Values, Knowledge, and Rights Shaping Land Use in the Peruvian Amazon: The Shimaa and Diamante Case Studies

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ABSTRACT In the midst of climate change, population growth, and global food crisis scenarios, efforts to succeed in Sustainable Land Management (SLM) implementation are under enormous pressure. To contextualize Indigenous experiences on nature valuation in light of sustainable development efforts, we explored how the traditional ecological knowledge (TEK) of two Indigenous communities interacted with major land policies with sustainability implications through an ethnographic and community-based participatory research approach. Data collection tools included talking circles, storytelling, unstructured interviews, and participant observation with Indigenous community members of Shimaa and Diamante to understand how two major land management policies intersect in SLM, Indigenous values, TEK, and rights in the Peruvian Amazon. In complementation with secondary literature assessing the focal policies, the empirical data analysis, through a lens of TEK, provides a deeper examination of Indigenous peoples' ways of knowing. Research findings show that TEK of Indigenous peoples can support values of nature and shape the design and implementation of SLM policies by incorporating Indigenous peoples' holistic values of nature (e.g., relational and intrinsic values) and methods for sustainable and equitable land management, with improved outcomes for communities. However, the TEK of Indigenous peoples, values of nature, and rights can be at odds with the Eurocentric-oriented SLM in terms of values placed on nature, and results in a disconnection between international and national policy goals with realities at the local levels. This study concludes that to fully realize the objectives of SLM, it is imperative for decision makers to recognize the TEK of Indigenous peoples rooted in a holistic understanding of the multiple values attributed to nature, which resonates with the notion of a plural approach to valuing nature. Further, methods should include land management practices that are beneficial for such communities and not strictly for the production of goods for societal consumption, however long it may be sustained into the future. Such a management scheme would value ecologic stability, community resilience, and a wide range of human-nature values while still recognizing development needs. **KEYWORDS** Indigenous Peoples, Peru, Amazon, traditional ecological knowledge (TEK), nature, plural valuation, sustainable land management (SLM)

INTRODUCTION

Indigenous peoples are inheritors of unique systems of knowledge or traditional ecological knowledge (TEK) that includes species information, skills, customs, and innovation (technology) related to the natural environment (Berkes, 1993; McGregor, 2009). Anishinaabe environmental activist Winona LaDuke (1994, p. 127) describes TEK as:

The culturally- and spiritually-based way in which Indigenous people relate to their ecosystems. This knowledge founded on spiritual-cultural instruction from time immemorial, and on generations of careful observation within an ecosystem.

TEK is expressed in stories, songs, and proverbs, customary laws, and language and handed down through oral history and experiential learning from one generation to

TABLE 1. Traditional Ecological Knowledge (TEK).

	TEK Category	Implementation Example
Biophysical (early indicators)	Plant species	Food and nourishment
		Medicinal plants
		Sacred plants
		Materials for building, fibers for ropes and clothing
	Animals	Food and nourishment
		Habitat, activities, seasonal changes
		Sacred or spiritual
	Ecological conditions	Rainy and dry seasons and indicators
		Signs of disaster (e.g. storms, freezes)
	Systems and interdependencies	Inter-ecosystem connections (e.g., riverine and floodplain)
		Connections between species, keystone species
		Indicators for ecosystem health, potential interventions

the other (Berkes, 1993; Pierotti & Wildcat, 2000; Whyte, 2013). TEK of Indigenous peoples is rooted in their worldviews or cosmovision,[1] which can be defined as being based on a kinship-centric system wherein all community members human and nonhuman kin—for example, biological beings such as plants, animals, insects, landforms, and spiritual beings such as deities linked to mountains and rivers—have duties and responsibilities to respect nature and care for one another (Berkes, 1993; LaDuke 1994; Pierotti & Wildcat, 2000). See table 1 for a brief overview of TEK elements commonly investigated and documented by social scientists' scholars.

For Indigenous peoples, nature (e.g., mountains, native crops, landscapes, wildlife) forms an integral part of ancestral heritage and identity, fostering connection to ancestors and responsibility to future generations (Cajete, 2000; LaDuke, 1994; Lajo, 2012). In this sense, the value of land for Indigenous peoples is not simply for agricultural purposes but is understood as a sacred space, wherein the diversity of living organisms and spiritual beings coexist on the land and have a right to respect, nourishment, and preservation. It can be argued that Indigenous peoples reflect a plural valuation approach to nature defined as "a science-policy process that assesses the multiple values

attributed to nature by social actors and how this can guide decision-making" (Jacobs et al., 2020, p. 3; Pascual et al., 2017; Rincón-Ruiz et al., 2019; Huambachano, 2018).

However, there is limited literature about a plural valuation approach of nature from an Indigenous perspective and the significance of TEK as a collaborative tool to inform sustainable policies intended to support better understandings on how nature is valued and subsequently managed.

Climate change and now the COVID-19 health crisis has sharpened recognition of the direct reliance on natural resources in rural communities, along with the underlying unsustainability of the world's natural resources (Fiorella et al., 2020). With the need to feed an estimated 7.8 billion people, global resources face great pressure for use and production, exacerbating the need for sustainable production of nature-based products like timber and agriculture (GRAIN, 2014; Huambachano, 2015). These events not only threaten the socioeconomic and cultural systems of land-based peoples as they are pressured to produce goods for the greater society but also deepen issues around food security and global environmental sustainability, making incorporating sustainable land management (SLM) policies that adequately draw from a diversity of nature valuation viewpoints paramount (Dixon et al., 2001; Food and Agriculture Organization [FAO], 2016; Hurni, 2000; Smyth & Dumanski, 1993; Walker & Salt, 2006).

One of the most recent definitions of SLM, provided by TerraAfrica (2017, p. 1), defines SLM as:

1. Cosmovision is a phrase commonly used in place of "worldview" in Latin America and is particularly prevalent when referring to Indigenous communities. The phrase encompasses the tenants of "worldview" but commonly includes elements of spirituality, mysticism, intergenerational beliefs, and other elements sometimes left out of a typical "worldview" definition (Huambachano, 2018).

TABLE 2. Sustainable Land Management (SLM) Approaches.

	SLM Approach	Implementation Example
Biophysical (early indicators)	Agronomy	Cover crops
		Crop rotations and intercropping with nitrogen fixing crops
	Organic fertilization	Compost
		Animal and green manure
	Minimum soil disturbance	Minimum tillage
		Mulching
	Agroforestry	Trees on cropland (contours, intercropping)
		Bush and tree fallows
		Live barriers/buffer strips with woody species
Socioeconomic (emerging indicators)	Social welfare	Conflict resolution
		Population growth rate
		Rural poverty rate
	Economic	Income distribution
		Access to markets
	Governance	Tenure/land use rights

The adoption of land use systems that, through appropriate management practices, enables land users to maximize the economic and social benefits from the land while maintaining or enhancing the ecological support functions of the land resources.

Literature on SLM (Hurni, 2000; Smyth & Dumanski, 1993) shows this concept emerged to support the "sustainable development" discourse popularized in 1987, when the Brundtland Report defined it as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs," at the United Nations World Commission on Environment and Development (WCED, 1987, p. 43). Increased emphasis has been placed on the study of SLM, particularly for sustainable agriculture and resilience (Cooper & Huff, 2018; Dixon et al., 2001; FAO, 2016). SLM approaches include agronomic practices such as use of organic fertilizers, minimum soil disturbance, residue utilization, water conservation, rain harvest, and various agroforestry practices (see table 2; Branca et al., 2013; United Nations Convention to Combat Desertification, 2009).

More recent SLM frameworks have incorporated socioeconomic variables (e.g., rural poverty rate, income distribution), conflict resolution, crucial for plural valuation (see table 1; GEF, 2015; Jensen et al., 2011; Schwilch et al., 2011). This research further explores the social welfare and governance attributes (tenure/land use rights), specifically under the socioeconomic (emerging

indicators) as outlined in table 2 (FAO, 2016; Schwilch, 2011).

SLM theory has, at times, made explicit mention of Indigenous or traditional knowledge, again, making space for the concept of plural valuation, including an emphasis on the intrinsic value of nature (Jenson et al., 2011; Trainor, 2006). Instead of focusing strictly on sustainable, but still utilitarianism use—also referred to as a *value-monism* indicating a single, or primary, value—the newer indicators address conflict management, which is often a result of misaligned land use values between various actors (Jenson et al., 2011; Pascual et al., 2017). In this light, SLM can provide a land and decision-making framework on which to consider natural resource use and management, wide-ranging values, and myriad actors. SLM can have important synergies and implications for areas inhabited by Indigenous peoples, whose values tend to align with sustainable use and who display unique knowledge and complex values for nature (e.g., use value and intrinsic value) and can be a divergent starting for land use planning from a utilitarian approach (Schwilch et al., 2011; Smyth & Dumanski, 1995). Despite these advancements, without specific consideration of Indigenous knowledge and values, SLM can still fall short for rural and Indigenous communities both diluting Indigenous values and/or demanding or pressuring goods and services from them.

Borras and Franco (2013) define land grabbing as the expulsion of existing peoples from their land to advance

land investment purposes, resulting in concentration of land ownership and control of vast areas belonging to an elite few. Land grabbing can occur both in physical removal, in changing cultural norms of land management, and in claiming rights to attributes like mineral, eminent domain, or even carbon rights (Karsenty et al., 2014). Over 1,200 titled Indigenous communities make decisions for more than 11,000,000 hectares of Peruvian tropical forests, but with limitations to those rights including mineral, petroleum, and public roads paths (Blackman et al., 2017). By analyzing two land policies and their impacts in two Indigenous Peruvian communities, Shimaa and Diamante, this work explores how Indigenous TEK might inform the deployment of SLM in contemporary societies with plural values, particularly in the knowledge-policy interface.

Highlighting the intrinsic nature valuation by Indigenous peoples, the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) study on the plural valuation of nature aims to bridge worldviews and values held by diverse social actors, referred to as *values-pluralism* (Löfmarck & Lidskog, 2017; Pascual et al., 2017). Plural valuation has been framed as an approach to support decision making through a science-policy process that "assesses the multiple values attributed to nature by social actors" (Jacobs et al., 2020, p. 3; Rincón-Ruiz et al., 2019). It is within this emerging literature that this study uses Indigenous TEK as the theoretical lens to investigate the extent to which major SLM-aligned environmental policies understand and incorporate plural values in the Peruvian Amazonian communities of Shimaa and Diamante. This work aims to advance understanding of how major theories of SLM and plural valuation complement one another while incorporating the unique knowledge and value systems of Indigenous communities. As such, the work aims to explore whether the approaches of SLM and TEK can be considered plural valuation approaches.

Research Approach and Methods
This study adopted an ethnographic and community-based participatory research approach, which emphasized an engaged process with individuals, which in this study are regarded as study partners, to identify research needs and priorities as well as discuss findings (Lassiter, 2015; Lewis & Russell, 2011; Plows, 2008). Both authors have developed trusting relationships with the people of Matsigenka and Yine in the communities of

Shimaa and Diamante, respectively, which started with initial community visits in 2010. One of the authors of this article engaged extensively in sustainable development initiatives in Peru with the sister organizations Nature Services Peru (NSP) and Servicios Ecosistémicos Peru (SePeru) working with members from the Diamante. For example, involvement in a forest carbon development project with NSP and land use planning and development initiatives with SePeru. Multiyear efforts of these organizations provided opportunities to participate in meetings and access open conversations with established trust where community members shared insights specific to forest use and deforestation pressure as part of a long-term engagement.

Additionally, because one of the authors of this study is an Indigenous scholar, strong attention was given to choosing data collection methods that are culturally sensitive to these Indigenous communities. Data collection tools included storytelling, unstructured interviews, workshops, participant observations, and talking circles. These methods allowed the researchers to start by forming trusting relationships, understanding study participants agency in the research process, developing relationships with key community members, and observing various rituals, traditional practices, and forest and field techniques. Data were collected from Indigenous persons knowledgeable about SLM and traditional food systems, exploring cultural values and knowledge about the sustainable management of environmental resources.

Using a purposive sampling technique (Creswell, 2009) based on observed behaviors and social structure, research participants were selected based on the characteristics below:

1. Respected elders of the community, who had an active participatory role in traditional resource management and food production systems,
2. Community members who were present at decision-making meetings, in current leadership roles, or were otherwise knowledgeable about land and resource decisions over time,
3. Individuals who had proficient knowledge of Indigenous cosmovision, land management practices, and who were respected by community members.

Sampling selection took place during introductory workshops, talking circles, and from personal observations

TABLE 3. Summary of Data Sources (Diamante and Shimaa Communities).

Indigenous Amazonian Community	Interviews	Participant Observation	Full Community Assemblies	Workshops	Talking Circles	Total Number of Study Partners
Diamante	22	Yes	Yes	One workshop, 14 people attended	Four talking circles (total 17 people)	39
Shimaa	15	Yes	Yes	Two workshops (convening 20 people but data were collected from 10 participants)	Two talking circles (gathering 10 people but data were collected from 5)	30

when interacting with potential research participants. In this study, talking circles embraced the rituals and cultural protocols underpinning Matsigenka and Yine peoples' cultures, for example, at the start of a talking circle, a Matsigenka leader conducted a welcoming ritual. During the sampling stage, key individuals with in-depth knowledge on TEK, cultural values, traditions, and sustainable land use practices were invited to be part of this study. A comprehensive source of secondary literature data on SLM and TEK, two key land policies, and resources from the Camisea Project Block 88 complements this study.

The researchers are both bilingual and multilingual community members who assisted in translations from Indigenous languages on occasion to improve understanding. An unstructured interview approach was used in this study because it favors open-ended questions, allowing for more flexibility and freedom to seek knowledge (Creswell, 2009). This is especially useful in this research because of the communication style of some community members, who prefer to revisit key topics in informal settings, and conversations can unfold over numerous days. As such, data collection was captured across a number of meetings and conversations in formal and informal settings; these often took place while working on *ayni*(collectively) on the land, engaging at meals, and through participant observation, such as observing conversation between community members. Observations were recorded using observation notes and charts, descriptions of activities, sketches and diagrams (including those developed by community members in meetings), photographs, and maps.

Data collection took a period of 6 months with multiple visits to and communications with the Diamante and Shimaa communities. Data were transcribed, processed, cleaned, and organized to allow for interpretation of themes and major categories of findings. Cutting across data sources, emergent themes were determined, and data reassessed, with coding to reveal empirical evidence of emerging themes and cross-referenced with researcher observations.

Diamante (Yine and Matsigenka), Madre De Dios Region

The Diamante Community, located in the Manu Province of Madre de Dios, is settled on the upper Madre de Dios riverbank and was formally granted property rights as property N° 017–86 through the Ministry of Agriculture on June 21, 1986, with a total of 15,811 hectares. With about 350 people, the Diamante community is made up of a mix of ethnic groups, primarily Indigenous Yine, Indigenous Matsigenka, and a small population of non-Indigenous Mestizo (IBC, 2017). Based on participant observations and multiple communal and small group meetings, it was noted that the community struggles with illegal logging activity despite having clear land title and no issues from overlapping forest concessions. The community relies on both market-based (e.g., agriculture) and subsistence (e.g., hunting, fishing, small-scale subsistence agriculture, and nontimber forest products) economies. The Ministry of Agriculture approved 7,500 ha² of current forests for development into agricultural crops, which would require deforestation via logging, then slash and burn techniques to undertake.[2] Also, it was learned through unstructured interviews[3] and talking circles[4] that immigration of outsiders, particularly

2. Land use scenario workshop, Diamante community, October 2013.
3. Interview, Community leader, Diamante community, November 2013.
4. Talking circles, Diamante community, October 2013 and November 2013.

opportunistic individuals looking for timber revenue, has sometimes put Eurocentric and Indigenous values in land and natural resource management at odds.

Shimaa (Matsigenka) Cusco Region

The Matsigenka are an Amazonian ethnic group with a population of approximately 8,000 individuals. They are widely dispersed, occupying portions of the Amazon in southeastern Peru, specifically around the Urubamba, Camisea, Timpia, and Manu rivers. One group of Matsigenka live at the Shimaa community located downriver in the Upper and Middle Urubamba River areas and is located approximately 7 h from the city of Quillabamba, in the Department of Cusco. Recognized as a native community by the central government, it has been registered in the National Registry of Native Communities in accordance with the Decree Law No. 22175. The Shimaa community has a total territory of 25,845 ha, recognized by title through the Ministry of Agriculture Property N° 992 on July 25, 1999.

CASE EXAMINATION

For Indigenous peoples, land is both an agricultural and sacred space, where the principle of collective ownership is bundled with ancestral rights of self-determination, land rights and access, and inter-responsibility with nature. In 2007, Peru recognized and voted in favor of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), which forwards the concept of Free, Prior, and Informed Consent (FPIC) for governmental and project interventions that affect Indigenous communities. Although the Political Constitution of Peru recognizes Indigenous peoples have the right to exercise and implement autonomy in internal affairs (e.g., administrative, economic, territorial, and governmental), as of 2020, few communities have taken steps to declare themselves self-governing communities (Acuña, 2015).

The rights of Indigenous peoples to their lands, territories, and resources are enshrined in the UNDRIP (2007) as well as by the UN Declaration on the Rights of Peasants (2017)—Peru voted in favor of both. However, despite mainstreaming land tenure based on private ownership, Indigenous communities continue to struggle to preserve their rights to ancestral lands and natural resources due to the policy-backed societal pressures for development, as well as differentiated values for extracting natural resources (Shenk et al., 2010). Further, the rights

of communities with individual community titles can be limited by governmental control of subsoil assets (e.g., fossil fuels, minerals), forests, eminent domain conflicts, and carbon (Blackman, 2017). As such, tenure and use distinctions with differing rights can directly influence how Indigenous communities can, or cannot, control the care and quality of nature in their territories.

Peruvian Land Policy Affecting Amazonian Communities

In a given geopolitical boundary, patterns of deforestation and land use typically emerge under different governmental administrations and related policy priorities (Chavez & Perz, 2012). Through many decades, the Peruvian government has engaged public policies to leverage natural resources such as logging, agriculture, and livestock for economic development. Recent examples of such interventions include provision of land use concessions, lines of credit, subsidies, government contracts, infrastructure development, and tax incentives (Chavez & Perz, 2013; Hecht, 2005).

Such policies have resulted in shifting human migrations and resulted land use changes (Chavez & Perz, 2013; INEI, 2015, 2017). For this research, two important Peruvian land and natural resource policies were assessed with a desk analysis of literature, public documents, media coverage, and data obtained from in situ research to determine attributes and impact in Indigenous communities using SLM and TEK and a plural valuation lens.

Case Study 1: Government Decree 27037 "Amazon Law" (Shimaa Community)

The Matsigenka people still preserve a traditional lifestyle rooted in their cosmovision denoting a holistic view of nature wherein plants, animals, and fish are all part of a holistic kinship system sustained in time and space. During a workshop with Matsigenka elders and community leaders, the value of the land specifically what the forest meant for the Matsigenka people was discussed. Unanimous answers reflected that the land for them represents nature or Mother Earth and the forests are their ancestral land where all living and nonliving beings reside and work in harmony to sustain everything in nature. Participant observation coupled with talking circles with Matsigenka community leaders emphasized that one of the main sustenance activities of Matsigenka people is small-scale agriculture, and they continue to grow food adopting traditional farming techniques such as the crop

rotation system and slash and burn agriculture. They cultivate bananas, maize, sweet potatoes, cotton, peanuts, and chili peppers, among other produce, in small gardens cleared from the forest. They supplement their diet with fish, game, fruits, and other foods gathered in the forest and rivers.

In 1998, the Fujimori administration approved the governmental Decree 27037 (Law on Sustainable Investment of the Amazon), referred to as "Amazon Law," with the aim of decreasing the tax burden on business activities through exemptions, resulting in an influx of foreign investments (Ministry of Energy and Mines, 2012a). Following the approval of the Amazon Law, natural gas and oil extraction in Peru was allowed by foreign investors (Montoya, 1993). For example, the well-known Camisea natural gas project is administered by the Camisea Consortium consisting of a selected pool of foreign direct investors and private Peruvian companies (Ministry of Energy and Mines, 2012b). It could be argued that Fujimori's policy reforms proved to be effective for Peru's neoliberal economy considering that in the 2000s the country experienced a rapid economic growth (McMillan & Zoido, 2004). Further, continued use of natural gas is often touted in Eurocentric society as having lower emissions than coal or oil, allowing it to continue to dominate in plans that claim to consider environmental benefits.

However, the Amazon Law resulted in unintended consequences that conflicted with the Indigenous cosmovision and livelihoods of the Matsigenka ethnic group. The approval of the concession license to exploit natural gas in "Block 88" or "Camisea Project," where the country's largest natural gas reserves are located as well as Indigenous communities, demonstrates the threat of the Amazon Law to the Shimaa community the land, TEK, and thereby well-being. For example, a Matsigenka leader pointed out[5] "there is a clear disconnection between our ancestral practices to preserve the land and the government's stake over our land."

The Camisea consortium has been extracting natural gas via two pipelines to transport the natural gas from the Camisea region to Lima, removing forest and disrupting soil and waterways across some of the most sacred land and biodiverse areas of the Amazon (Castillo, 2004; Montoya, 1993). Regardless of this exploitation, the Amazon region has experienced high levels of extreme poverty

and food insecurity in recent decades, despite the increase in agriculture, oil, and natural gas investment in the region (World Bank, 2015). Communities point to increases in this exploitation as a direct cause of environmental issues. For example, during unstructured interviews with Shimaa community elders,[6] the name of this community comes from the word *sima* that in the Matsigenka dialect means fish. The name *sima* or fish refers to the abundance of fish that have been available in the rivers of this community prior to the Camisea Project (Shepard, 2002).

Further, the study finds that the Amazon law fails to mitigate unsustainable business practices by the Camisea consortium companies operating nearby, threatening territorial lands and thereby well-being and survival as a result. Particularly, land erosion, degradation, and water pollution concerns in the ancestral lands of the Matsigenka people emerged concomitant with the lack of diligence of multinational companies in the construction of those pipelines. Such concerns were raised because of four oil spills the community endured between 2004 and 2006 (Castillo, 2004). It has been asserted that unethical business practices created these outcomes, resulting in challenges to the livelihood of Indigenous communities that depend on land for survival (Huambachano, 2011).

In relation to health impacts, the Camisea project has also been linked to illnesses in the community of Shimaa and beyond; some claim this is due to fossil fuel waste materials being dumped in the forest and rivers by Camisea business operations (Hydrocarbons Technology, 2011; Shoobridge & Kapila, 2006; Vigo, 2012). Indeed, a field visit with two Shimaa community members within the territory revealed visible environmental impacts of the Camisea Project, for example, pipeline tubes remaining on the ground, as well as waste like plastic bags and bottles.

Furthermore, during one of the talking circles, a Matsigenka elder expressed "the community's discontent and anger against the Camisea Project[7]" Another Matsigenka elder recalls "I remember when we used to catch lots of fish from the Urubamba River and I would feed my family with fish only but not anymore; not after the Camisea Project's big construction trucks invaded and contaminated our river and spoilt our community."[8]

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5. Interview, Shimaa community, April 13, 2013.

6. Interview, Shimaa community, June 6, 2013.
7. Interview, Shimaa community, June 1, 2013.
8. Interview, Shimaa community, June 1, 2013.

These examples highlight divergent ethical values of use and responsibility of natural resources and demonstrate how the extractive activities supported by the Government Decree 27037 "Amazon Law" represents a form of oppression through land grabbing by destroying parts of Indigenous ancestral territories and diminishing the value of their TEK to provide for themselves. Further, fieldwork observations contend that there has been no evidence of reforestation or similar mitigative work carried out to preserve or restore the area.

Case Study 2: Forest and Wildlife Law (ley forestal y de fauna silvestre) (No. 27308) (Diamante Community)
Enacted in 2000 and entered into force in a 2001, Supreme Decree Forest and Wildlife law (No. 27308) restructured the existing forest regulatory regime that had been in place under the 1975 Forest Law 21147 (ITTO, 2003; Sears & Pinedo-Vasquez, 2011). Although this law forwards concepts of "sustainable forest management" and requires all logging concessions to incorporate "best-management" practices such as use plans, sustainability certification, improved conditions, and to authorize annual harvest areas (L'Roe & Naughton-Treves, 2014; Sears & Pinedo-Vasquez, 2011), in practice, results have been conflicting in both landscape management and socioeconomic impacts. The law was formed with values of SLM and input from the international community, including the FAO, the World Wildlife Fund (WWF), and others (ITTO, 2003; Sears and Pinedo-Vasquez, 2011), but evidence from various studies suggests it has not effectively limited exploitative actors (see Sears & Pinedo-Vasquez, 2011; Smith et al., 2006; Urranaga et al., 2012).

Illegal timber affects Indigenous communities because extractions from unauthorized areas are often from Indigenous land (Hidalgo & Chirinos, 2005; Sears & Pinedo-Vasquez, 2011; Valqui et al., 2015). Although the new law encouraged greater transparency and centrally organized information on land use and forest management, corruption and illegal logging continues, with some estimates upward of 80–90% of total Peruvian timber coming from illegal sources each year (Hidalgo & Chirinos, 2005; Sears & Pinedo-Vasquez, 2011; Urranaga et al., 2012; Valqui et al., 2015).

There are wide-ranging examples of how the law continues to promote a mono-value utilitarian extractive model centered on a Eurocentric approach to development. Smith et al. (2016) argue that the Forest and Wildlife Law does not adequately address timber and logging issues, in part caused by unresolved overlapping and contested land use rights and concessions. For example, the law does not recognize forest users that do not currently have secure land rights, only protecting communally held land overlapping a forestry concession if they have formal title or if the process to formally title the land is underway (Plant & Hvalkof, 2002; Valqui et al., 2015). The law further failed to provide protections for "uncontacted" Indigenous communities as it makes no exceptions or exclusions for lands where these individuals have been reported or otherwise documented (Valqui et al., 2015). In addition, the law encourages privatization by emphasizing plantations and land accumulation by private interests, which can violate FPIC in the case of informal land holdings by Indigenous communities (Sears & Pinedo-Vasquez, 2011; Valqui et al., 2015).

As documented in the literature (see L'Roe & Naughton-Treves, 2014) and in Diamante, these new management practices have caused some Indigenous communities to shift from family-centered riparian logging to new quadrant-based systems. They also reflect a shift toward Eurocentric valuing of nature, moving away from a rich diversity of values for plant and animal species. Such a system encourages road construction, which increases inland logging and often results in additional forest loss and degradation. Although intended to reduce environmental damage by shifting harvest areas, evidence shows this disrupted existing management that benefited Indigenous communities, for example, by targeting areas closer to rivers for transportation and had been implemented in a generally sustainable manner (L'Roe & Naughton-Treves, 2014).

The Diamante community has taken the steps to develop forest management plans and other requirements of the Forest and Wildlife Law (No. 28308), including shifting quadrants for forest management.[9] In workshops and talking circles, some Indigenous community members shared how they were negatively impacted by this as certain equipment and/or physical strength is required to move logs from the inner areas to the riverbed for transport, which resulted in an increased reliance on external actors, including loggers to access timber (Valqui et al., 2015). This influx of external loggers into communities to provide labor and additional equipment further diluted

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9. Participant Observation, Full Community Assembly, October 2013.

direct financial benefits of timber sales for communities and increased interactions with sometimes dangerous and dishonest individuals. Diamante had been somewhat slow to adopt a management plan, but some knowledgeable community members reported this was because non-Indigenous people living in the community were profiting from the current system with external loggers and limited transparency.[10]

Overall, study partners conveyed that such actors had divergent values from Indigenous members, focusing on extraction and often taking more timber than allowed and damaging remaining trees. In some ways, the Forest and Wildlife Law further aggravated these differences, bringing into focus extractive tendencies of non-Indigenous actors and allowing paths for profitability, despite alignment with SLM, while minimizing the intrinsic value of land and linkages between Indigenous cosmovision and TEK, central to community well-being. Further, the law, along with pressure for legal agricultural activity, increased pressure for extractive use in some cases, essentially targeting Indigenous lands for production of resources for societal consumption, often with limited benefits to the communities themselves. Although the practices may have alignment with elements of SLM, TEK values can be lost in such shifts to extractive land use, including long standing traditions around sharing resources among community members, knowledge and appreciation of nontimber forest products, and in acknowledging certain indicators of forest health, which can be overlooked with strong economic drivers for timber; potentially leading to degradation.

In a workshop focused on future land management scenarios, participating community members articulated shared concerns with the current extractive dynamics.[11] For example, in a discussion of balancing timber harvest and habitat protection, one elder community member[12] stated "if we cannot find a balance, we will end up with nothing" in an appeal to the broader community, including youth and migrants, to unify behind sustainable use plans that incorporate TEK and have limited influence by extractive outsiders.

The planned construction of a road by the government across their territory further complicates protection of their land, threatening both TEK and SLM, as it is anticipated to increase access for illegal timber harvest (Finer et al., 2016). Although there are expected benefits (e.g., quicker access to medical treatment), the challenge of maintaining Indigenous values with increasing pressure to extract timber resources remains daunting, particularly when combined with physical access from road construction and policies, like the Forest and Wildlife Law, can encourage utilization. In Diamante, an Indigenous cosmovision centered on a plural or collectivist set of values and responsibilities for the land and TEK has been weakened with changes to forest management laws, the introduction of non-Indigenous actors for resource extraction, increased access to often illicit markets, and governmental encouragement to take up agriculture and extractive activities. Although there is still rich knowledge of plant and animal species, including medicinal, nourishment, fiber materials, and as indicators of overall forest health, threats to the forests and community also directly threaten this knowledge. Despite the permission to harvest in the Forest and Wildlife Law, Diamante has recently collectively explored eliminating wood extraction permits and removed external loggers from the community, demonstrating a commitment to their TEK and an Indigenous interpretation of SLM.[13]

CONCLUSIONS

This investigation identifies challenges to incorporating the plural valuation approach of Indigenous societies by centering on the Matsigenka and Yine peoples and their traditional land management, TEK, and policy-introduced land-based natural resource conflicts. Research findings indicate that extractive utilitarian approaches to land management for natural resources and food production can misalign with the TEK of Indigenous peoples and their plural valuation approach of nature even if aligned with SLM. To illustrate this argument, in this study, Matsigenka and Yine peoples living in the Shimaa and Diamante communities elicited commonalities in their diverse values and beliefs in preserving and managing their ancestral territories rooted in their holistic worldview of nature and are windows into the cosmovision and values of nature of other Indigenous communities. The

10. Participant Observation. Diamante Community Land Planning Workshop. November 2013.
11. Participant Observation. Diamante Community Land Planning Workshop. November 2013.
12. Participant Observation, Talking circle, Diamante community, November 2013.

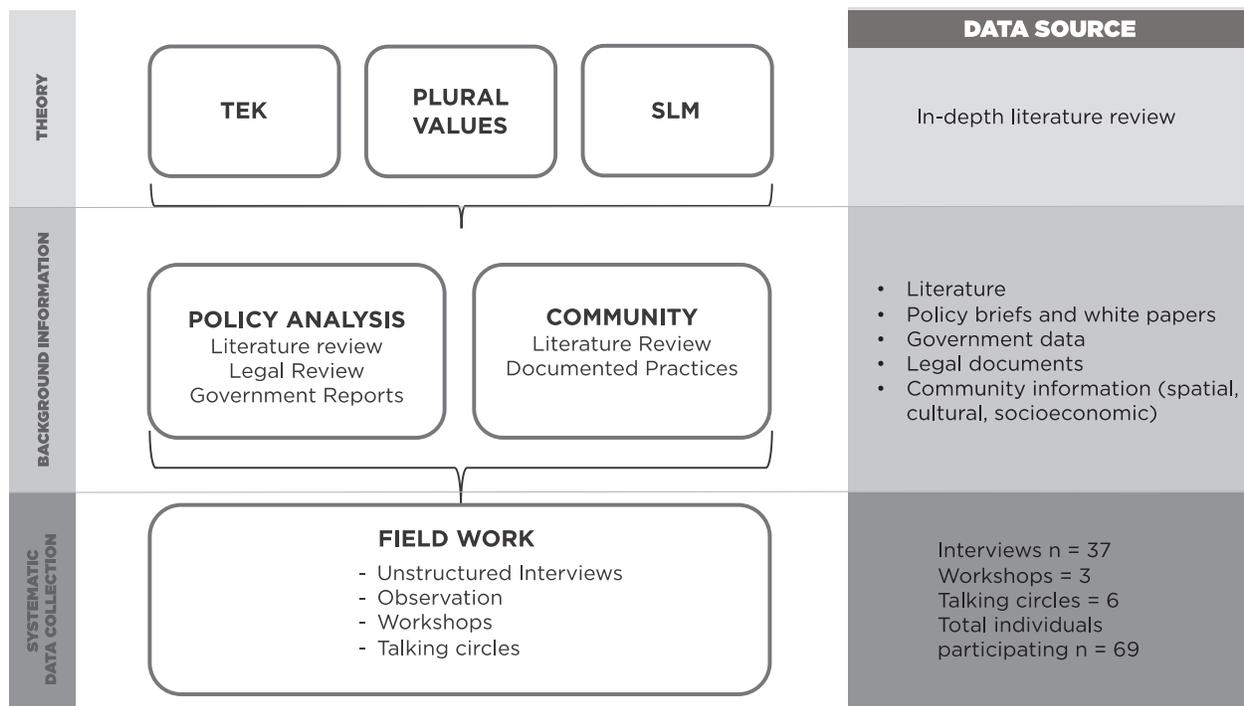13. Key informant interview, SePeru, June 2020.

FIGURE 1. Methodology for plural value analysis of knowledge and policy in Peruvian Shimaa and Diamante indigenous communities.

Matsigenka and Yine peoples' cosmovision highlights a relationship-centric approach to nature wherein human and nonhuman entities interact with one another in a richly symbolic life existence, which guides a holistic sustainable view of land management and is a requirement for maintaining traditional livelihoods.

As a result, these Indigenous groups do not feel alienated from the land, nor superior to it, but quite the opposite, they view themselves as part of it, emphasizing balance of use as foundational. Such an inherent view of the land resonates with the plural valuation of nature discussed by IPBES (Pascual et al., 2017). We argue that although the land management and food production of traditional peoples has often been regarded as unsophisticated and inefficient when compared to Eurocentric approaches, these tactical approaches offer intrinsic value in understanding how to sustainably maintain well-being and resilience while promoting development. If sustainable management is a goal shared by many, all stakeholders across the landscape need to have equal access to tools and knowledge, while following requirements to implement those behaviors. Therefore, effective SLM should inform policies, public education campaigns, and capacity-building efforts that balance various land user needs for near-term productivity with long-term

objectives, inclusive of cultural practices and variations in valuation of nature. There is a profound challenge in engaging multiple stakeholders in a manner that is mindful of Indigenous communities, particularly communities with low interest in destructive practices, intensification, or in scaling market-based activities.

This study suggests that although considering TEK is inherently a plural value approach, SLM requires purposeful planning and implementation to ensure plural values are included in policy making—especially if it impacts the livelihoods and well-being of Indigenous peoples. A disconnection between policies at the national and regional level with local-level impacts is evident in this study, particularly for Indigenous communities. Moreover, a lack of Indigenous TEK in policy making and program planning processes represents an underutilized knowledge resource and results in a source of strain in policy implementation and assessment. This has direct implications for policy implementation not only in the study's focal country of Peru but in other countries with rural and Indigenous populations facing challenges with land management, human development, and conservation. We offer that by assessing and incorporating multiple values of nature to guide decision making with Indigenous knowledge and science, plural valuation can improve the policy-making
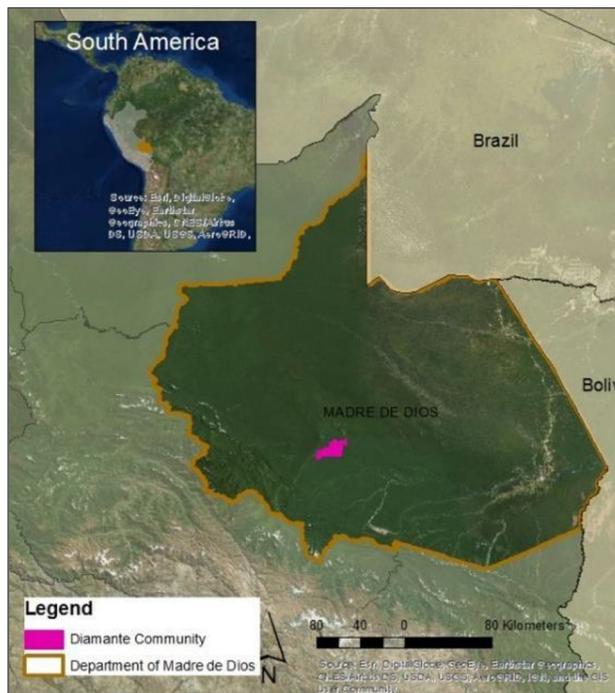
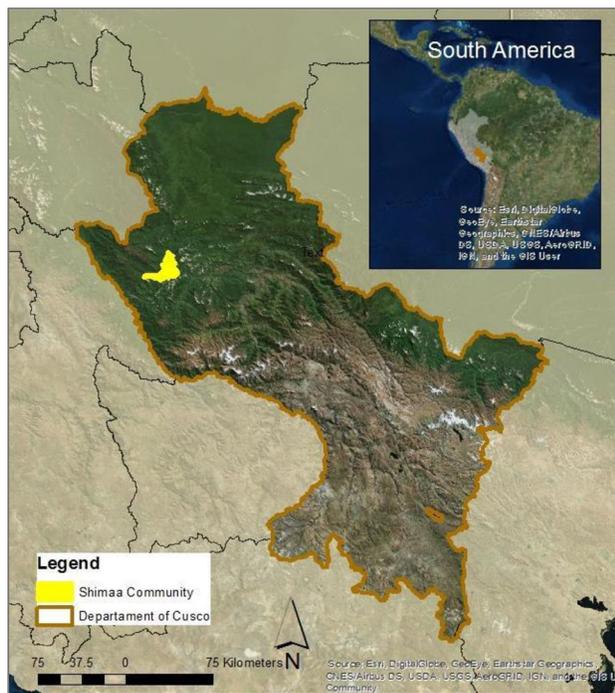**FIGURE 2.** Map of Diamante community, Madre de Dios Peru.

FIGURE 3. Map of Shimaa community, Cusco, Peru.

process. This study reveals this can be achieved by championing alternative views of development that incorporate TEK in SLM, perhaps by explicitly identifying plural valuation of nature intrinsic to a range of actors—a contrast

to merely economic gain in the production of food, gas, minerals, or timber. Indigenous perspectives of TEK, as this study shows, could play a vital role in providing knowledge to improve both the recognition of Indigenous understanding of SLM and societal well-being by folding in externalities (e.g., resulting in higher costs for fossil fuel use and lower emissions, limiting deforestation).

A major endorsement for incorporating plural values such as the TEK of Indigenous peoples in the context of SLM-oriented policy development is that it will likely result in more successful program and policy interventions. For example, improved scientific understanding with the inclusion of rural and Indigenous values and knowledge can support public-facing efforts to formulate policy that can relate SLM and TEK to local realities. To do this, at the local, regional, and international level, policy makers, program and agency leaders, nongovernmental organization, and development organizations need to continue to find ways to work effectively with Indigenous peoples, ensuring safeguards for policy impacts on their communities and quick feedback loops to address grievances and unintended consequences. Such an approach will help to communicate and incorporate current successes into policies that address development needs instead of imposing external and often Eurocentric development trajectories.

To conclude, this study extends application of plural valuation by bridging Indigenous natured-based values held by diverse social actors of Shimaa and Diamante communities with land management impacts from major land polices in Peru. This study calls for a paradigm shift away from a Eurocentric view of land to place the TEK of Indigenous peoples and diverse values of nature at the heart of developing a plural valuation approach in SLM-grounded policies. Recognition of the plurality of nature values would support ecologic stability, climate resilience, maintenance of traditional knowledge and culture, and a wide range of benefits for broader society, including limiting negative externalities like pollution and environmental degradation. These efforts could result in policies and programs with careful analysis, consultation, and inclusion of rural and Indigenous communities, honoring intrinsic values for nature and focusing on the human-nature relationship with an emphasis on well-being—essentially a "paradigm shift" to draw Indigenous TEK into mainstream policy instead of inserting major policies onto Indigenous land.

CASE STUDY QUESTIONS

1. What is an Indigenous cosmovision or worldviews?

2. What are the environmental concerns in each of the communities identified?

3. How does the Indigenous traditional knowledge interact with the policies presented in the study?

4. How might Indigenous peoples' intimate relationship with their lands and the natural world frame an intrinsic value of nature?

5. How might policymakers incorporate indigenous knowledge into the policy-making process?

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