

# The Importance of Place Names in the Search for Ecosystem-Like Concepts in Indigenous Societies: An Example from the Bolivian Andes

Sébastien Boillat · Elvira Serrano · Stephan Rist ·  
Fikret Berkes

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**Abstract** This paper aims to deepen the search for ecosystem-like concepts in indigenous societies by highlighting the importance of place names used by Quechua indigenous farmers from the central Bolivian Andes. Villagers from two communities in the Tunari Mountain Range were asked to list, describe, map and categorize the places they knew on their community's territory. Results show that place names capture spatially explicit units which integrate biotic and abiotic nature and humans, and that there is an emphasis on topographic terms, highlighting the importance of geodiversity. Farmers' perspectives differ from the classical view of ecosystems because they 'humanize' places, considering them as living beings with agency. Consequently, they do not make a distinction between natural and cultural heritage. Their perspective of the environment is that of a personalized, dynamic relationship with the elements of the natural world that are

perceived as living entities. A practical implication of the findings for sustainable development is that since places names make the links between people and the elements of the landscape, toponymy is a tool for ecosystem management rooted in indigenous knowledge. Because place names refer to holistic units linked with people's experience and spatially explicit, they can be used as an entry point to implement an intercultural dialogue for more sustainable land management.

**Keywords** Toponyms · Ecosystem · Traditional knowledge · Land use · Sense of place · Bolivia · Andes

## Introduction

In contemporary ecology, the concept of ecosystem refers to the unit that includes all of the organisms in a given area and their interactions with one another and with their biophysical environment. Golley (1993, p. 3) observes that the ecosystem 'was an extension of the Mother Earth idea in modern guise'. But in practice many ecologists define their 'ecosystems' to exclude people, and tend to depict them in a mechanistic, Newtonian view, as if using a machine theory applied to nature (Golley 1993). This in turn has created problems for environmental conservation regarding the social dimension of ecosystem management (Glaser 2006), prompting searches for ways to restore the unity of human-environment or the integrated social-ecological system (Berkes and Folke 1998; Hoole and Berkes 2010; Berkes 2011). Many environmental sub-disciplines are concerned with developing holistic approaches that would enable understanding the dynamic relationships of societies and their ecosystems, but coordination between them is often lacking (Pretty 2011). Ecosystem-like concepts

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### Present Address:

S. Boillat (✉) · F. Berkes  
Natural Resources Institute, University of Manitoba,  
303-70 Dysart Road, Winnipeg, MB R3T 2M6, Canada  
e-mail: boillat@cc.umanitoba.ca; sboillat@hotmail.com

S. Boillat  
Parque Homero esq. Giovanni Boccaccio, Cochabamba, Bolivia

E. Serrano  
Facultad de Ciencias Agrícolas y Pecuarias, Universidad Mayor  
de San Simón, Av. Petrolera km. 4 1/2, Cochabamba, Bolivia

S. Rist  
Centre for Development and Environment, University of Bern,  
Hallerstrasse 10, CH-3012 Bern, Switzerland

existed (and to some extent still exist) in a number of indigenous societies in various parts of the world (Berkes and others 1998; Berkes 2012). What can we learn from these societies? What are main insights for understanding the interrelationships between worldview, practices and traditional knowledge and what do they mean for sustainable development? We examine these questions in regard to an indigenous society in the Andes, a region where the concept of Mother Earth idea has a long tradition (Sampietro Vattuone and others 2008).

Perhaps the best known examples of traditional ecosystem-like concepts come from the Pacific region and include the ancient Hawaiian *ahupua'a*. These wedge-shaped units of land and sea belonged to specific groups of people. They stretched from mountain top to the coast, and included various use zones as well a protected forest at high elevation (Costa-Pierce 1987). Variations of the Hawaiian system may be found in the Yap *tabinau*, the Fijian *vanua*, and the Solomon Islands *puava*. In each, the term refers to an intimate association of a group of people with land, reef, and lagoon, and all that grows on or in them. This 'integrated corporate estate' concept is effectively the personal ecosystem of the group in question (Hviding 2006). Similar notions of integrated social-ecological systems exist in various parts of the earth. These include the watershed-based indigenous salmon resource use systems of the Pacific Northwest (Williams and Hunn 1982); Balinese water temples and the holistic management of rice irrigation (Lansing 1987); the aboriginal Australian concept translated as country, which situates humans as belonging (or not belonging) to a particular piece of land (Howitt 2002; Weir 2009); and the Canadian eastern sub-arctic Cree notion of *ashkii* (land) which encompasses the biophysical environment as well as the humans that go with it, as part of the 'dressing of the land' that makes the land complete (Berkes and others 1998).

Two key characteristics define these indigenous ecosystem-like concepts (Berkes and others 1998). First, the social-ecological unit is defined in terms of some spatially explicit boundary. This might be what natural scientists would call a geographical boundary, such as a watershed. The spatially explicit unit may be potentially characterized by vegetation types, or some aspect of biodiversity or geodiversity (Gray 2011). Second, humans within this social-ecological unit are interlinked or interrelated with the animals, plants and the physical environment with some kind of bond. This bond is often cultural, as in the cultural identification of a group with the 'country' or land. In this sense, native worldviews have been qualified as 'spatially oriented' (Pierotti and Wildcat 2000). More generally, recent social theory is bringing an increased attention to spatial relationships (Howitt 2002), and could help deepen the understanding of this cultural bond. This includes the

concept of primal landscapes, which emphasizes the importance of the meaning children ascribe to the environments in which they grow up (Measham 2006), and the concept of place as an event rather than a thing, in which the spatial dimension corresponds to a relation where the subject and the perceived world are immersed (Howitt 2002). As a matter of fact, many traditional societies do not make a fundamental separation between nature and culture, nor between the living and the non-living (Ingold 2006). For example, the Anishinaabe people of Pikangikum perceive forest fires as beings who possess agency and who intentionally create order in landscapes (Miller and Davidson-Hunt 2010).

Our starting point in this article is toponyms or place names. A place begins to exist when people give it a name and a meaning, thus differentiating it from the larger, undifferentiated space (Tuan 1977). The largest body of literature on place-making deals with the meaning of places for large social groups (e.g., Brace and others 2006; Shinde 2012). Here we focus more specifically on places that are meaningful to small communities, seeking for local place names which express specific interactions of a social group with specific elements of the environment. In Slovenia, Penko Seidl (2008) found that these local place names often last for a long time, survive language shifts, and that only very few place names are known outside the community in which they are used. Taylor (2008) showed how local place names were used as collective expressions of identity and political power by the San of Namibia to claim exclusive access to an area. According to Radding and Western (2010), a place name often becomes opaque with time and successive historical events, as its original meaning is lost and the name becomes divorced from the original reason of choice. While this seems to be widely the case in the Western world, a study of Nahua toponyms in Mexico found that most place names were in fact 'analyzable' in the sense that they were formed of signifying lexemes in the local language (Taller de tradicion oral and Beaucage 1996).

Native Andean cultures have been known to have a tradition of highly detailed and accurate perception of space, often poorly understood by science. Many achievements of pre-Colombian Andean civilizations related to space perception and management remain unexplained. For example one thinks about the Nazca representations in Peru or the straight lines around the Sajama volcano in Bolivia, which are only visible from the sky (Aveni 1996). Referring to contemporary Quechua and Aymara communities in western Bolivia and northern Chile, Martínez (1989) mentions the fact that 'there is hardly a square meter of land that would not have been denominated'. He speaks about 'a full space, filled with meaning, which exists and makes existence possible; and a

humanized space made real by the linguistic process, with which it is possible to build a relationship' (Martínez 1989, p. 23).

In this article, our objective is to deepen investigation about ecosystem-like concepts in traditional societies by highlighting the importance of place names. Landscape ethnoecology makes a distinction between the study of 'place kinds' or 'folk ecotopes' that occur repeatedly across space, and place names, which are unique spots on the landscape (Hunn and Meilleur 2010). Our study considers categories of places and more specifically focuses on place names with the objective to characterize concrete cultural bounds between people and their land. We argue that, at least for our study area, place names are concrete elements of traditional knowledge that are able to integrate biotic, non-biotic and human elements of the landscape and to order them into geographically defined, operational basic units. We begin with an overview of the study area and methods. We next discuss place names, first by the kinds of characteristics they refer to, and second, the reason and the significance of the names. We then examine the nature of the link or bond between the people and the landscape, how people build personalized relationships with places, how they categorize places and what are the implications of their perspective on local ecosystem management.

## Study Area and Methods

Research was carried out with the peasant communities of Chorojo and Tirani, in the Tunari Mountain Range (*Cor-dillera del Tunari*), near the city of Cochabamba in central

Bolivia (Fig. 1; Table 1). Since the Inca rule in the fourteenth and fifteenth centuries and the subsequent Spanish conquest, the Cochabamba valley has been an important agricultural production centre in what is today called Bolivia. During colonial and republican times, the authorities granted valley and then mountain farms to landlords who kept indigenous workers under serfdom. Cochabamba was the centre of the 1952 Bolivian revolution that led to the agrarian reform after 1953, through which large estates were expropriated in favor of agrarian syndicates formed by Quechua-speaking workers.

As of 2010, each agrarian syndicate represents about 20–200 families. They collectively own and regulate the use of a continuous area of about 10–20 sq km that they call their territory. The syndicates, together with the territory, form a whole that people call the 'peasant community'. Community members identify themselves as *campesinos* (peasants) who belong to the Quechua group, but more precisely as being *comunarios* (community members) of their respective villages. Hereafter, we will refer to the people of the study area as *comunarios*. In the Tunari Range, between 2,700 and 4,600 m, extensive land use contrasts with intensive agriculture in the valley and the growing urban area of Cochabamba. In these mountains, *comunarios* practice traditional, non-mechanized potato and other crop production on small plots, complemented with extensive pastoralism and small-scale forestry. Depending on the harvest, approximately half of the production is marketed and the rest is kept for self-consumption. While grazing and highland agriculture areas are collectively owned, irrigated and rain-fed agricultural plots on the slopes are owned by families and individuals under customary rule, sometimes with formal recognition.

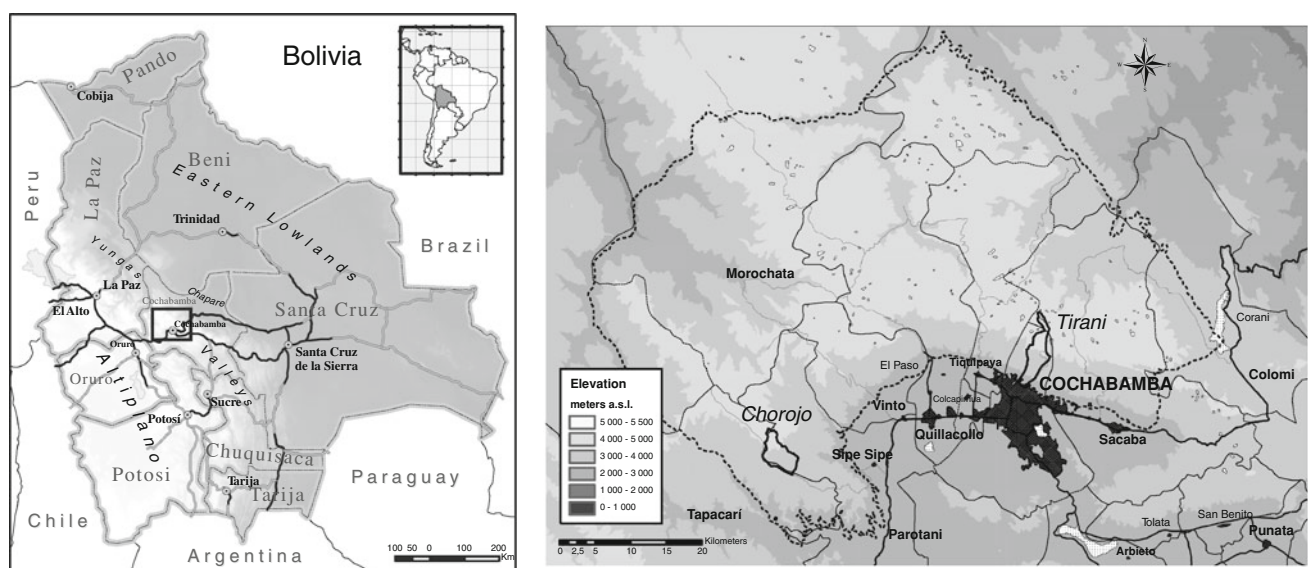


Fig. 1 Location of the study area

**Table 1** Main characteristics of the two communities studied

	Chorojo	Tirani
Area (km <sup>2</sup> )	16.4	19.8
Altitude range (m)	3,400–4,600	2,700–4,500
Population	230	1,200
Access	60 km from the city of Cochabamba, seasonal track road	Adjacent to the city of Cochabamba's neighborhoods
Education offered	Up to fifth grade	Up to high school, university in the city
Health services	Health post since 2009	Health post, hospital in the city
Languages spoken	Most Quechua monolingual; young men and some women bilingual with Spanish	Most bilingual Quechua-/Spanish, some older women Quechua monolingual
Economy	Subsistence and some market-oriented agriculture, off-farm migration	Market-oriented agriculture and floriculture, temporary jobs
Relation with Tunari National Park	Park regulations not applied	Park regulations applied: ban on grazing, exotic tree plantations

Source modified from Boillat (2007, p. 130)

The Tunari Range is characterized by a high topographical and biological diversity, ranging from irrigated fields and shrublands at the foothills to a mosaic of rain-fed fields, shrublands, *Polylepis* forest patches and pine and eucalyptus plantations on the slopes, and high-altitude grasslands on the hilltops. The area harbours a high level of biological endemism (Fjeldsa and Kessler 1996) and was declared the Tunari National Park (TNP) in 1962. The boundaries of the Park were then extended in 1991, restricting agriculture and pastoralism, and promoting forestation. The community of Tirani, near the city and included in the Park since the beginning, has experienced a transformation of livelihoods due to Park regulations and urbanization, including the abandonment of pastoralism and cultivation in part of the territory; in the rest of the Park, however, regulations are poorly enforced and most people living in the area still practice traditional agriculture (Boillat and others 2008). This is the case of Chorojo, which, though included in the Park since 1991, has experienced less external stress and relatively little change (Serrano and others 2006). In Tirani and Chorojo, people speak Quechua as mother tongue. Most people from Tirani are bilingual with Spanish, except older women; in Chorojo most people are Quechua monolinguals with younger men and some women being bilingual with Spanish. Table 1 summarizes the characteristics of both communities.

In 2002, several communities included within the TNP expressed concerns about a possible stricter enforcement of the Park regulations (AGRUCO 2002). In this context, the Federation of Cochabamba Agrarian Syndicates asked researchers from the San Simón University of Cochabamba to help these communities to gain recognition as traditional managers of the area. A research partnership which included the agrarian syndicates and Bolivian, Swiss and Canadian universities was set up with the objective to highlight the role of the communities' traditional ecological

knowledge in managing the area. The two communities were chosen to represent traditional management (Chorojo) and transformed management due to park regulations and urbanization (Tirani). The present study was part of this partnership and had the specific objective to investigate ecosystem-like concepts used by indigenous farmers in both communities. During the research process, it became soon clear that rather than using generic categories of places, the farmers use specific place names to attach concrete ecological knowledge of their territory, and consider this knowledge as a proof of their capabilities to manage the area (more details see also Boillat and others 2008).

To investigate the body of knowledge linked with place names, two rounds of focus group discussions were carried out in each community. Informants were chosen during the monthly community meeting among interested people, ensuring that participants included women and men, as well as all adult age groups (Table 2). During the first round, in July and August 2005, the participants were asked to list all place names they know within the territory of the community. Then, for each listed name they were asked to explain (1) why this place was called so, and (2) why this place was important for them. Finally, they were asked to locate each place name on a high-resolution (1 m per pixel), 1:6,000 print of satellite images from the area, obtained from Google Earth (© Google). To ensure gender-balanced participation, these activities were carried out separately with one group of women and one group of men, and then each group presented and discussed the results in a plenary session. Results were handed over to the communities in form of toponymic maps. A second round of focus group discussions was held in May 2006, where the participants were asked to do a further abstraction effort and to list 'categories of places', describe them and evaluate their potential for productive activities. They were also asked to mention categories of altitudinal belts, vegetation types and land use types they knew about.



**Table 2** Participants in focus group discussions and interviews in the framework of the study

	Chorojo		Tirani	
	Men	Women	Men	Women
First round of discussion groups				
Group of men	15	–	15	–
Group of women	–	12	–	11
Mixed group	10	8	6	3
Second round of discussion groups				
Mixed group	5	4	7	5
Open-ended interviews	6	5	7	4

Between the two discussion workshops, open-ended interviews were carried out with key informants (Table 2), mainly the elders, with the objective to inquire about existing institutions of knowledge, understood as ‘the subset of institutions, which frames the processes of remembering, creativity, and learning’ (Davidson-Hunt and Berkes 2003, p. 2) in relation to places and place names. Institutions of knowledge are intimately related with people’s worldview, i.e., the way people conceive the universe, which invariably shape how people interpret their observations (Berkes 2012). Seven fields transects in Tirani and four in Chorojo with small groups of 2–6 people designated by the local organization<sup>1</sup>, as well as the use of printed photographs further allowed to verify the location of selected places. Finally, participant observation was carried out accompanying the *comunarios* in sowing, harvesting and, to a lesser extent, shepherding and forestry activities. There was about 70 % overlap of the people involved in focus groups, interviews and transects. Data processing consisted in sorting all place names according to their meaning and their importance, digitalizing and analyzing their location into a GIS (using ArcGIS, © ESRI), as well as transcribing, recompiling and interpreting testimonies and field notes on the topic of place names, using Atlas.Ti (© Scientific Software Inc.). More details of the study area and methods may be found in Boillat (2007).

## Results

### Listing and Mapping Place Names

In Chorojo, the participants listed first all places located at the community’s borders, and then moved in a diminishing spiral toward the centre of their territory. They listed a total

of 240 place names; with 131 place names listed by the group of men and 79 by the group of women. Twenty nine names were mentioned by both groups. Fifty-nine additional names were mentioned during field transects and validation phases. In Tirani, the participants listed 68 place names starting from the higher to the lower areas of their land. The men mentioned 28 place names and the women 34, including 18 place names mentioned by both groups. Because some people arrived late while others had to leave the meeting earlier, it was not possible to drive conclusions about gender differences in the repartition of knowledge on place names. Transects and validation phases yielded 24 additional names.

Of all place names listed, 95 % had a concrete meaning in Quechua or Spanish, which could be explained by the participants. The remaining 5 % were names that neither belong to Quechua nor Spanish. People called these places ‘named by the grandfathers’. The explainable meanings were related to either one or two characteristics of the place. All place names expressing two characteristics included a term referring to topography, except eight place names that included a term referring to water. Among all place names, 69 % included a reference to topography in Chorojo and 53 % in Tirani. References to other characteristics were very diverse and occurred in less than 20 % of the names for each characteristic. Table 3 shows the diverse characteristics expressed in the meanings of place names, by order of importance, topography being the most important single characteristic, followed by native flora, soils, rocks and so on.

The mapping session produced a set of maps for each community, including the maps drawn by the men and by the women’s groups. During the plenary session men and women agreed on the validity and location of the places names, allowing building a single, consensual toponymic map. Figure 2 shows a section of the map produced for the community of Chorojo<sup>2</sup>. The participants easily conceptualized mapping units as polygons, using natural boundaries like rivers, watershed divisions, field or forest limits, or altitude lines. Sometimes the place’s limits were made evident by its topographical characteristics, in other cases when the name referred to a point feature, e.g., a stone with a specific shape, the place was assumed to coincide with this feature’s surroundings. When combined with land cover information, the produced maps show also that places do not correspond to specific land use and land cover types (Fig. 2). Rather, a high diversity of land use categories and land cover types can usually be found within a single place. The map of toponyms thus is representing a layer of categories that is clearly different from scientific

<sup>1</sup> While in Tirani the local organization preferred to plan transects with the researchers, in Chorojo they privileged participant observation for the researchers, arguing that so they would best learn about their territory and their knowledge.

<sup>2</sup> The whole map can be found in Online Resource 1

**Table 3** Characteristics expressed in the meanings of place names in Chorojo and Tirani

Characteristics	Examples	Literal translation
Topography, shape of the relief	Sombrerito Orqo Jatun Kinray	'Hat-shaped mountain' 'Large slope'
Native flora, plants or vegetation types	Q'otu Monte Yaretayoq Loma	'Dense forest' 'Hill with <i>yareta</i> ( <i>Azorella compacta</i> )
Soil characteristics	Puka Churo Llust'a Kinray	'Site with red soil between two rivers' 'Slippery slope'
Rocks, often with a particular shape	Killa Rumi Mama Rumi	'Moon-shaped rock' 'Mother-like rock'
Built environment: houses, school, road, market, etc.	Escuela Churo Qolqe Yupana	'School site between two rivers' 'Where we count the money'
Native fauna	Atoq Jusq'ito	'Andean fox's ( <i>Pseudalopex culpaeus</i> ) small hole'
History: a past event in the place	Machu Wañusqa Inca Waraqasqa	'Where an old man died' 'Place hit by the Inca's sling'
Water: source, stream, river, lake	Qhochá Pampa	'Flat area with a small lake'
Secondary: name is defined by its relation to another site	Jatun Rumi Wasa Kursani Qhuchu	'At the big rock's back' 'Corner of Kursani'
Cultivation: sowing, crop production	Habas Tarpuna Era Moq'o	'Place where lima beans are sown' 'Knoll where wheat is threshed'
Pastoralism: grazing, livestock production	Waka Rodeo Pampa	'Where we gather the cows'
Climate, microclimate	Qoñi Pampa	'Warm flat area'
Religious and spiritual: saint, spirit, sacred place, religious infrastructure	Auki Samana Calvario Moq'o Laguna San Juan	'Where the ancestor rests' 'Calvary (place of Jesus' crucifixion) hill' 'Saint John's lake'
Boundaries, meeting places, etc.	Kinsa Linde Punta	'Peak of the three limits'

biophysical categories used for mapping land use and land cover.

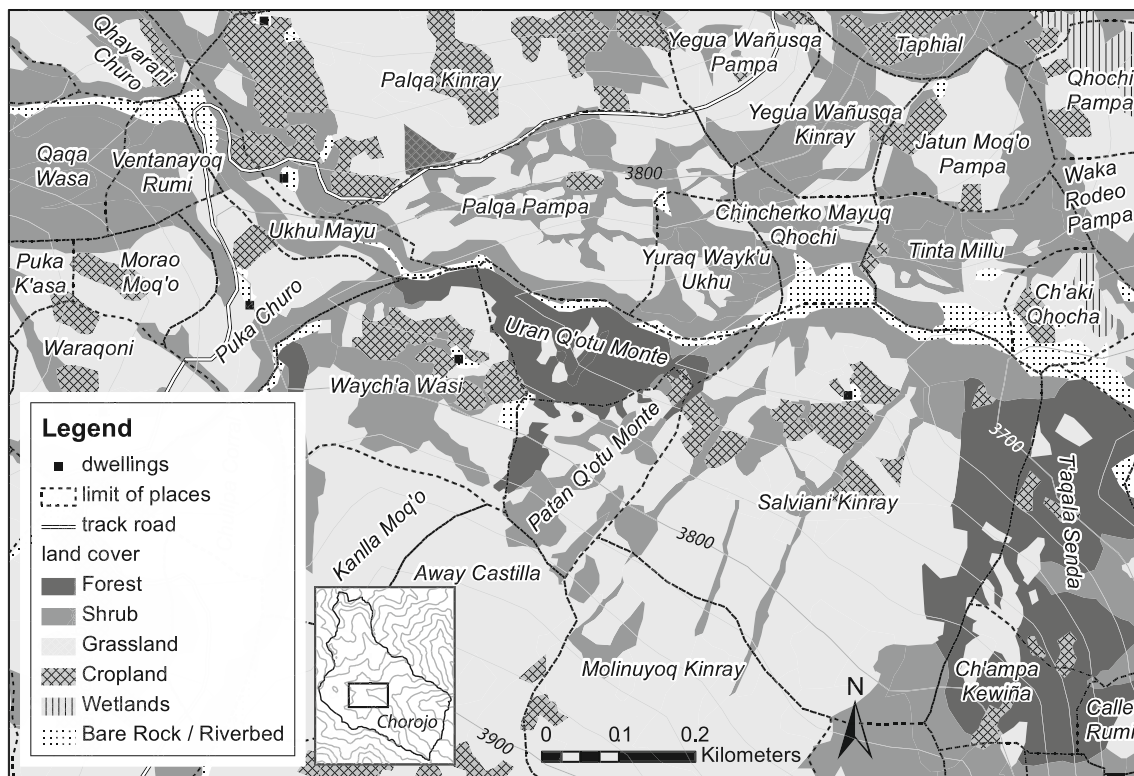
#### Characterizing Places

Table 4 shows six examples of how place names were described, with the answers provided by the participants on 'why a place is called like that' and 'why is it important for the community'. The descriptions show the high diversity of information and categories that people associate with each place name. Places described as important for cultivation or pastoralism had often a topographic component in their name, but the use of a place was not strictly related to the meaning of its name. The importance of a place referred to crop production in 43 % of all described places, and to pastoralism in 39 %, showing the prevalence of traditional activities. 17 % of described places included a reference to water. Other characteristics of importance mentioned were forestry, pathways, sacred sites, built environment and wild fauna. These examples show that place names express geographically the bounds people have with the elements of the land. Place names thus refer

to basic units to which local knowledge on resources, potentials and experiences is geographically attached.

Participants mentioned the sacred character of the territory and the strong link between the land and their identity. First, they insisted not to rank the importance of places, because 'every place is important' and necessary to the integrity of their territory. Second, they related land to the *Pachamama*, a maternal figure linked to the earth and crop production (Van den Berg 1990; Rist 2002)<sup>3</sup>. An elder from Chorojo stated: '*Pachamama* is everywhere in Chorojo, in the gulches, in the rivers, from the Jatun Mayu river to the protecting mountains (...)', showing that the use of place names also includes a spiritual perception that goes beyond merely ordering productive activities geographically and also beyond the physical boundaries of a place.

<sup>3</sup> There are many interpretations of the notion of *Pachamama* which also play a role in contemporary Bolivian cultural politics and among urban groups. For lack of space, we cannot extend further discussion of the concept, but focus exclusively on the notion of *Pachamama* in the rural context, as referred to in the rituals aimed at improving agricultural production (Van den Berg 1990).



**Fig. 2** Section of the toponymic map of the community of Chorojo

**Table 4** Examples of description of the places given by workshop participants in Chorojo and Tirani

Place name	Answer to 'why is this place called that'	Answer to 'why is this place important'
Balcón Cueva	There is a little cave shaped like a balcony where one can hide from the rain; inside the cave there is a <i>qhocha</i> (small lake), which is now dry	This is the place where oca, potatoes, ulluco are grown. That is where our comrade Eulogio lives
Kasasani o Kasani Ch'anca	It is <i>monte</i> (woodland), it is really a <i>ch'anca</i> (stony place). It was a place where wild animals were hunted ( <i>cazar</i> , in Spanish)	In the <i>ch'anca</i> , there is grass, <i>ichhu</i> ( <i>Stipa ichu</i> ), <i>kewiñas</i> ( <i>Polylepis subtusabilda</i> ) for the animals to graze. It is a sacred site; it is <i>Auki Cabildo</i> (where the ancestors meet)
Awara Pampa	It is a <i>pampa</i> (flat place) with a <i>moq'o</i> (small hill); you can see everything from there. It is joyful to see	That place is for sown fields, the lands are apt for agriculture, and that place produces each year, because these are not <i>aynoqas</i> (sector fallow fields) because everyone has fields
Chawpi Monte	It's the centre ( <i>chawpi</i> ) of the woodlands ( <i>monte</i> )	It's for gathering firewood, to cut (wood) for the fences of shifting pens; there is <i>lewincho</i> ( <i>Schinus andinus</i> ) and <i>t'ola</i> ( <i>Baccharis dracunculifolia</i> )
Lama Pampa	It is suitable for cultivation (potato, wheat, barley, oats and root crops like mashua, oca, and ulluco), they were croplands, everything grows there; it is big, everyone has land there	There's <i>kapalipa</i> (unidentified species), <i>retama</i> ( <i>Spartium junceum</i> ), <i>kewiña</i> , <i>t'ola</i> , <i>qayaras</i> ( <i>Puya</i> spp.), alders ( <i>Alnus acuminata</i> ). Now it has been reforested, it cannot be used any more, it is 90 % planted with pine and eucalyptus
Chola Qhawana	From there you could see a <i>cholita</i> (woman dressed traditionally) in front of Viscachani. The name has been put there as a sign, because it is haunted, a <i>cholita</i> appears	It used to be a nice place to graze, the animals always went there; it is a place for grazing, but there are no more animals. There are crops

#### Places, Knowledge Institutions and Worldview

The statements made by the *comunarios* during open-ended interviews and participative observation gave further

insights on the bonds that link people with places. Table 5 shows statements stemming from male and female villagers of all ages from Chorojo and Tirani, in relation to places. The first six statements show that places are

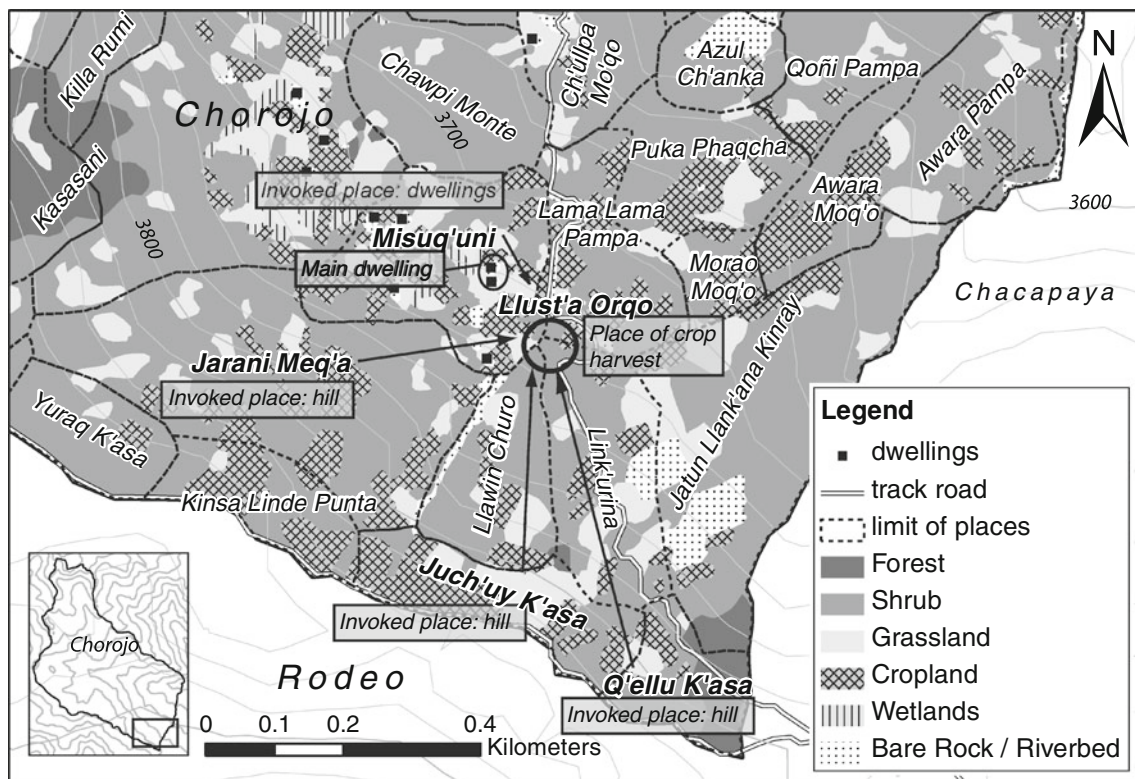
**Table 5** Statements expressed by the *comunarios* around the notion of place and place names

Principles expressed	Statements from community members
Places are living beings	<p>(1) The people put a name to each place. It is like us, each one of us has a name. This hill also has its name, as does every one of them</p> <p>(2) The name of the Río Colon is the one which is written in the executive property title of the community. Some named it Pintu Mayu. I wonder why? ... How can I say ‘My name is Don Donato’ and the day after tomorrow they might call me Don Berno or something like that ... but my name is Donato Merida!</p> <p>(3) The female places are those where it is easy to cultivate, the pampas, these are Pachamamas. There are female mountains and male mountains, irregular mountains with holes; those would be Pachatatatas (‘earth’s fathers’) or Cabildos. The flat mountains, those are Pachamamas</p>
Places have agency	<p>(4) Some places are strong, like those in the highlands, and they help to produce potatoes, oca, barley, and oats</p> <p>(5) Sometimes the boys climb trees, fall off and get sick. Then we perform a q’oa, we call back the spirit, give offerings (‘invite’) to the Pachamama so that they may heal. There are places where no q’oas are performed, and that is why the boys fall ill</p> <p>(6) Certain places are bad. If I am going to plant in those places which are bad, especially for human beings, then the plant won’t hurt me, but it is the place that will hurt me. That is the belief. But at least we know those places which cannot be touched</p>
Bond with places through reciprocity and respect	<p>(7) That side [of the hill’s soil] has already fallen because people have harvested the trees. Sometimes the wind makes it fall and also the rain. Since we have multiplied ourselves, people use it and the hill has the right to make it fall</p> <p>(8) When we are sowing, we always perform the ch’alla for the most important mountains, for the places (lugares). We are inviting them because this zone has names, from each place. (...) So we entrust ourselves to them, who act as intermediaries. We entrust them with our work</p> <p>(9) We have to name every peak and hill and propitiate them the rituals of ch’alla and q’oa if we want to sow potatoes and other tubers. We also name the big stones, the Aqorani hill and the Tunari Peak, which is called San Martin, these are important mountains for propitiating, we name them and so we have learned from our grandfathers</p> <p>(10) Let us propitiate a ch’alla ritual to the Holy Earth, in the same way we propitiate the ch’alla to the Holy Virgin Earth (<i>Santa Terra Virgina</i>) of Q’ellu K’asa, of Jarani, also the same for Juch’uy K’asa, and now we give the ch’alla to the Holy Virgin Land of Misuq’uni. (...) So today we will harvest the product and tomorrow we will bring it to Sipe Sipe, may it be in a good time, Llust’a Orqo is our Holy Land to give the ch’alla, because it made us produce, so we identify us with him</p>
Need for interaction	<p>(11) Places where there are no human people, get angry when we approach them. Vapors raise from the lakes, or hail falls, or cold or wind comes. But when the lakes are calmed down (<i>mansos</i>), in that case nothing happens</p> <p>(12) Here, for example in the highlands, if you sit down on a ‘virgin’ rock (<i>una piedra virgen</i>) where no one has ever been, you get <i>jap’eqa</i>, you fall ill</p>
Common natural and cultural heritage	<p>(13) Killa Rumi (‘moon’s rock’), the place stirs that name (<i>este nombre levanta</i>), right? (...) I think that this place is called Killa Rumi since the time of the Incas. (...) It must exist from the time of the Incas</p> <p>(14) Before, the gold used to just lie on top of the ground. People say that the Incas put it inside the depths of the land using a sling (<i>de un waraqazo</i>). (...) The Incas commanded the stones as if they were sheep. The Incas could even move the mountains</p>
Origin of knowledge in the land	<p>(15) There it is (the Aqorani peak) Jatun Mariano (the ‘big’ Mariano), and he has his brother, Juch’uy Mariano (the ‘small’ Mariano). It has its name, that’s what its name is. That is what we found out</p> <p>(16) The pyramids (a group of three sacred mountains) appear in dreams and show that we must invite them. (...) ‘You will invite me something like this, I want this part, it is my food’, they say, that is how they reveal themselves</p>

considered to have life-like characteristics. The statements 1 and 2 express a strong analogy between place names and people’s names, giving emphasis in respecting the identity of a place. According to the third statement, some places are also said to have a ‘gender’ and are associated to male or female expressions (for more details see Serrano and others 2006). Moreover, the statements 4–6 attribute

agency to the places: they are said to be ‘good’ or ‘bad’ and able to ‘get angry’, changing the weather, destroying crops or giving people or animals ‘fright sickness’, called *jap’eqa* or *susto*, which is interpreted by the theft of the soul through the place. In this context, virtually all elements of the landscapes are living beings with an ‘inner world’ expressed in a capability of intentionality and an ‘outer





**Fig. 3** Location of the sites cited during a ritual offering in Chorajo

world' expressed in the forms of stones, mountains, lakes, rivers, plants or animals. They form a 'natural community', in which each entity has life, spirit and agency, thus 'humanizing' the landscape (Serrano and others 2006).

The next four statements show the implications of considering places as living beings for the cultural bounds people have with the land. The statement 7 refers to soil erosion which people clearly perceive as a result of overuse. In this case, they interpret the loss of soil as the expression of the 'hill's agency' who reacts to people's lack of respect. The statements 5 and 8–10 refer to ritual offerings to the places made under the form of 'ritual tables', also called *q'oa*, composed of incense, a mixture of plants and symbolic figures made of sugar called 'mysteries' (*misterios*), which are burned and subsequently buried on the site. The ritual is performed during sowing, harvest and other key dates of the ritual calendar, and is associated with a banquet to which spiritual entities are 'invited' to share food, represented by the ritual table, and drinking (*ch'alla*) in form of alcoholic beverage dropped to the ground (Fernandez 1995). More specifically, the statement 10 is an example of a prayer recited by a *comunario* during a ritual to start a harvest. First, he addresses the offering to the 'Holy Virgin Earth', which is a way of naming the *Pachamama* (Van den Berg 1990). Then, he lists a series of places to which the offering is directed. Figure 3 shows the location of the sites listed

during the ritual: the first three places mentioned are nearby hills. The fourth site corresponds to the dwelling place of the *comunario* who recite the prayer. Finally, the prayer is directed to the specific site where the crop is harvested.

The last four statements give further insights on how people explain the origin of knowledge about the land. In the statements 13 and 14, people attribute to the Inca both the creation and the naming of the places that shape the current landscape. *Comunarios* associate the Inca with a 'civilizing mission' directed towards people and nature together (Gil Garcia and Fernandez Juarez 2008), and consider the Inca as the origin of both cultural and natural heritage which cannot be set apart one from the other. The statements 15 and 16 show that the *comunarios* interpret the creation of some place names as a revelation which is the result of a dialogue with the place. This is especially the case with the most sacred and highest mountains, the Aqorani and Tunari peaks, which have human names that are believed to pre-exist human knowledge. In this context, one can identify several sources of knowledge about place names: on the one hand, the answers given by the *comunarios* on 'why is a place called so' (Table 4) show that names are clearly linked with directly observable features of a place; on the other hand, some places are more linked with a mythical and spiritual dimension where knowledge also comes from dreams and revelations.

**Table 6** Specific sites to which people attribute particular powers

Name	Attributed powers	Category	Location
‘Big’ and ‘Small’ Aqorani peaks	The ‘father’ and ‘mother’ of the community, gather the snow to bring water to the community	Sacred mountain ( <i>orqo</i> ), ancestors’ gathering ( <i>auki cabildo</i> )	Chorojo
The three pyramids: Sombrerito, Negro Wañusqa and Cara del Indio	Have minerals that make water sources pure; may get angry raising clouds and hail	Sacred mountain ( <i>orqo</i> )	Tirani and neighbour community of Leuque Pampa
San Martin Tunari	The protector of Cochabamba, has a male and a female part	Sacred mountain ( <i>orqo</i> )	20 km from Chorojo and 25 km from Tirani
Illimani	The protector of La Paz, the source of reproduction and life, has three male and female parts	Sacred mountain ( <i>orqo</i> )	About 40 km from La Paz
Khuchi Rumi (pig rock)	Brings luck to those who raise pigs; may get angry and make trucks fall into the ravine	Rock, spirit of livestock ( <i>illa</i> )	Chorojo, along the road to Waka Playa
Toro Lunki (abundance of bulls)	Brings luck to those who raise cows	Rock, spirit of livestock ( <i>illa</i> )	2 km from Chorojo
Killa Rumi (moon’s rock)	Shines at night when there is no moon; stems from the times of the Inca	Rock	Chorojo
Cumbre Rumi (summit’s rock)	Opens at midnight and a band starts playing. Has tunnels which connects it to the Cochabamba cathedral and the Pyramid mountains	Rock	Tirani
Toro Laguna (bull’s lake)	Gets angry by raising clouds and hail when someone makes noise	Lake	About 5 km from Tirani
Kasasani Monte	The trees look like ancestors that are watching people, they are as old as the Incas	Forest, ancestors’ gathering ( <i>auki cabildo</i> )	Chorojo

The interplay between place names, knowledge institutions and worldview shows that people attribute different, often overlapping functions to places and place names. Besides political and ownership claim (statement 2) and location of resources (Table 4), some places are believed to have particular powers. These sites are not called sacred sites, because the *comunarios* consider that the whole territory is sacred, and that ritual offerings may be directed to any places, including fields and dwellings. Table 6 shows some of these sites mentioned by Chorojo and Tirani villagers, the power they attribute to them and their locations. While the ‘power’ of some places may be locally restricted, other places, like for example the protecting mountains or the rocks which are believed to bring luck in livestock breeding, are believed to influence the human-nature community well beyond their spatially explicit locations. These places may lie beyond the political boundaries of the communities. Though they have a spatially explicit location, their spatial and temporal scale of interaction with the human and natural community is rather open and different to the local function attributed to the other sites.

#### Categories of Places

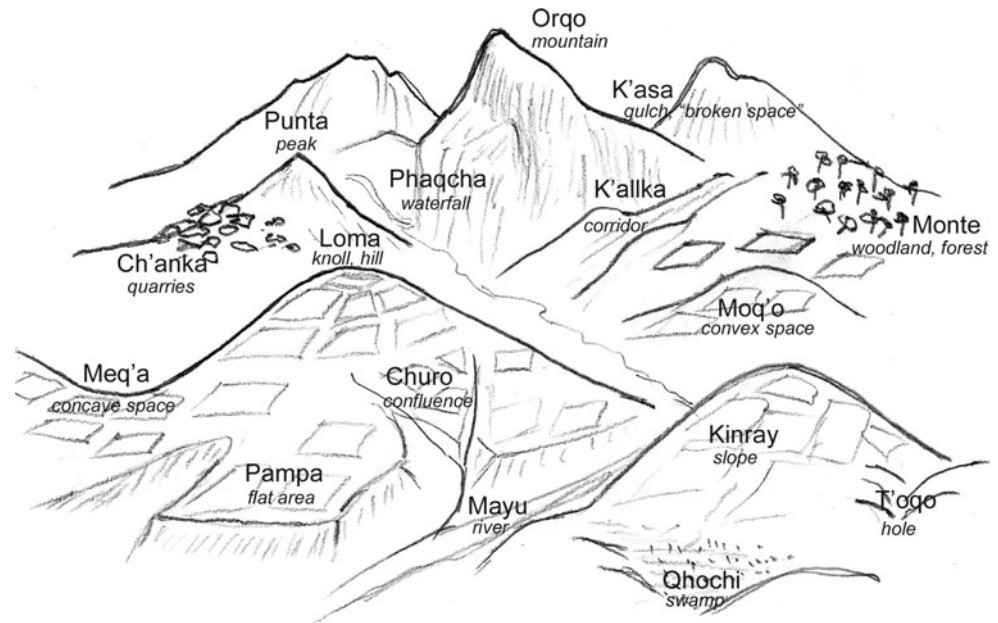
Although the *comunarios* insisted on not ranking the places by importance, they also understood the notion of

‘categories of places’ that occur repeatedly across space in the sense of Hunn and Meilleur (2010). When asked to list these categories, in both communities the participants listed a set of terms mainly related to topography and, to a lesser extent, vegetation and the presence of water. Figure 4 shows how the *comunarios* ordered these concepts in an idealized Andean landscape. The terms stem from both Quechua and Spanish language, but are both used when speaking in either language. To mean a ‘place’, even Quechua monolinguals use the Spanish term *lugar*.

People described the potential use of each category, differentiating cultivation (*pampa* and *loma*), grazing (*kinray*, *moq’o*, *ch’anka*, *qhochi* and *orqo*) or transit sites (*k’allka* and *k’asa*). *Mayu* designates river, riverbed, and *per extenso*, the lines on the palm of the hand. *Monte* means woodland, including shrubland and forest, and is suitable for cultivation in agroforestry and grazing. *Orqo* designates more precisely a mountain in its sacred or ‘powerful’ dimension. However, topography gives only general clues on the potential use of a place. It could be observed, for example, that *kinray* can be used for cultivation, depending on soil suitability.

In both communities, categories of altitudinal belts were preferably expressed in relative rather than in absolute terms. People knew the generic terms of *valle* for valley, *puna* for highlands, and *alturas* or *loma* for slopes, yet they

**Fig. 4** Categories of places represented in an ideal Andean landscape (drawing by S.Boillat)



rather spoke about *pata jallp'as* (lands above), *chawpi jallp'as* (lands in the middle) and *ura jallp'as* (lands below). The terms are relative to the community's territory, for example in Chorojo the *ura jallp'as* would be between 3,400 and 3,600 m, whereas in Tirani between 2,700 and 3,000 m. Here the term of *jallp'a* refers specifically to cultivable lands, and *per extenso*, to soil types.

Inquiring about vegetation types yielded few concepts, confirming that vegetation cover is not an important criterion in differentiating places. Among them the central concept of *monte*, mentioned above, to which people sometimes ascribe the dominant shrub or tree species, like *kewiña monte* (*Polylepis* forest), *t'ola monte* (*Baccharis* shrub), *aliso monte* (*Alnus* forest), etc. Some other specific vegetation types that had a name were *qhochi* (swamp), and *chilliwari* or *pajonal* (tussock grasslands), but no set of terms could exhaustively cover the whole spectrum of plant formations found in the area. It was especially difficult to make the villagers understand the concept of vegetation types. When speaking about 'vegetation', they started to list individual plant species, while speaking about 'plant communities' they listed place names. However, the notions of 'categories of places', 'categories of plants', or 'categories of soil' were clearly understood and associated with a list of local concepts.

Land use types were conceptualized among two basic notions: *chaqra*, the cultivated plot, and *purma*, the non-cultivated, but potentially cultivable land (see also Pohl and others 2010). People from Chorojo made further distinction between short fallow (1–5 years) called *sumpi*, long fallow (5–20 years), called *purma*, and *inca purmas*, which are land that is told to have been cultivated during Inca times but not since.

#### Place Names and Local Ecosystem Management

Place names give reference to where people carry out land use activities, and often include social and spiritual dimensions. In Chorojo, the *comunarios* can distribute their sowings in more than 20 plots, scattered across the community's territory (Serrano 2003), with each plot having a name. The same occurs with grazing sites: in Chorojo, a 13-years-old shepherdess could easily name about 20 different grazing sites with different types of pastures which were used rotationally throughout the year. These strategies are clearly related to risk management and allow adapting to the high spatial and temporal variability of environmental conditions, especially rainfall. In the *comunarios'* perspective, managing risks means building 'personalized' relationships with the places, which are ideally as diverse as possible across the territory. In this context, risk management becomes an expression of the complex cultural bonds between people and the different elements of the landscape, which favours an extensive, integral and diversified use of the community's territory (Serrano and others 2006; Boillat 2007).

Diversified use has clear ecological consequences: in Chorojo, one can observe a patchy cultural landscape made of a mosaic of cultivation plots, grazed shrublands and grasslands, forest patches, wetlands and rocks, thus harbouring high landscape heterogeneity (Boillat 2007). In the case of Tirani, these links are less clear because people are not allowed to use certain parts of their territory due to Park regulations. Nevertheless, people from Tirani expressed the need to redistribute land use across the whole territory and claim for the right to do so (Boillat 2007).



## Discussion

Worldviews and knowledge of the people of the communities of Chorojo and Tirani provide insights on the importance of place names in people's relationship to the land. The ecosystem-like concepts held by the *comunarios* are consistent with the literature (Berkes and others 1998; Berkes 2012). First, in the *comunarios*' perspective, a social-ecological unit is clearly geographically defined with what constitutes their community: a specific social organization with well-defined membership overlaps with a continuous territory. Chorojo and Tirani community territories are defined by watershed boundaries or rivers, thus also corresponding to what natural science would consider coherent ecological units. Second, within this community area, toponyms help us deepen the understanding of how people in this social-ecological unit are interlinked with the environment. The characteristics and the use of place names show that they clearly refer to spatially explicit units that encompass local knowledge on the environment, plants, animals and their interactions, as well as their interactions with people. Because it emphasizes the inclusion of humans, the *comunarios*' notion of 'place' is a human-inclusive ecosystem and a nature-inclusive human community at the same time.

Within the community territories, place names define basic units of interactions between humans, biota and their environment that do have a geographically explicit expression as polygons. Traditional knowledge usually spans several scales. In our case, the high density of place names and the detailed knowledge people have for each place indicates the central importance of the local scale. While topography plays a prevailing role in defining a place, vegetation and soil also play important roles together with a series of diverse criteria such as the built environment and history. The diversity of criteria used, the knowledge attached to the places, as well as the inclusion of humans, give interesting pathways to a holistic understanding of the dynamic relationships between people, biota and the environment which builds on local knowledge. It also shows that in the *comunarios*' perspective, diverse aspects of the environment have value. For example, the importance of topography expressed in place names, together with the fact that sacred places are often linked with outstanding topographic features (Boillat 2007) shows that the *comunarios* consider geodiversity an important element of the landscape, an element that is often overlooked in conservation (Gray 2011).

However, inquiring more deeply into the *comunarios*' concept of place shows that their perspective goes beyond the existing material relationships between humans and their environment. As observed in some other indigenous societies (Ingold 2006; Miller and Davidson-Hunt 2010),

the *comunarios* ascribe to the idea that any element of the environment has life and agency. The perceived effects that places are having with the human and the rest of natural community are not necessarily limited to the geographical polygons, as shown for the case of protecting mountains and livestock spirits on rocks, which can influence areas that go way beyond their physical boundaries. Through this, spatially discrete units are creating a second symbolic layer of interactions, which rather than being characterized by discreteness is constituted by multiple horizontal and vertical overlays. Therefore, considering places as living beings and directing ritual offerings to them is at odds with the classical concept of ecosystem in which human relationships such as showing of respect and taking care of the land are not considered as influencing ecological processes and relationships.

Humanizing the landscape, as the *comunarios* do, does not fit with the classical scientific ecosystem thinking, remembering that the ecosystem concept was expressly coined to oppose the idea of a biological community as a superorganism, and maintain an ecology connected to mechanistic, reductionist science (Golley 1993). However, elements of Western thinking, such as Aldo Leopold's land ethic, bioregionalism, and sense of place, that are able to break away from this mechanistic, reductionist science (Berkes and others 1998) are more in tune with the *comunarios*' views.

In a more general sense, one could conclude that the toponyms analysed here do express different ontological assumptions on 'how nature is' and also imply differences in the method used to inquire about nature (epistemology), e.g., expressed in the perception that certain place names were revealed through ritualistic practices. Natural science would first statistically characterize an area, e.g., by studying the floristic composition of selected plots, and then define plant communities as proxies for ecosystems (Mueller-Dombois and Ellenberg 1974), thus characterizing first and then defining categories. From the *comunarios*' perspective, by contrast, the definition of the places stem from tradition, are made evident by the place's most outstanding characteristics or are spiritually revealed. Thus the definition of a place precedes the observation of their ecological and other characteristics but is not considered to be arbitrary.

Because the *comunarios* consider places as living beings, they consider the option that places may pre-exist human knowledge. This happens with the most 'powerful' places, the highest mountains, whose names are not defined by people, but that reveal their names to them. This perspective helps to understand why topography prevails among criteria that define places names: in the mountainous environment of the Tunari Range, topography is the most outstanding feature of the landscape, and as they are



perceived as living beings, it is the topographical entities ‘who speak to the people’. In places where other features prevail, like the presence of a forest, water, infrastructure, or history, these other characteristics shape place names. The fact that most place names are analyzable highlights a dynamic and reflexive process related to the creation of place names and its links with the cultural bounds between the *comunarios* and their environment.

The ‘method’ that the *comunarios* use in inquiring about the environment also has implications for their perspective on ecosystem management. As observed by Wyndham (2009) for the Raramuri indigenous group of Northern Mexico, the *comunarios* conceptualize their land management systems as spheres of relations and lines of interaction. They manage relations rather than material or economically valuable resources, and these relations between humans and landscapes are ‘complex, multidimensional, and personal’ (Wyndham 2009, p. 291). As shown in section [categories of places](#), categories of places only capture the more general features of an ecosystem, whereas place names are the focus of peoples’ relationships with the land, extending humanity to all elements of the landscape. As stated by other indigenous groups as well, knowledge of places is considered to be the product of a relationship that implies respect and responsibility (McGregor 2004). In this context the most sacred elements of the landscape are also the most ‘humanized’ ones: these are the highest mountains, which have human names. The relational perspective means that the ecosystem encompass humans; it is the presence of humans that makes the land complete.

This idea is perhaps best exemplified with the notion stated by an elder that ‘places where there are no human people get angry’. *Comunarios* seek a thorough, multifaceted relationship with their territory, carrying out diversified productive activities. While this strategy can be interpreted as a ‘minimax strategy’ to adapt to risks, the *comunarios*’ perspectives go beyond risk management as a ‘game against nature’ (Lipton 1982) to a ‘game with nature’ that includes a notion of social relationships with the elements of the environment. The *comunario* sows many plots, but at the end it is the goodwill of the place as well as of the major spiritual entities, God and *Pachamama*, which makes the crop succeed or fail. In this sense the *comunarios* interpret the unpredictability of ecosystems as the expression of the place’s agency. This thinking corresponds to the idea of place as an event, a relation, rather than a thing (Howitt 2002), and is more in line with the emerging view of ecosystems as non-linear and multi-equilibrium systems—but with the difference that indigenous peoples use a relational language including metaphors and spiritual perceptions (Berkes and others 1998).

There are some practical implications of the Quechua farmers’ perspective on places and place names, for the

sustainable management of ecosystems. To become operational, sustainability must identify the values to be maintained in the long term (Norton 2005). In classical biocentric conservation, nature, and more specifically biological diversity at different levels, has an intrinsic value and comes first (Noss 1990). In the *comunario* perspective, we suggest that it is the relationship of people with the entities of the landscape which comes first. From this perspective, sustainability would imply ensuring the maintenance of the potential of interaction in the long term, not only to conserve biological and geological diversity, but also the productive potential of the environment and its bounded cultural heritage including traditional knowledge. Environmental scientists and managers often struggle with the question of how to bring together society and environment. For example, the now classical triple bottom line approach brings together ecological, social and economic issues but often addresses them as separate realms. New approaches that focus on the protection of ecosystem integrity, such as catchment care (Hatfield-Dodds 2006), stewardship (Carr 2002) and duty of care (Earl and others 2010) could be further developed to focus on protecting the integrity of social-ecological systems. Taking ‘humanized places’ as the basic management unit, rather than species or vegetation types, provides a highly valuable pathway to develop these approaches and design methodological tools that go beyond the environment-society divide. As stated by Ingold (2000), indigenous peoples ‘do not see themselves as mindful subjects having to contend with an alien world of physical objects’. Rather, they follow an ‘ontology of dwelling’ which consists of ‘taking human condition to be that of a being immersed from the start, like other creatures, in an active, practical and perceptual engagement with constituents of the dwelt-in-world’ (Ingold 2000, p. 42). Places as conceived by the *comunarios* are very concrete expressions of this ontological position and provide spatially explicit starting points towards a wider approach of ecosystem management.

Protecting social-ecological integrity also includes the protection of peoples’ rights over their land. The strategy of asserting identity over a territory through place names is an important part of the process (Taylor 2008). This is clearly the case in our study area, where indigenous farmers have been seeking to strengthen their identity and political rights since the 1953 agrarian reform, and where peasant organizations are a major political force in the current State restructuring under the presidency of Evo Morales (Healey 2009). In this context, more attention should be given to ‘micro’ place-making, which is important for external identity of the *comunario*, but also important for their collective identity. On the one hand, knowing place names assert the *comunario* identity towards outsiders; on the other hand, it gives the

community the spatial references to make operational their own institutions to govern resources. These considerations do not imply a ‘museum’ approach, which sees these relationships as static, but emphasize the continuous dynamic relationship between people and the land. This dynamic is expressed, on the one hand, by the fact that most place names are signifying lexemes and that people could easily explain their meaning. The fact that Quechua and Spanish are relatively new languages in the area (introduced in the fifteenth and sixteenth centuries, respectively) suggests that people have been recreating place names up to recent times. On the other hand, the idea to establish a personal relationship with the places also implies that this relation is dynamic. Conservation measures that exclude people are clearly not compatible with this view (Hoole and Berkes 2010), thus explaining why local people often oppose protected area regulations, even if they get economic compensations.

Neither does our analysis suggest that there are no unsustainable processes in Andean communities: as shown by the statement 7 in Table 5, soil erosion and degradation are clearly perceived as a threat by the farmers themselves. Hence, any technical-scientific solution has a better chance of success if it is carried out in cooperation with the *comunarios*. This requires a dialogue in which contradictory and complementary ontological and epistemological options on the human-nature relationships are made explicit. The shift in conservation thinking to include people faces many challenges in implementation and practice (Galvin and Haller 2008). One of the key issues is how to implement an intercultural dialogue on ecosystem management, a dialogue involving *comunarios*, facilitators and external knowledge holders (Boillat and others 2010). Place names, as key components of traditional knowledge which are spatially explicit, practically operational and interlinked with local institutions and worldviews, provide an important entry point for such a dialogue.

## Conclusions

On the basis of empirical research with two indigenous communities of the Bolivian Andes, we highlighted the importance of place names as spatially explicit basic units of interactions between humans, biota and their environment. Each place has a specific body of traditional ecological knowledge attached to it, and gives pathways towards a holistic understanding of social-ecological interactions. This very detailed and integrative knowledge has a great potential to address the complexity of ecosystems and extend the scope of science (Kimmerer 2002), especially in bioculturally diverse and poorly researched area like the Andes.

Traditional ecological knowledge on ecosystems differs however from scientific knowledge in the sense that the *comunarios* ‘humanize’ the landscape and consider some places as living beings with agency. This perspective opens up a layer of interactions with the environment that goes beyond material relationships, and includes the notion of personalized relationship with the place. In this sense, indigenous ecosystem management consists of managing relations rather than resources. This encourages multifaceted and diverse relationship with the territory and the diversification of productive activities, in line with the emerging view of ecosystems as non-linear and multi-equilibrium systems (Golley 1993).

Finally, the importance of place names as holistic and spatially explicit units has implications that go beyond conservation or environmental management in the context of indigenous peoples. New approaches of environmental management are increasingly focusing on the integrity of ecosystems rather than on its separate components. Taking ‘humanized places’ as the basic management unit could help to develop these approaches further. This would include the recognition and enhancement of place-based environmental knowledge in different contexts, as well as the development of combined ethical and legal instruments to protect the integrity of social-ecological systems.

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