP that gives voice to local community participation. In this way, integrating and acknowledging spatial heterogeneity can allow us to identify trade-offs and scale disparity between theorized spaces (delineated by instrumental, intrinsic ecological, and biophysical values), lived spaces (shaped by sociocultural values of non-material NCP), and perceived spaces (imbued with instrumental and non-instrumental relational values). Hence, the understanding of new modes of spatial planning and their consequences of decision-making in the use of land can be used to facilitate an effective policy design.

Spatial management decisions would benefit greatly from anticipating how planning goals affect and are affected by interconnected factors, such as the overlapping of different spatial views of territorial planning. Such insight is useful to recognize ways in which external knowledge can assist local planning in solving problems without dominate local initiatives.

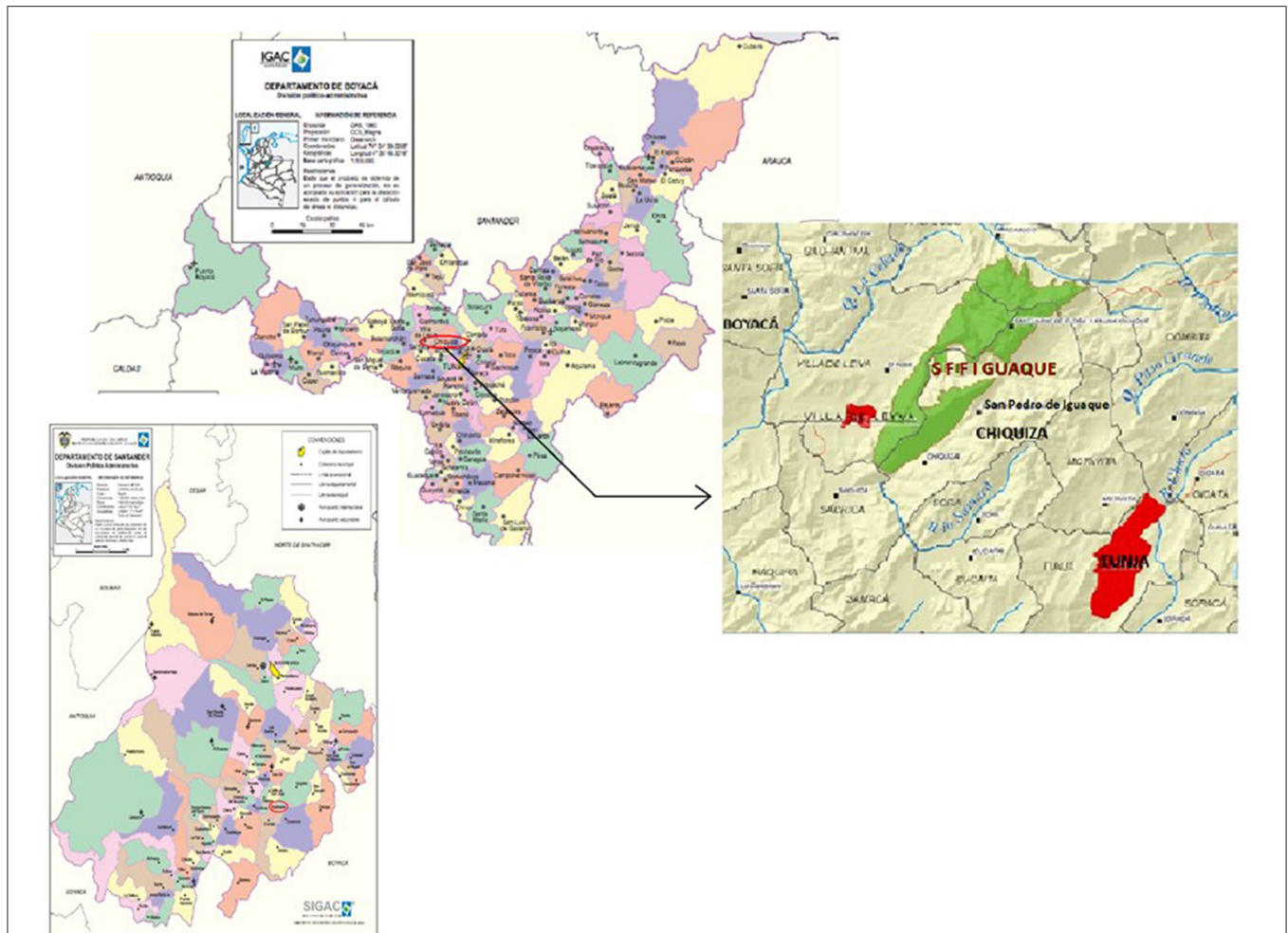


FIGURE 2 | Case study areas in red circles. Sand Pedro de Iguaque (Boyacá—Upper map) and Ocamonte (Santander—Lower map). Upper map also shows the overlap between the municipality of Chiquiza—San Pedro de Iguaque and the Iguaque National Natural Park (SFF Iguaque in green).

Given that lived and perceived spaces are frequently side-lined in decision-making, this study elevates the relevance of these spaces to support the spatial prioritization of land use and provide insight into how spaces can be blended to inform natural resource management decisions. Describing NCP value-guided shape of spaces may be used as an empirical basis for developing practical guidelines for addressing and communicating the NCP framework in planning schemes. It can become an instrument to maintain the momentum toward transformative change by improving decision-making processes.

Results are also useful to gain a better understanding of the inputs, motivating conflict, and cooperation. There has been a tendency to systematize and homogenize landscapes by certification schemes and ways of imposing instrumental and ecological values and a more regular pattern of land use. Bridging the gap between conceptualized spaces and their integration into a wider local context is a big challenge to overcome. One of the ways to deal with this lies in surpassing social barriers by acknowledging the co-existence of local modes of

relationship with landscapes by lived and perceived spaces. The triad of social spaces as a conceptual framework can thus be useful in the operationalization of NCP in environmental management and governance schemes. By thinking about spaces relationally, decision-making processes can improve through shifting the status of spaces from physical areas into lived, perceived, and conceptualized spaces endowed with the values of NCP, meaning, and significance. In this sense, this work broadens the horizons of relational approaches to the environmental agendas toward a more holistic approach to nature, NCP, and land systems.

This article has analyzed two case studies to show how diverse values ascribed to NCP shape social spaces based on place-based relationships. This framework captures multiple values experienced by local communities and recognizes intangible spaces as key factors for more inclusive land management. Since NCP are focused on the plurality of values and meanings associated with land (Ellis et al., 2019), the triad of social spaces offers a better understanding to help bridging the frequent

conflictive division among plans/discourses (conceived spaces) and local realities (lived and perceived spaces). The triad of social spaces (Lefebvre, 1991) can therefore be useful for guiding landscape planning and decisions to protect and enhance (agro)biodiversity and its associated NCP.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors without undue reservation.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants, in accordance with the local legislation

REFERENCES

- Altieri, M. A. (2004). Linking ecologists and traditional farmers in the search for sustainable agriculture. *Front. Ecol. Environ.* 2, 35–42. doi: 10.1890/1540-9295(2004)002[0035:LEATFI]2.0.CO;2
- Arias-Arévalo, P., Martín-López, B., and Gómez-Baggethun, E. (2017). Exploring intrinsic, instrumental, and relational values for sustainable management of social-ecological systems. *Ecol. Soc.* 22:43. doi: 10.5751/ES-09812-220443
- Barth, F. (2002). An anthropology of knowledge. *Curr. Anthropol.* 43, 1–18. doi: 10.1086/324131
- Basso, K. (1996). *Wisdom Sits in Places. Landscape and Language among the Western Apache*. Albuquerque, NM: University of New Mexico Press.
- Biodiversity Information System of Colombia (2020). *Biodiversity in Numbers*. Available online at: <https://cifras.biodiversidad.co/> (accessed July 13, 2020).
- Chan, K. M. A., Gould, R. K., and Pascual, U. (2018). Editorial overview: relational values: what are they, and what's the fuss about? *Curr. Opin. Environ. Sust.* 35, A1–A7. doi: 10.1016/j.cosust.2018.11.003
- Chaplin-Kramer, R., Sharp, R. P., Weil, C., Bennett, E. M., Pascual, U., Arkema, K. K., et al. (2019). Global modelling of nature's contributions to people. *Science* 366, 255–258. doi: 10.1126/science.aaw3372
- Christie, M., Martín-López, B., Church, A., Siwicka, E., Szymonczyk, P., and Sauterel, J. M. (2019). Understanding the diversity of values of "Nature's contributions to people": insights from the IPBES Assessment of Europe and Central Asia. *Sustain. Sci.* 14, 1267–1282. doi: 10.1007/s11625-019-00716-6
- Colfer, C. J. P., and Minarchek, D. (2013). Introducing 'the gender box': a framework for analysing gender roles in forest management. *Int. For. Rev.* 15, 411–426. doi: 10.1505/146554813809025694
- Conservation International (2020). *Explore the Biodiversity Hotspots*. <https://www.cepf.net/our-work/biodiversity-hotspots> (accessed July 13, 2020).
- Cronon, W. (1985). *Changes in the Land - Indians, Colonists, and the Ecology of New England*. New York, NY: Hill and Wang.
- Departamento Administrativo Nacional de Estadística (2014). *Censo Nacional Agropecuario 2014*. <http://www.dane.gov.co/files/CensoAgropecuario/entregadefinitiva/Boletin-1-Usodel-suelo/1-Boletin.pdf> (accessed July 15, 2020).
- Díaz, S., Pascual, U., Stenseke, M., Martín-López, B., Watson, R. T., Molnár, Z., et al. (2018). Assessing nature's contributions to people. *Science* 359, 270–272. doi: 10.1126/science.aap8826
- Ekstrom, J., and Young, O. (2009). Evaluating functional fit between a set of institutions and an ecosystem. *Ecol. Soc.* 14:16. doi: 10.5751/ES-02930-140216
- Ellis, E. C., Pascual, U., and Mertz, O. (2019). Ecosystem services and nature's contribution to people: negotiating diverse values and trade-offs in land systems. *Curr. Opin. Environ. Sustain.* 38, 86–94. doi: 10.1016/j.cosust.2019.05.001
- European Landscape Convention (2000). *European Landscape Convention and Reference Documents*. Available online at: <https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=09000016802f80c6> (accessed January 12, 2021).

and institutional requirements. The participants provided their informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

LB-M carried out the conceptualization, methodology, data collection, analysis, and writing.

ACKNOWLEDGMENTS

The author wishes to thank the communities and organizations of Ocamonte and San Pedro de Iguaque, who shared their voices, worldviews and experiences through the respective field works. Special thanks are due to reviewers for constructive comments.

- Fache, E., and Pauwels, S. (2020). Tackling coastal "overfishing" in Fiji: advocating for indigenous worldview, knowledge, and values to be the backbone of fisheries management strategies. *Mar. Stud.* 19, 41–52. doi: 10.1007/s40152-020-00162-6
- Federación Nacional de Cafeteros de Colombia (2020a). *Coffee from Santander*. Comité de Cafeteros de Santander. Available online at: <https://santander.federaciondecafeteros.org/cafe-de-santander/> (accessed July 13, 2020).
- Federación Nacional de Cafeteros de Colombia (2020b). *Colombian Green Coffee*. Available online at: <https://federaciondecafeteros.org/wp/productos/cafe-verde/> (accessed July 13, 2020).
- Fine, G. A. (2015). "Participant observation," in *International Encyclopedia of the Social and Behavioral Sciences, 2nd Edn*, ed J. D. Wright 530–534. doi: 10.1016/B978-0-08-097086-8.44041-9
- Fish, R., Church, A., and Winter, M. (2016). Conceptualising cultural ecosystem services: a novel framework for research and critical engagement. *Ecosyst. Serv.* 21, 208–217. doi: 10.1016/j.ecoser.2016.09.002
- Fortnam, M., Brown, K., Chaigneau, T., Crona, B., Daw, T. M., Gonçalves, D., et al. (2019). The gendered nature of ecosystem services. *Ecol. Econ.* 159, 312–325. doi: 10.1016/j.ecolecon.2018.12.018
- Franks, P., Booker, F., and Roe, D. (2018). *Understanding and Assessing Equity in Protected Area Conservation: A Matter of Governance, Rights, Social Impacts and Human Wellbeing*. IIED Issue Paper. London: International Institute for Environment and Development.
- Goodwin, S., Brogaard, S., and Krause, T. (2019). Values held by Swedish primary school students towards forest ecosystems and the relevance for a nature's contributions to people approach. *Ecosyst. People* 15, 331–346. doi: 10.1080/26395916.2019.1687585
- Guber, R. (2001). *La Etnografía. Método, Campo y Reflexividad*. Bogotá: Grupo Editorial Norma.
- Hanaček and Rodríguez-Labajos (2018). Impacts of land-use and management changes on cultural agroecosystem services and environmental conflicts - a global review. *Glob. Environ. Change* 50, 41–59. doi: 10.1016/j.gloenvcha.2018.02.016
- Horcea-Milcu, A. I., Abson, D. J., Apetrei, C. I., Duse, I. A., Freeth, R., Riechers, M., et al. (2019). Values in transformational sustainability science: four perspectives for change. *Sustain. Sci.* 14, 1425–1437. doi: 10.1007/s11625-019-00656-1
- International Coffee Organisation (2020a). *Historical Data on the Global Coffee Trade - Total Exports by All Exporting Countries*. Available online at: <http://www.ico.org/historical/1990%20onwards/PDF/1e-exports.pdf> (accessed July 13, 2020).
- International Coffee Organisation (2020b). *Volatile Coffee Prices: Covid-19 and Market Fundamentals*. Available online at: <http://www.ico.org/news/coffee-break-series-2e.pdf> (accessed July 13, 2020).
- James, S. P. (2020). Legal rights and nature's contributions to people: Is there a connection? *Biol. Conserv.* 241:108325. doi: 10.1016/j.biocon.2019.108325
- Jones, K., and Tobin, D. (2018). Reciprocity, redistribution and relational values: organizing and motivating sustainable agriculture. *Curr. Opin. Environ. Sustain.* 35, 69–74. doi: 10.1016/j.cosust.2018.11.001

- Kadykalo, A. N., López-Rodríguez, M. D., Ainscough, J., Droste, N., Ryu, H., Ávila-Flores, G., et al. (2019). Disentangling 'ecosystem services' and 'nature's contributions to people'. *Ecosyst. People* 15, 269–287. doi: 10.1080/26395916.2019.1669713
- Keller, R., Keune, H., and Maynard, S. (2018). Where do IPBES delegates in Europe see challenges, needs, gaps and opportunities in policy uptake of "Nature's contributions to people"? innovation. *Eur. J. Soc. Sci. Res.* 31, S116–S124. doi: 10.1080/13511610.2017.1361814
- Kenter, J. O., Reed, M. S., and Fazey, I. (2016). The deliberative value formation model. *Ecosyst. Serv.* 21, 194–207. doi: 10.1016/j.ecoser.2016.09.015
- Latawiec, A. E., dos Santos, J. S., Maioli, V., Junqueira, A. B., Crouzeilles, R., Jakovac, C. C., et al. (2018). "Forest landscape restoration and land sparing-sharing. Shifting the focus towards nature's contributions to people," in *Forest Landscape Restoration: Integrated Approaches to Support Effective Implementation*, eds S. Mansourian and J. Parrotta (New York, NY: Routledge), 100–118.
- Lefebvre, H. (1991). *The Production of Space*. Oxford: Blackwell.
- Lleras, R. (2016). "Las manifestaciones artísticas en la época precolombina," in *Arte en Colombia*, ed M. I. Rueda (Bogotá: Credencial Historia), 26–37.
- Martín-López, B., Leister, I., Cruz, P. L., Palomo, I., Grêt-Regamey, A., Harrison, P. A., et al. (2019). Nature's contributions to people in mountains: a review. *PLoS ONE* 14:e0217847. doi: 10.1371/journal.pone.0217847
- McElwee, P., Calvin, K., Campbell, D., Cherubin, F., Grass, G., Korotkov, V., et al. (2020). The impact of interventions in the global land and agri-food sectors on Nature's Contributions to People and the UN Sustainable Development Goals. *Glob. Change Biol.* 26, 4691–4721. doi: 10.1111/gcb.15219
- Morales, M., Otero, J., van der Hammen, T., Torres, A., Cadena, C. E., Pedraza, C. A., et al. (2007). *Atlas de páramos de Colombia*. Bogotá: Instituto de Investigación de Recursos Biológicos Alexander von Humboldt. Available online at: <http://www.humboldt.org.co/es/component/k2/item/299-atlas-de-paramos-de-colombia> (accessed July 15, 2020).
- Páramo, P. (2018). *La Investigación en Ciencias Sociales: Técnicas de Recolección de la Información*. Bogotá: Universidad Piloto de Colombia.
- Pascual, U., Balvanera, P., Díaz, S., Pataki, G., Roth, E., Stenseke, M., et al. (2017). Valuing nature's contribution to people: the IPBES approach. *Curr. Opin. Environ. Sustain.* 26–27, 7–16. doi: 10.1016/j.cosust.2016.12.006
- Pedraza, S., Sánchez, A., Clerici, N., Ospina, L., Quintero, A., and Escobedo, F. J. (2020). Perception of conservation strategies and nature's contributions to people around Chingaza National Natural Park, Colombia. *Environ. Conserv.* 47, 158–165. doi: 10.1017/S037689292000020X
- Rocha, M. (2012). *Palabras mayores, palabras vivas*. Tradiciones mítico-literarias y escritores indígenas en Colombia. Bogotá: Taurus Pensamiento.
- Schröter, M., Başak, E., Christie, M., Church, A., Keune, H., Osipova, E., et al. (2020). Indicators for relational values of nature's contributions to good quality of life: the IPBES approach for Europe and Central Asia. *Ecosyst. People* 16, 50–69. doi: 10.1080/26395916.2019.1703039
- Stenseke, M. (2018). Connecting relational values and relational landscape approaches. *Curr. Opin. Environ. Sustain.* 35, 82–88. doi: 10.1016/j.cosust.2018.10.025
- Turner, N. (2005). *The Earth's Blanket: Traditional Teachings for Sustainable Living (Culture, Place and Nature: Studies in Anthropology and Environment)*. Washington, DC: University of Washington Press.
- Turvey, S. T., and Pettorelli, N. (2014). Spatial congruence in language and species richness but not threat in the world's top linguistic hotspot. *Proc. Biol. Sci.* 281, 1–8. doi: 10.1098/rspb.2014.1644
- Vaz, A. S., Moreno-Llorca, R. A., Gonçalves, J. F., Vicente, J. R., Méndez, P. F., Revilla, E., et al. (2020). Digital conservation in biosphere reserves: Earth observations, social media, and nature's cultural contributions to people. *Conserv. Lett.* 13:e12704. doi: 10.1111/conl.12704
- Zafra-Calvo, N., Balvanera, P., Pascual, U., Merçon, J., Martín-López, B., van Noordwijk, M., et al. (2020). Plural valuation of nature for equity and sustainability: insights from the Global South. *Glob. Environ. Change* 63:102115. doi: 10.1016/j.gloenvcha.2020.102115

Conflict of Interest: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2021 Bravo-Monroy. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.