

Integration of Science and Indigenous Knowledge Through the Concept of
Cultural-biogeochemical Energy: Application to Planning in Madidi National Park and
Indigenous Territory of San José de Uchupiamonas

by

Patricia Cristina Quiroga Yañez

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Department of Renewable Resources
University of Alberta

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Abstract

The study I present here is about Indigenous knowledge and its integration with science. The purpose of working with such integration, is to propose management principles for an area in the Bolivian Amazon that is both a national park and Indigenous territory—a double category area.

The Tacana-Quechua people have been impacted by the colonial period and are currently witnessing the poor results of management plans born of international declarations and conventions. I assert that the dialogue in these organizations and institutions is insufficient and fails to include the Indigenous view of nature due to barriers that prevent understanding—for example, the history of humanity; animism; the medieval language of religion; superstitions and taboos; cultural symbols; paradigm and cosmovision; conservation; and sustainable development. Bolivian legislation regarding the environment has moved towards the Indigenous view of nature, so I conceived a management framework in accordance with the Quechua geometric representation of space, and proposed a new organization of scientific disciplines and academic fields of study that I called *evolving disciplines*. The principles that I have proposed (talk to Earth, respect in action, etcetera) are set out in that framework and aim at recovering, revitalizing, and preserving the knowledge of the original Tacana-Quechua ancestors for use and application in future planning in Madidi National Park and Indigenous Territory of San José de Uchupiamonas.

I applied documentary analysis and the ethnographic method. I examined the work of V. Vernadsky because his concept of cultural-biogeochemical energy overcomes the duality of nature and culture; and his analysis of the geometric representation for two notions—the state of space, and the right-handedness and the left-handedness—are fundamental for understanding

nature's reality, which is the common content between science and Indigenous knowledge. I researched the same notions in Quechua and Tacana traditions during my fieldwork in the Indigenous town of San José de Uchupiamonas, which is located in Madidi National Park in Bolivia—wherein the daily activities of residents and the activities of shamans preserve their knowledge. The Quechua people present a geometric representation of space in their textiles. This representation appears more complex in contrast to the representation of space than most scientists work with; it includes the Universe, the Earth, and the four human dimensions. I emphasize that it is not only the representation of reality that matters but also our interactions with it that can modify reality with the proper use of sounds. Thus, this representation becomes dynamic, ever changing, and mobile.

There is a need to promote recognition of the scientific potential of Indigenous knowledge to contribute to human evolution that may lead to a great advance in knowledge hand in hand with science. This integration may take years or decades. There is a need for communication and interaction that, in addition to words and dialogue, also includes the further understanding of a conscious use of sound—this communication and interaction happens between the four human dimensions, the Earth, and the Universe. A future scientific challenge is to deepen the analysis of the concept of cultural-biogeochemical energy and see it as a force that is transforming the biosphere.

Resumen ejecutivo

El estudio que presento aquí trata sobre el conocimiento indígena y su integración con la ciencia. El propósito de trabajar con dicha integración es proponer principios de gestión para un área en la Amazonia boliviana que es al mismo tiempo un parque nacional y territorio Indígena, es decir es de doble categoría.

La gente del pueblo Tacana-Quechua fue afectada por la colonia y actualmente está sobrellevando los malos resultados de los planes de gestión basados en declaraciones y convenciones internacionales. Afirmo que el diálogo en estas organizaciones e instituciones es insuficiente y no incluye la visión Indígena de la naturaleza debido a barreras conceptuales que impiden su comprensión, por ejemplo, la historia de la humanidad; animismo; el lenguaje medieval de la religión; supersticiones y tabúes; símbolos culturales; paradigma y cosmovisión; conservación; y desarrollo sostenible. La legislación boliviana sobre el medio ambiente se ha movido hacia la visión Indígena de la naturaleza, lo cual me permitió concebir un marco de gestión de acuerdo con la representación geométrica del espacio quechua, y propuse una nueva organización de disciplinas científicas y campos de estudio que denominé *disciplinas en evolución*. Los principios que he propuesto (hablar con la Tierra, respeto en acción, etcétera) están establecidos en ese marco y apuntan a recuperar, revitalizar y preservar el conocimiento original de los ancestros del pueblo Tacana-Quechua para su uso y aplicación en la planificación futura en Parque Nacional Madidi y Territorio Indígena de San José de Uchupiamonas.

Realicé análisis documental y utilicé el método etnográfico. Examiné el trabajo de V. Vernadsky porque su concepto de energía cultural-biogeoquímica supera la dualidad naturaleza versus cultura; y su análisis de la representación geométrica de dos nociones, el estado del

espacio, y la preferencia dominante de derecha o izquierda, las mimas son fundamentales para comprender la realidad de la naturaleza, que es el eje común entre la ciencia y el conocimiento indígena. Investigué las mismas nociones en las tradiciones Quechua y Tacana durante mi trabajo de campo en el Pueblo Indígena de San José de Uchupiamonas, que se encuentra en el Parque Nacional Madidi en Bolivia, donde las actividades diarias de los pobladores y las actividades de los chamanes aun preservan su conocimiento. El pueblo Quechua tiene una representación geométrica del espacio en sus tejidos. Esta representación aparece más compleja en contraste con la representación del espacio con la que trabajan la mayoría de los científicos; incluye el Universo, la Tierra y las cuatro dimensiones humanas. Enfatizo que no solo la representación de la realidad es lo que importa, sino también nuestras interacciones con ella que pueden modificar la realidad con el uso adecuado del sonido. Así, esta representación se vuelve dinámica, siempre cambiante, y móvil.

Existe la necesidad de promover el reconocimiento del potencial científico del conocimiento Indígena para contribuir a la evolución humana y llevar a un gran avance en el conocimiento humano de la mano con la ciencia. Esta integración puede llevar años o décadas. Existe una necesidad de comunicación e interacción que, además de las palabras y diálogos, también incluya una comprensión más profunda del uso consciente del sonido: esta comunicación e interacción ocurre entre las cuatro dimensiones humanas, la Tierra y el Universo. Un desafío científico futuro es profundizar el análisis del concepto de energía biogeoquímica cultural y comprenderlo como una fuerza que está transformando la biosfera.

Preface

This thesis is an original work by Patricia Cristina Quiroga Yañez. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics.

Board, Project Name “A NEW MANAGEMENT FRAMEWORK BASED ON THE CONCEPT OF BIOSPHERE DEVELOPED BY VERNADSKY FOR THE MADIDI NATIONAL PARK, BOLIVIA (An approach following the indigenous of nature)”, No. Pro00069521, DATE Monday, March 19, 2018.

Dedication

To the male energy of my family: Rodolfo, my father who added what was missing in my past, future, and present. My three brothers Leo, my oldest brother from my father's side, Reynaldo whose force pushed me up in the most difficult moments, and Juan who never was born. They walk along with me on the right side of my space. Diego my fiancé, the emotional certainty of my sound.

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To the Tacana-Quechua shamans that preserved the knowledge of San José de Uchupiamonas: Juan Aliaga, Inocencio Cari, Reymundo Navi who shared with me powerful and humble understandings of the space they live in. To the ones that passed away but still are present for the legacy left in the memory of people as masters of the order in the forest and laws of nature.

To the living jungle and the protective entities in the Madidi National Park who brought me there.

They could not speak other languages nor share
They could not read or write
Because of that, they were called blind, deaf and dumb
They were the indigenous peoples
-Nicolás Paucar-

There is a general lack of self-awareness in society...
Consequently, one has first to work on one's own character...
Never to be afraid or ashamed to state an opinion and to complete your work once started...
It is also necessary to have a wide ranging knowledge...
Educate your mind, and familiarizing yourself with philosophy, mathematics, music and art...
A scientist should not be a narrow-minded expert and specialist.
-Vladimir Vernadsky-

Part of keeping life in equilibrium implies to surf into to the unknown dimensions of the
human species
-Patricia Quiroga-

Whitehorse, Yukon.

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GLOSSARY*

Air. See bio-inert natural body. One of the components of the human dimension.

Anisotropic. It manifests right-handedness and left-handedness.

Autonomy. It is the capacity to make informed decisions excluding interferences from others and through one's own independence of mind and after personal reflection.

Awareness. The *mental* experience of consciousness.

Bioelectromagnetic field. It is the area in which interaction between electromagnetic fields and biological entities occur.

Biosphere. The region of transformers that convert cosmic radiations into active energy in electrical chemical, mechanical, thermal, and other forms. It is dynamic, and includes mental and spiritual activity.

Bioinert material. Biologically inert or bioinert material refers to any material that once placed in the human body has minimal interaction with its surrounding tissue.

Bio-inert natural body. Bio-inert bodies are characteristic of the biosphere. These are lawful structures, consisting of inert and living bodies simultaneously (for example, soils, lakes, air masses, lakes).

Chaco. Slang in San José de Uchupiamonas to refer to a chosen place in the jungle that after it has been burned and trees have been cut, becomes a place to grow crops.

Chakana. It is called the Inca cross.

Cognition. It is the process of knowing.

Consciousness. The state of being aware of oneself (all dimensions) and one's surroundings.

Creolization. Cultural change.

Energy. The capacity of doing work.

Environment: It is a complete space, social and natural.

Euclidian space. In geometry, a two- or three-dimensional space in which the axioms and postulates of Euclidean geometry apply.

Evolution. Change with no back. This is not a mere morphological evolution (change in gene frequency through time resulting from natural), it implies the evolution of our thoughts as a species.

Field. The concept of a field was introduced to explain the interactions of particles or bodies through space.

Fire. See bio-inert natural body. One of the components of the human dimension.

Fourth dimension. Ordinary space has three dimensions. Relativity has shown in particular in what manner time may be regarded as the fourth dimension.

Fractal. In mathematics, they exhibit similar patterns at increasingly small scales, also known as expanding symmetry or evolving symmetry.

Geochemistry. It is concerned with (1) the determination of the relative and absolute abundance of elements in the earth, and (2) the study of the distributions and migration of the individual elements in the various parts of the earth.

Geological force. Geologic forces are forces that can change the geography of the land. Human species or even a single individual—including his thoughts and spirituality, can be considered as a new geological force.

Heliobiology. Study of the sun's effect on biology.

Interaction. A mutual effect between two or more systems or bodies, so that the overall result is not simply the sum of the separate effects.

International community: Broad group of people and governments of the world.

Isotropic. It lacks any manifestation of right-handedness and left-handedness.

Kichirakui: A Quechua word. It refers to the act of asking permission to Pachamama to start working the land including the petitions of wellbeing for the labours that will be initiated.

Living well. A civilizational and cultural alternative to capitalism based on the indigenous worldview.

Mental activity. It is related to cognition. See cognition.

Mind. A set of faculties, processes and activities of the human beings that enables our awareness.

Management. An activity undertaken by humans for the purpose of harvesting, transporting, protecting, changing, replenishing, or using resources.

Matter. A specialized form of energy which has the attributes of mass and extension in space and time. There are states of matter (solids, liquids, gases, plasma, and others like glass or liquid crystal; or the ones under extreme conditions Bose-Einstein condensate, neutron-degenerate matter, quark-gluon plasma).

Mechanism. A system of parts working together. A mechanism has a state strictly identical in the past and in the future.

Mirror image. Reflected duplication of an object.

Morphology. The study of the form of the organism.

Neurology. A branch of medicine concerned especially with the structure, function, and diseases of the nervous system including the brain, the spinal cord and the nerves.

Neurochemical. Or neurotransmitter, is a chemical that is released from neurone endings to cause either excitation or inhibition of an adjacent neurone or muscle cell.

New Physics: Fundamental developments in the physical sciences during the last half of the twentieth century: the theory of quarks, unification of the four fundamental interactions; gravitational wave and black hole physics; study of chaos and complexity, indeterminism.

Organized state. According to Vernadsky, it is a peculiar mechanism, a continuously changing equilibrium—a dynamic equilibrium—never reaching a state strictly identical in the past and in the future.

Physics. The study of the properties of matter and energy.

Property rights. They are theoretical socially-enforced constructs in economics for determining how a resource or economic good is used, owned and sold.

Radiation. Energy radiated from the sun in the form of electromagnetic waves, including gamma rays, X-rays, ultraviolet light, visible light, infrared radiation, microwaves, radio waves, long-waves.

Resonance. A vibration of large amplitude in a mechanical or electrical system caused by a relatively small periodic stimulus.

Sacred. Space with power.

Self-determination. A principle that does not state how a decision is made, nor what the outcome should be, whether it be independent.

Self-government. Generally, when self-governance of nation-states is discussed, it is called national sovereignty, which is an important concept in international law.

Shaman. A general term to designate people that produce medicine, have access to the Earth energies and is an advisor among indigenous nations.

Sound. It is part of the dimension of vibration (along with motion) it is in between the dimension of energy and the dimension of matter.

Soil. See bio-inert natural body. One of the components of the human dimension.

Symmetry. In mathematics (geometry) an object is symmetric if it can be divided into two or more identical pieces. In physics, the principle of space-reflection symmetry, or conservation of parity, states that no fundamental distinction can be made between left and right.

Symmetry of life. Is the distinction between right and left corresponding to life, these are the inequalities or right-handedness and left-handedness.

Space. A fundamental notion to understand nature's reality. The way it is represented and defined is the result of the human thought that varies from culture to culture.

Spirit. The energetic body of any entity composed of fire and air. In anthropology, it is often used in contrast to "soul" though is as an immaterial component of living humans.

State of space. The condition of the physical space that includes the states of and the physical field. In indigenous knowledge, this space also includes the state of vibration produced deliberately to modify it.

Structure. It means the arrangement of parts. Examples are the organs in a body, or crystals in a substance like granite, buildings, machines or sentences. It reflects the hierarchy of its parts.

"Susceptibilidad". This Spanish word is very specific in Bolivia to express the feelings of the people when researchers around are mistrusted or under suspicion.

Universe. All of space and its contents, the study of which is called cosmology. The universe is dynamic and is evolving.

Water. See Bio-inert body. One of the components of the human dimension.

Wave motion. The propagation of a periodic disturbance carrying energy.

Western culture. Also known as Western civilization, Occidental culture, the Western world, Western society, and European civilization, is a term used very broadly to refer to a heritage of social norms, ethical values, traditional customs, belief systems, political systems and specific artifacts and technologies that have some origin or association with Europe.

Thought. In a scientific sense, it is related to mental activity, cognition. See cognition. In an indigenous sense, it includes thinking by the body.

Spirituality. It is related to consciousness. See consciousness.

* A fuller version of the glossary is included in **Appendix P**

1.0 INTRODUCTION

I am completing my thesis in a time when the scientific community's questions and answers about the current deterioration of the Earth are moving slowly to the knowledge of the Indigenous peoples in the world. The study I present here is a small contribution to the ongoing discussion about the Indigenous view of nature and its integration with science. The purpose of my study is to propose management principles for an area in the Bolivian Amazon that is both a national park and an Indigenous territory—a double category area.

The Indigenous Town of San José de Uchupiamonas is located in the Madidi National Park and Natural Area of Integrated Management (PN-ANMI Madidi), in La Paz Department, Bolivia, South America (67°30'–69°51' West, 12°30'–14°44' South) (**Figure 3.1**). This area covers approximately 1,271,500 Ha. Like many other places, this community has been impacted by the colonial period and is currently witnessing the poor results of management plans born of international declarations and conventions. The Indigenous peoples in the Town of San José de Uchupiamonas belong to two large Indigenous groups, the Tacana people and the Quechua people who have ended up together due to the historical migration of both groups. There has been little participation of the Tacana-Quechua people in the planning of the protected area, and there is ineffective inclusion of their view of nature in the planning process because their view differs from the perspective of the traditional institutions, and because their view is generally not known, not accepted, and is rapidly being lost in time as elders are passing away. The traditional institutions see the practices of the Tacana-Quechua people as religious matters, and some practices related to agriculture or fishing may be technically interesting, but not enough to be considered in the planning process. However, the Tacana-Quechua people keep knowledge about nature that can be observed and studied, particularly in the textiles of the Quechua people, and in the cultural symbols and the healing practices, along with nature's help, of both Indigenous groups.

Because nature is very important for Indigenous peoples and is also a focus of scientific study, I reviewed the work of V. Vernadsky, an eminent natural scientist. His main ideas refer to the biosphere and the stage of noosphere, which is explained as *cultural-biogeochemical energy* (Vernadsky 2012a, 18). This concept of *cultural-biogeochemical energy* is the concept that best gives credit to Indigenous knowledge because it integrates nature and culture. Indigenous peoples' relationship with nature has always been part of their culture, and not a

separate dimension. For Vernadsky, the human thought and consciousness (cognition and spirituality) shape and transform the biosphere (Vernadsky 2001, 30) because they act as a *geological force*. If the Indigenous view of nature, which results from their way of thinking and consciousness, allowed Indigenous communities to maintain an integral well-being for centuries, it is a geological force that should be studied in social and natural sciences (Vernadsky 2001, 22; see section 2.3.2).

My thesis is about Indigenous knowledge in those terms, as a cultural-biogeochemical energy in two senses, as a concept and as a force. As a concept, it makes possible the integration of science and Indigenous knowledge, and as a force it offers the possibility of human evolution, specifically with reference to the knowledge of the Tacana-Quechua people. My thesis is also about providing the basis that would allow for the inclusion of this integration in the management plan of Madidi National Park.

Previous management plans for this national park have shown little interest or understanding of Indigenous knowledge, and for many years this has indirectly endangered the existence of Indigenous peoples and their territories in Madidi.

Legally, there is the opportunity to include the Indigenous view of nature as the main guideline for environmental policies, according to the innovative Bolivian national laws that have attracted attention from the international community: Law 071, *Mother Earth's Rights Law*; Law 300, *Framework Law of Mother Earth and Holistic Development for Living Well*; and Law 459, *Ancestral and Traditional Bolivian Medicine*.

The Indigenous Town of San José de Uchupiamonas is in the process of preparing the *Plan de Vida*, one of the management plans for Madidi National Park (See 3.3.3), with the collaboration of the non-governmental organization (NGO) Wildlife Conservation Society (WCS). The community hopes that this time the plan can reflect what they want for their community by considering the way they live. My thesis was accepted by the town's communal assembly as a comparative document for the *Plan de Vida* in reference to the principles that can be addressed in that management plan.

1.1 Research questions

Main question:

How to integrate the Indigenous view of nature into the wildland management system of Madidi National Park and Indigenous Territory of San José de Uchupiamonas, Bolivia?

This research poses other questions:

- a) How is Indigenous knowledge perceived in the international context?
- b) Which scientific notions are important in the work of V. Vernadsky?
- c) How is the conception of nature understood among Indigenous peoples?
- d) How to design the structure and organization of a wildland management plan?

1.2 Objective

Propose management principles for the area based on the integration of the Indigenous view of nature and the scientific notions developed by Vernadsky.

1.3 Methodology

I followed three stages of work to answer these questions:

- 1) I searched for relevant current and past information related to Indigenous peoples in international and South American contexts. The search included primary and secondary sources; grey literature; and statistics on ecology, demography, and other social variables. Also, I looked for Vernadsky publications. To all this literature I applied documentary analysis.
- 2) I had a period of direct and interactive work in San José de Uchupiamonas, located in Madidi National Park, for about three months, in addition to interviews with experts, recognized Indigenous shamans, government authorities, and public servants.
- 3) I processed all the information and data collected and I proposed management principles for Madidi National Park and the Indigenous Town of San José de Uchupiamonas, which will become a document of comparison with the *Plan de Vida*.

In addition, I analyzed similarities in contrast to the experiences of other Indigenous peoples in the world to have alternate elements for a better understanding of the Indigenous view of nature and management frameworks.

For the documentary analysis, I gathered relevant texts that reflect the recognition of Indigenous knowledge, and I subsequently created **Tables 2.1, 2.2, and 2.3** to help identify a chronological order of the main international conferences and documents released. Also, as much as possible I reviewed Indigenous authors' work in relation to science. The Tacana-Quechua people do not have written information; since their knowledge is orally transmitted, I turned to the old cultural symbols and ancient textiles of Quechua people, which became the most important source for my analysis of the geometric representation of space.

For the analysis of Vernadsky's concepts, I relied on original articles translated from Russian to English in the 1990s. *The Biosphere* (the disseminated book of his authorship before 2000, Russian version 1926, see 2.3.2.2) posed, for the first time, the possibility of a planetary vision in its functional sense more than a descriptive one (Vernadsky 1997b, 10). His subsequent work on the noösphere, in which he explains the development of human mental and spiritual activities (Vernadsky 1997b, 11; Vernadsky 2012a, 16), was not as widely disseminated as *The Biosphere*. Vernadsky's work was done in the 1920s and 1930s and covers more than he discussed in *The Biosphere*. His studies of the evolution of scientific thought led him to develop the notion of the "noösphere," which he explains as the cultural-biogeochemical energy (Vernadsky 2012a, 18). Vernadsky's concepts are valid today for the significance of humankind and science as an important geological force (Wolf and Muller 2014; Winkler 2014; Vernadsky 1997b, 10). His analysis of the notions of space and left-right handedness, and their geometric representations, are the core of my thesis because the concept of nature is linked to them. In other words, his analysis is crucial because how we represent nature is how we understand it, and therefore how we act and relate with it. From those ideas, I started to work on the integration of science and Indigenous knowledge, which are both fundamentally rooted in nature. I develop conceptual maps of those notions based on Vernadsky's analysis (**Figure 2.3**), then I draw the representation of space for Quechua people based on cultural symbols and Quechua textiles (**Figure 4.3**). The Quechua representation appears broader and more complex in contrast to the representation of space that most scientists work with, and it is closer to Vernadsky's studies about the evolution of the biosphere.

The fieldwork was completed over three months of living in the Indigenous Town of San José de Uchupiamonas, and three additional weeks in the nearest cities, to interview external participants who do not live in the park. I chose the ethnographic method because its

main objective is adequate for this research. It can be synthesized in the words of one of the pioneers that developed the method, the anthropologist Bronislaw Kasper Malinowski, who stated: “The final goal ... is to grasp the native’s point of view, his relation to life, to realize his vision of his world” (Malinowski, Singer, and Dakowski 1985). I applied some of the techniques and tools of ethnography based on face-to-face contact in the daily life of the people. The techniques were the following: a) Participation/Observation; b) Diary fieldwork; c) Storytelling listening; and d) Interviewing.

The ethnography method allowed me to participate as one more individual of the community, and allowed me a close and vivid experience that highlights the difference of *how* people express rather than *what* they say (Bielawski 1992). For example, when I heard: “Say to your rifle you are sorry for lending it to other people and then promise it that you would be nice with your rifle next time” or “animals live here and have intentions,” the content (what) needs further explanation, and the way people expressed themselves (how) immediately shows their values. People were imbued with confidence and certainty, which can only be perceived through that vivid experience.

To propose management principles for the community, it was important for me to be prepared for not falling into mistakes that I could commit as an outsider. I point out that I was tempted to use models of management that seemed innovative and appealing for Indigenous peoples. For instance, I reviewed the *Adaptive Management* model, but despite its adaptive features, it is not Indigenous-based. Also, I reviewed the first South America workshops on the “new model” of management (see 4.2). I realized that any management model or framework for an area that has the double category of national park and Indigenous territory needs to be based on an Indigenous view of nature. I decided to conceive a management framework starting in the “roots” (**Figure 4.6**). I observed that Indigenous practices are in concordance with the structure of the Earth, the Universe, and Human dimensions (**Figure 4.3**). These practices are based on the use of sound that exists only in the real moment depending on a person’s communication with the changing environment, which changes as a result of the forces of living matter. This understanding motivated me to propose a new organization of scientific disciplines, in contrast to the classical multidisciplinary, interdisciplinary, and transdisciplinary approaches, which I call *evolving disciplines* (**Figure 4.7**). This organization is coherent with the geometric representation of space, or organized state, of the textiles of the Quechua people. All the

principles I suggest can be set in those diagrams that simulate the movement of evolving disciplines.

1.4 Summary of chapters

In chapter 2, I analyze contradictions and omissions in the international declarations and conventions relevant to the Indigenous peoples around the world. Also, I emphasize the work of international Indigenous representatives who have been presenting documents with spiritual terminology that is linked with the history of colonization; but these documents have not received inclusion in the international declarations and conventions. While it is true the international community is promoting Indigenous rights, it poorly notices or values the scientific potential of the Indigenous knowledge. In general, the Indigenous knowledge has been relegated to religious beliefs or, worse, to a world of “strange things” due to the practices of ceremonies performed on the land. In a different section of chapter 2, I emphasize the role of science in the history of humanity, and I refer to the concept of cultural-biogeochemical energy that V. Vernadsky described as the geological power of human activities including human thought-consciousness (Vernadsky 2001, 30). In his approach, an individual personality can be reflected in large-scale phenomena. Also, I explain his notions of space and left-handedness and right-handedness, which I use as the basis for integrating science with Indigenous knowledge.

In chapter 3, I provide a detailed description of my fieldwork in the Bolivian Amazon, specifically in the Indigenous Town of San José de Uchupiamonas, which is the only community in the Madidi National Park—this is a double category area (both national park and Indigenous territory) according to the laws of Bolivia. I present reports of the four planned activities: 1) Departure and community engagement; 2) Living in the community; 3) Preparing future contact; and 4) Formal meetings and interviews. The results of the activities are three: First, I was accepted to present this thesis as a comparison document to the *Plan de Vida*, one of the management plans of the town (see 3.3.3) that the community is expecting to work on in 2018. Second, this chapter shows that the Tacana-Quechua people’s knowledge survives in the daily activities and especially in the shaman's performances. Third, it reflects the need for integration of Tacana-Quechua people in the modern world. The people of San José de Uchupiamonas are working hard to ensure success of many creative activities so that they do

not disappear (see 3.2.2); this suggests opportunities for future research regarding Indigenous knowledge and science.

In chapter 4, I discuss the integration of science and the Indigenous view of nature that are said to be of two different worlds; however, in the analysis of the supposed mystery of the former and the potential evolution of the latter, I find a common ground for the integration to happen. This common ground *is nature, which is the content of both*. I divide the chapter into two sections. The first section refers to the two critical notions Vernadsky proposed in order to understand nature properly: the states of space and left-handedness and right-handedness. These notions are linked to Euclidean space, which is insufficient to represent the phenomena of living organisms (Vernadsky 2007, 13) and the laws of symmetry in living organisms are unknown (Vernadsky 2007, 16). According to Vernadsky, science does not have a complete representation of the reality of nature in regards to a living organism and its symmetrical geometry. Also, I present Indigenous knowledge regarding those two notions in Quechua traditions. The Quechua people present a geometric representation of space in their textiles, which in the words of Vernadsky can be called an organized state. Also, Tacana people share this representation, but not specifically in their textiles. Then, I emphasize that it is not only the representation that matters, but also the interaction with it. With proper use of sound, that is, with consciousness of the vibration, Quechua people make possible the modification of their organized state. Therefore, this use of the Quechua people's geometric representation of space presents great potential for furthering the evolution of scientific thought—the cultural-biogeochemical energy, as Vernadsky called it.

In the second section, based on my analysis of integration between Indigenous knowledge and science, specifically with respect to the concepts of Vernadsky and Quechua people's representation of space, I conceived a management framework starting in the “roots” and proposed a new organization of the scientific disciplines. The principles are aimed at recovering, revitalizing, and preserving knowledge of the original Tacana-Quechua ancestors for use and application in future planning in the Madidi National Park and Indigenous Territory of San José de Uchupiamonas.

1.5 Definitions

1.5.1 Indigenous knowledge

This term is debatable as to whether it is appropriate. There are myriad names trying to approach a more precise description of this concept for different purposes (**Figure 1.1**).

For my thesis, I use the term *Indigenous knowledge* because I assume it is accepted in general language. Sometimes I use the singular of the term when it comes from the conventional and international recognition. I use the plural of the term *Indigenous knowledges* when I refer to it from the Indigenous peoples' side. Also, I use the terminology *Indigenous view of nature* because nature offers a common ground with science and it is best understood when I analyze the geometric representation of space; however, I observe the term *view* (see 4.1.1.7), which can act as a barrier for fully grasping Indigenous knowledge.

At some points in this thesis I use the term *Indigenous thought* because the verbs *to know* and *to think* are different in meaning—while *knowing* is complete and static, *thinking* is incomplete and has a dynamic state. There are limitations, but the verb is richer at illustrating that the Indigenous peoples are not only interested in knowledge, but also in ways of knowing, whether mentally or physically (including thinking by the body).

I find controversies with the term “Indigenous” because it is an assigned name, not the one Indigenous peoples use themselves. Similarly, I use this word as general language because it is the most commonly used term internationally, and because I did my fieldwork in an “Indigenous town.” Who is Indigenous? Is the identity based on genetics, colour, family, history, geography? The criteria may be tricky and currently are confusing, even racist. In my documentary analysis I found that an Indigenous individual always has a relation and *interaction* with the environment (Berkes 2012; Boff 1998; Brown 2004; Clarkson, Morrissette, Regallet, and International Institute for Sustainable Development 1992; Figueroa 2012; Gray, Parellada, and Newing 1998; Revkin 2004). The environment can be called land, territory, or ecosystem at a local scale; and nature, global ecosystem, ecosystem as a whole, biosphere, Earth, or Mother Earth at a global scale.

People's science. **Folk ecology.** Rural people's knowledge. **Ethnoecology.**
 Ethnohistory. **Ethnobiology.** **Ethnobotany.** **Ethnoscience.** Local knowledge.
 Traditional environmental knowledge. **Traditional ecological**
knowledge. **Simple traditional knowledge.** Indigenous ecological knowledge.
Indigenous technical knowledge.
Indigenous thought. **Indigenous View.** Native Science. **Indigenous cultural**
knowledge. **Indigenous knowledges.** **Tribal knowledge.** **Indigenous theory.**
Indigenous wisdom. *Native wisdom.* **Ancient knowledge.**

Figure 1.1 Indigenous knowledge terminology

Source: Own elaboration, 2017. Indigenous knowledge terminology.

I can mention three characteristics of this *interaction* that exist for Quechua people. An Indigenous person is the one who knows nature's laws (see 4.1.2.2), knows how to "speak" with the Earth (See 4.1.2.3), and takes cares of her (Smith 1999; Cajete 2000; Ferguson 2005; Little Bear 2016; Kovach 2009; Paucar 2014) with actions that have unique features (**Table 4.2**). This last characteristic is not only present in Quechua people, but also in many other Indigenous groups.

Paucar (2017) says that everyone can look back many generations in their family and will certainly find a great past, a great culture that relied on Earth. So everybody is born from Earth, and the integration of original peoples is the integration of everybody in the world finding their origins to Earth. This description goes far beyond what we currently call Indigenous peoples; it is universal, and the ultimate meaning is that all people are children of Earth. Some people may be conscious of that, and others not yet. For my thesis, "Indigenous" refers to the various nations that maintain their practices with nature, are non-industrialized, and do not fall into modern consumerism.

1.5.2 Science

Instead of providing a definition of science I offer a background that illustrates the tendencies for how science is used and the paradoxes involved. The science I am interested in for the purposes of this thesis is the one that has potential to evolve the human understanding of nature, the one that has always been breaking its own limits, which I explain in section 2.3.1.

The way classic science works, despite all new findings, it is still very standard, especially in methodology and purpose. The scientists who have changed the methodology and purpose somehow have demonstrated the benefits of that. For instance, Dr. Jane Goodall, in her studies on chimpanzees, gave proper names rather than numbers to the chimpanzees and asserted that animals are not only sentient but sapient (Butler 2014). Goodall challenged the tight requirements of her time by naming chimpanzees instead of labelling with numbers: “They told me I’d done everything wrong. I shouldn’t have given the chimps names. I couldn’t talk about their personalities or their feelings, because those are unique to humans” (“Life’s Work: Jane Goodall” 2010). Dr. Dian Fossey and her close approach to mountain gorillas asserted that “a gorilla is not just a stack of scientific data. It is alive” (Mowat 1987, 289). These examples are not up-to-date, but valid as they exemplify that the methodology and purpose of studies done in very tightly controlled environments tend to persist. Mowat (1987, 299) says:

Data gathering surely is important, but things haven’t changed that much from the days when scientists shot everything in sight to gather data. They build their reputation then on mainly dead animals. Now they use live animals too, but the principle is the same. Alive or dead, you use the data to pile up a lot of research papers until you’ve got enough to get ‘silverback’ status. Nothing terribly wrong with that, except that many modern scientists, just like their predecessors, don’t seem to care if the study species perish, just so that they get all the facts they need about them first.

The science studying species may change from dead animals to living animals and may move to the interaction between animals and their environment, and currently tends to include Indigenous peoples; but the principle is the same: data. Indigenous knowledge and Indigenous peoples are about to perish. The integration I propose does not pretend to incorporate more data coming from Indigenous knowledge. The study should contribute to the field and bring benefit for the community involved.

It is true that laboratory science has had results. For example, discoveries such as penicillin were achieved in small-scale experiments; however, ecosystems cannot be simplified in only a laboratory. The unnecessary cruelty to big or small living beings in the name of science, where just data is valued, is disappointing. Science can step out of methods such as the injection of chemicals for adding parts. Science, if integrated with Indigenous knowledge, would be able to replace those methods with good treatments to animals, and with caring relations in natural environments in order to obtain health and balance (see 4.1.1.8). This does not mean a new science or the creation of different types of science (good and bad science,

value-free science). Science needs to be cleaned from the inclinations of power groups. It was influenced by Judeo-Christian narratives and uses (Kassam 2010, 61). Also, philosophers assert that science derives from positivism. Science is not an ideology nor a philosophy. Positivism picked up science and science was given the power to control. In that framework, science becomes a human construction, and its symbols and language arbitrary. Jean Abelé, in his 1955 book *Etudes* (quoted in Sequeiros, Medina, and Medina de la Fuente 2009, 1077), says “the criterion of objectivity is none other than the agreement between scientists.” When scientists have been enveloped by the logic of power groups, their work has benefited those groups, but the uses of science are not the same as science itself. Science is natural to every human, not the property of groups in power. Science is the constant seeking of truths.

1.6 Limitations and contributions

The approach I opted to use to integrate science and Indigenous knowledge is based on the analysis of the geometric representation of space and the symmetry of living organisms. This three-dimensional representation in solid matter may be difficult to grasp if it is not experienced, as in the case of the use of sound that is common among Indigenous peoples (see 4.1.2.3). The written explanation may not offer the same understanding of the Indigenous knowledge as when it is experienced. I have considered some concepts (see 4.1.1) to illustrate the possible barriers that an outsider may have when grasping the way Indigenous peoples perceive nature. Indigenous peoples share broad perspectives of nature through history, stories, cultural symbols, and so on.

Also, I remark that language shapes our understandings and can lead us to narrow our ideas about the Indigenous world. If we use the wrong words, we may transmit wrong messages. Because I am a non-native English speaker, I had a hard time trying to find words to describe what I wanted to translate from Spanish contexts. However, the translation should not be taken literally; the main message is as a whole, in the complete idea and not in a single word. For example, I developed a table for equivalencies between religious language and Indigenous language (**Table 4.1**) that should be reviewed by Indigenous people.

Another important contribution of this thesis is the recovery of the concept of cultural-biogeochemical energy developed by Vernadsky, as well as his fundamental notions of states of

space and the left-handedness and right-handedness and their geometric representation. An integration between science and Indigenous knowledge is possible within these concepts.

This thesis increases the academic literature on Indigenous knowledge and may constitute a source for future research. It is also an attempt to overcome the tension involved when daring to challenge the approaches of academia.

Finally, as I am educated in the Western manner, as well as in the Indigenous world because of my grandmother's teachings, I do share both teachings, and they are part of my life. I hope my readers can understand this duality and tolerate the mixing of expressions when I refer to them, or I refer to us.

2.0 LITERATURE REVIEW

In this section, I initiate the analysis of Indigenous knowledge by locating it in the international context. I show historical events and studies expressed in documents that reveal current trends not only from the traditional and legitimized point of view of institutions, but also from Indigenous authors and Indigenous groups. In society there is a growing interest in Indigenous knowledge. At the same time, contradictions and omissions in international institutions have not yet been resolved. To my analysis, the international community has poorly noticed and valued the scientific potential of Indigenous knowledge to contribute towards the growth and evolution of humanity. Indigenous peoples' legal efforts to share their view of nature date to 1923 (**Table 2.3**), but it still is blurry and occasionally it is classified as “strange” or only perceived as a religious matter. Most of its content is little recognized in agriculture, traditional medicine, spirituality, or subjects related to social and human sciences. Indigenous knowledge can be studied within the natural sciences. I identify the work of V. Vernadsky and his concepts of biosphere and noösphere, which offer a novel perspective to overcome the duality of nature and culture; thus those concepts become a link to integrate science and Indigenous knowledge.

2.1 The international community and Indigenous thought (*Two worlds*)

2.1.1 International events

In the international context, there are declarations and conventions (**Table 2.2**) that recognize Indigenous knowledge and promote its importance for areas such as the environment, health, rights, education, wildland management, and so on. These declarations and conventions brought benefits, especially in the legal systems of many countries. On the other hand, however, they manifest and reinforce irreparable gaps between “two worlds.” Although there are attempts to approach the Indigenous peoples' “world,” it is not yet grasped in its roots. I will refer to some examples of the two previous statements.

First, there are significant changes in the general perception and depiction of Indigenous peoples compared to those made many years ago. Indigenous peoples were seen as savages by European colonizers, considered to be useless for states although they were used as an important labour force.

Table 2.1 NGOs and international institutions working on Indigenous issues

Institution	Initials/details	Year	Main issue	Remarks
International Work Group for Indigenous Affairs (IWGIA)	IWGIA is registered as a non/profit Organization	1968	Consultative/observer status with the UN Economic and Social Council (ECOSOC), the International Labour Organization (ILO), UN Educational, Scientific and Cultural Organization (UNESCO), the UN Framework Convention on Climate Change (UNFCCC), the Arctic Council and the African Commission on Humans and Peoples' Rights (ACHPR) and the Green Climate Fund (GCF)	Founded by anthropologists alarmed about the ongoing genocide of Indigenous peoples taking place in the Amazon. The aim was to establish a network of researchers and human right activists to document the situation of Indigenous peoples and advocate for an improvement of their rights
Survival International	Survival International is a British non-governmental organization, operating in seven languages across six country offices which all have charitable/nonprofit status.	1969	Prevent the annihilation of tribal peoples and to give them a platform to speak to the world so they can bear witness to the genocidal violence, slavery, and racism they face on a daily basis. Lobbying the powerful they help defend the lives, lands, and futures of people	Promote campaigns for uncontacted Indians
Cultural Survival	Non-governmental organization based in Cambridge, Massachusetts, US	1972	Cultural Survival advocates for Indigenous peoples' rights and supports Indigenous communities' self-determination, cultures, and political resilience	Since 2005 has held consultative status with ECOSOC. Coordinates with UNPFII and EMRIP. Spiritual Tradition is in their vision
International Union for Nature Conservation	Traditional Ecological Knowledge Working group	1989	Protected areas and ecosystem services Safeguards the interest of Indigenous peoples	No Indigenous participation
	Recognition of ICCAS	2003	"New paradigm" for protected areas, shifting away from only state-centric and exclusionary approaches to more diversified and equitable forms of governance and management, including ICCAs	5th World Parks Congress held in Durban (South Africa) in 2003
World Wide Fund for Nature (WWF)	Indigenous and Community Conserved Areas (ICCAs) Reducing Emissions from Deforestation and Degradation, and conserving, sustainably managing, and enhancing forest carbon stocks (REDD+)	1996	First international conservation organization to formally adopt a policy recognizing the rights of Indigenous peoples Principles on Indigenous Peoples and Conservation was drafted in 1996 and updated in 2008	Worked with the IUCN in 2000 to develop Principles and Guidelines on Indigenous and Traditional Peoples and Protected Areas
United Nations (UN)	Permanent Forum on Indigenous Issues (UNPFII)	2002	Economic and Social Development, Culture, Environment, Education, Health, Human Rights. Provides expert advice and recommendations on Indigenous issues to the Council, as well as to programs, funds, and agencies of the UN, through ECOSOC	Deals with Indigenous issues related to economic and social development, culture, the environment, education, health, and human rights
	Expert Mechanism on the Rights of Indigenous Peoples (EMRIP)	2007	Fulfilment of rights	Commission on Human Rights. Mandate amended on 2016
	Special Rapporteur on the Rights of Indigenous Peoples	2001	Good Practices Agreements. Overall on Human Rights	Commission on Human Rights Renewed in 2007
	World Conference on Indigenous Peoples	2014	Perspectives and best practices	General Assembly
	United Nations Research Institute for Social Development UNRISD		The role of Indigenous knowledge in the context of participatory management.	
Food and Agriculture Organization (FAO)	Sustainable agriculture and rural development (SARD) initiative supported an Indigenous Peoples' survey of cultural indicators	2002	Indicators promote greater global understanding of the importance of culture for Indigenous peoples' food and agro-ecological systems. Final version of a paper entitled "Cultural indicators of food and agro-Indigenous peoples' ecological systems" was released in 2006	Receives financial assistance from the Governments of Italy and Norway
UNESCO PNUD	Man and the biosphere program Journal: Indigenous knowledge and Development Monitor CIRAN/Nuffic	1970	The program was approved after a conference of 1968 in which the conception of biosphere was credited to Vernadsky. Traditional management systems in coastal marine areas.	Center for International Research and Advisory Networks

Source: Own elaboration, 2017.

Stories in different areas of the globe have depicted Indigenous people as “meagre, ugly, ill-made people” (Mackenzie 1801, 35); as “horrendous and evil ... people” (Smith 1999); as “brute Indians” (Roeder 1995, 4); as “fossil societies ... which had not evolved and had nothing to teach...” (Reichel-Dolmatoff 1976, 307). They were not shown to have a helpful culture, being beggars, drunkards, impure, criminals, and described as a “society in its infancy ... [with] apparent absence of local rulers and formal enforceable laws” (Cruikshank 2005, 151). Even today that type of thinking influences some environmental professionals who suggest removing the Indigenous inhabitants from protected areas (Gray, Parellada, and Newing 1998, 34). However, recently, tendencies to recognize Indigenous knowledge and values are growing. International organizations started to get interested in Indigenous knowledge around the 1970s (**Table 2.1**) and documentation has been increasing as a result of many events (**Table 2.2**). The United Nations declared 1993 the International Year of the World’s Indigenous Peoples and has twice declared an International Decade of the World’s Indigenous Peoples—the first was 1995–2004, and the second was 2005–2014. However, the documents coming from Indigenous organizations date from 1923 (**Table 2.3**), and their actions to have dialogue with the international community were taken before the 1880s (Sanders 1980). These documents present a contrast when compared with the international documents regarding the spiritual terminology and the objectives linked with the history of colonization. Although Indigenous peoples are not against the work of international institutions and organizations, they know there are other ways of embracing the land, following their own view and ways, that are not yet included. ILO Convention 169 on Indigenous and Tribal Peoples (1989) is an international recognition of Indigenous rights. It recognizes Indigenous identities, languages, and religions, and guarantees Indigenous peoples’ right to participate in decision-making about activities that may impact their own communities and territories. Indigenous people can prioritize their own development. Many countries have changed legislation and planning systems on the basis of ILO 169. However, critiques arise about the limitation of Indigenous voices themselves, and this calls for an analysis of the impact of these guidelines from the United Nations (see international in **Table 2.2**).

Table 2.2 Documents regarding Indigenous issues

Region	Document Name	Year	Main issue	Remarks
International	Declaration of Belem	1988	Ethnobiology and Indigenous cultures	International Society of Ethnobiology.
	Convention 169	1989	Indigenous rights. It replaced Convention 107 of 1957	ILO International Labour Organization. 22 countries signed
	Declaration of Rio	1992	Environmental development Sustainable Development	United Nations
	Agenda 21. Chapter 26	1992	Chapter 26 on Indigenous peoples	United Nations
	Convention on Biological Diversity	1992	Conservation in situ. Protected Areas	United Nations
	UN Doc. E/CN.4/Sub.2/1993/28 (July 28, 1993)	1993	Cultural and intellectual property of Indigenous peoples	Study on the protection of the cultural and intellectual property
	Declaration of Geneva	1999	Health and survival of Indigenous peoples	World Health Organization
	Durban Accord	2003	Involve local communities, Indigenous and mobile peoples in the creation, proclamation, and management of protected areas	World Parks Congress UINC. South Africa.
	A Guide to Indigenous Women's Rights	2004	Elimination of All Forms of Discrimination Against Women	United Nations. Human Rights. International Convention
	RES 3.056. World Conservation Congress	2004	Indigenous peoples living in voluntary isolation and conservation of nature in the Amazon Region and Chaco	UINC Bangkok, Thailand
	Declaration on the rights of the Indigenous peoples	2007	Self Determination. Development. Consultation	United Nations
	Indigenous and Tribal Peoples' rights in practice: A guide to ILO Convention No.169.	2009	Rights in practice	ILO, Genova
	The Americas	Declaration of Barbados I	1971	Social Freedom and reintroduce, ethnocultural knowledge
Declaration of Barbados II		1977	Political Organization and union of Nations	Indigenous leaders and Anthropologists
Declaration of San José		1981	Ethnocide, cultural genocide	Organized by FLACSO and UNESCO
Declaration of Barbados III		1993	New forms of colonization	Signed by anthropologist
Creation of FILAC		1992	Service of dialogue and respect between Indigenous peoples and governments	The Fund for the Development of Indigenous Peoples of Latin America and the Caribbean (FILAC)
COICA Statement		1994	Intellectual property rights and biodiversity.	Coordinating Body of Indigenous Organizations of the Amazon Basin (COICA) and UNDP. Bolivia
Declaration of Belem		2005	Protection of Isolated Indigenous People	Sponsored by Brazil, Moore Foundation, ILO, European community, OTCA, USAID, and WATU
Santa Cruz de la Sierra Appeal		2006	Indigenous Peoples in voluntary Isolation and in initial contact of the Amazon Basin and El Chaco	United Nations High Commissioner for Human Rights
ACTO / BID (RG-T1503 - ATN/OC-11423F-RG) Strategic framework		2011	Developing a regional agenda protection of Indigenous peoples in voluntary isolation and initial contact	BID, ACTO
OEA/Ser.L/V/II. Doc. 47/13 30 December 2013 Original: Spanish		2013	Indigenous Peoples in voluntary isolation and initial contact in the Americas: Recommendations for the full respect of their human rights	Inter-American Commission on Human Rights.
Bolivia	Administrative Resolution 48 SERNAP	2006	The intangibility of Toromona Territory. Madidi National Park	National Service of Protected Areas SERNAP
	Basis for public policy on Indigenous peoples and originating in situation of vulnerability	2006	Extreme Vulnerability	Land Vice-Ministry. Unit of Indigenous Territorial Management
	Law 3760	2007	It elevates to the rank of Law the 46 articles of the Declaration of the United Nations on the human rights of the Indigenous people	Bolivian Government

Political Constitution of the Plurinational State of Bolivia	2009	Changes from Republic to a Plurinational State recognizing Indigenous Nations	The constitution was changed with the participation of Indigenous groups
Law 071	2010	Mother Earth rights law	It is considered the first instance of the environmental law that gives legal personality to the natural system
Law 300	2012	Framework law of Mother Earth and holistic development for living well	Living Well is the key concept defined in its Article 5.5 as “a civilizational and cultural alternative to capitalism based on the Indigenous worldview”
The answer to the Consultation questionnaire on Indigenous peoples in voluntary isolation and initial contact	2013	The questionnaire was the basis for the inform OEA/Ser.L/V/II. Doc. 47/13 Original: Spanish 30 December 2013	Document sent to OAS, IACHR
Law 450	2013	Law of protection to nations and original Indigenous peoples in a high-vulnerability situation	It describes territorial, health, diffusion and sensitization mechanisms
Law 459	2013	Ancestral medicine. Material and spiritual resources for the prevention and cure of diseases, respecting the harmonious relationship between people, families, and community with nature and cosmos	First experience of this type of Indigenous medicine as part of the National Health System
Supreme Decree 2195	2015	Mechanism for financial percentage compensation to Indigenous lands and peasant communities for hydrocarbon impacts	
Supreme Decree 2298	2015	Prior consultation for hydrocarbon-based actions to be convened by the Ministry of Hydrocarbons	Do not consider Indigenous own type of organization
Supreme Decree 2366	2015	Authorizes hydrocarbon activities in protected areas	Consultations on Indigenous peoples are not considered

Source: Own elaboration, 2017 (based on Diez Astete 2015; Quiroga 2007).

It is important to acknowledge this aspect of the NGOs’ pride. They are assessing themselves as effective in exposing the concerns of Indigenous peoples. The trend of *acting on behalf of the Indigenous peoples*, despite all the benefits this may have, becomes a limitation for Indigenous peoples to explain their knowledge in the ways that they want.

After many years of work, the United Nations Declaration on the Rights of the Indigenous Peoples (UNDRIP) was adopted in 2007. Several international organizations and states accepted it for developing new policies relating to Indigenous peoples. The Declaration was based in the following reports: 1) Panorama of the main human rights issues besetting Indigenous people (E/CN.4/2002/97 February 4, 2002); 2) The impact of large-scale or major development projects on the human rights and fundamental freedoms of Indigenous peoples and communities (E/CN.4/2003/90 January 21, 2003); 3) The obstacles, gaps and challenges faced by Indigenous peoples in the realm of administration of justice and the relevance of Indigenous customary law in national legal systems (E/CN.4/2004/80 January 26, 2004); 4) The obstacles, disparities and challenges facing Indigenous peoples with regard to access to and quality of

education and the cultural appropriateness of educational approaches (E/CN.4/2005/88 January 6, 2005); 5) The gap in implementation between, on the one hand, the advances made by many countries in their domestic legislation, which recognizes Indigenous peoples and their rights, and, on the other, the daily reality in which many obstacles to the effective enforcement of those legislative measures are encountered (E/CN.4/2006/78 February 16, 2006); 6) The various trends that have affected the situation of the human rights of Indigenous people (A/HRC/4/32 February 27, 2007); and 7) Promotion and protection of all human rights, civil, political, economic, social and cultural rights, including the right to development (A/HRC/6/15 November 15, 2007). These were presented by the Special Rapporteur Rodolfo Stavenhagen, and none of the reports refers to the Indigenous view of nature, which has been proposed and requested officially by Indigenous peoples since 1923 (**Table 2.3**).

Indigenous people have expressed that the most important thing is to recover a sense of identity based on land. None of those reports refer to the land, as Indigenous peoples want. A version of the Indigenous declaration of human rights was developed in 1977 by the World Council of Indigenous Peoples Second General Assembly, and it aims for autonomy in the land (the modern self-government concept), which is the priority, and this is stated in its first article. UNDRIP states something similar, which is self-determination, but this is not in the first article, it is in the fourth.

Self-government was discussed in the UN Working Group on Indigenous Populations, with controversies that are not well known. Erica-Irene Daes' reports are detailed in these issues (E/CN.4/Sub.2/1993/26/Add.1, 3-5; E/CN.4/Sub.2/1993/29, 16-21).

Erica-Irene Daes reports that in the eyes of some governments, self-determination threatens the sovereignty of the state, and the recognition of Indigenous populations as separate peoples suggests that any internal minority might claim status equal to that of the state. Also, she reports that to solve the conflict the UN members decided to change the meaning of self-determination, so that in the declaration it means "internal" (Zinsser 1990, 54-55).

Table 2.3 Documents regarding international Indigenous claims

Region	Document Name	Year	Main issue	Remarks
Indigenous groups	1 st Request to the established world to participate in the Society of Nations (Geneva, Switzerland)	1923	On Participation	Iroquois from Ontario, Canada
	First Indigenous NGO: World Council of Indigenous Peoples	1975	On self-determination and self-government.	Dissolved in 1996. All documents in Library and Archives Canada.
	Declaration of Indigenous Peoples	1975	This declaration was agreed upon by the delegates to the first international conference of Indigenous Peoples	Port Alberni, British Columbia IWGIA Document 29, 1977
	Declaration of Human Rights	1977	The true situation and rights of the Indigenous Peoples	Kiruna, Samiland, Sweden
	Resolution of the 5 th Annual Meeting of the Traditional Elders Circle	1980	On sacred objects	Reservation in Montana
	Declaration of Quito	1990	500 years of resistance	First Continental Meeting of Indian Peoples
	Declaration of Managua	1992	Union of nations in resistance. Identity	Third Continental Meeting of Indian Peoples October 12
	Declaration Kari-Oca	1992	On territory and environment	Brazil
	Declaration of Mataatua	1993	On cultural and intellectual property rights of Indigenous peoples	New Zealand
	Julayinbul Statement	1993	On Indigenous property rights	Australia
Declaration of Kimberley	2002	On Sustainable Development	Johannesburg	

Source: Own elaboration, 2017.

In the final version of UNDRIP, Article 4 specifies that Indigenous peoples have the right to autonomy in matters related to their “internal and local affairs.” What would “internal and local affairs” mean for Indigenous peoples? On this specific point, Indigenous peoples have had a bad experience when the League of Nations was established in 1920 (the precursor of the United Nations). Sanders (1980, 2-4) explains that Indigenous peoples wanted international support for their grievances, but they were advised to return to their countries and work with their domestic legal and political frameworks and deal with their local governments because the League of Nations had no jurisdiction over that.

It seems that despite the efforts shown in these documents, the act of recognizing Indigenous knowledge is limited to rhetorical intentions that are not able to give autonomy nor self-government.

Second, to illustrate better the “irreparable gaps” between “two worlds” I present quotations taken from many contexts. I notice extreme differences between the procedures of international organizations and the practice of Indigenous peoples. The interests are different

and agreement is very difficult. The Earth is a point of discussion with respect to what it/she is?
How does it/she function or feel?

The projects are failing as a consequence of our exclusion ... in its early years, the park was developed by natural scientists, who were interested in flora and fauna rather than in social questions. This caused problems for the ... communities. For example, the president of the ... community has said: 'when a caiman dies, they come from Lima to find out why, but when a Matsigenka¹ dies no one takes the trouble. (Gray, Parellada, and Newing 1998, 45)

Euro-Australian rangers remain cautious and hesitant about the wide-scale and intensive use of fire—particularly by a people, Aborigines, who do not have 'an ecological point of view' ... The European view is basically that fire is bad but can be used to good purpose; the Aboriginal view is that fire is good and must be used, sometimes under conditions that seem extreme to us. (Lewis 1989, 955)

Many sectors that identify themselves as 'allies' of Indigenous peoples still consider them incapable of protecting their lands on their own. (Gray, Parellada, and Newing 1998, 177)

Our experience as Indigenous people [in Canada] indicates that the dominant perspective assumes its perspective to be correct above all others. Because of this, all other perspectives are denied or minimized. Indigenous populations have found themselves in the position of the conquered, the subjugated or the annihilated ... We know that our survival depends on respecting the gifts of creation and restoring the balance. We know that this does not appear to be the agenda of the dominant perspective. (Clarkson et al. 1992, 10-11)

We will not allow whites to manage our territories. Although you send us letters proposing joint management we have clearly explained that the land cannot have two owners, and we are the owners. When you try to manage resources you destroy them, yet you tell us that you will teach us how to conserve and manage our resources, but we have said that these lands have a spiritual owner ... [w]ithout this defense, white men would already have destroyed the environment. (Gray, Parellada, and Newing 1998, 108-109)

These quotations are samples of the inconsistency between Indigenous peoples' and resource managers' perspectives. While resource managers take a "safe" distance from Indigenous practices or are skeptical of what seems to make no sense, Indigenous peoples apparently do not put all their attention on scientific research, wildlife management, and conservation. The dialogue is insufficient because there is no point of encounter from both sides.

¹ Indigenous people of the Amazon Basin jungle regions of southeastern Peru, east of Machu Picchu and close to the borders of Bolivia and Brazil.

2.1.2 What elements would explain this “no point of encounter”?

To address this answer, I formed questions because we need a meaningful continual analysis of the reasons for the divergence between the two positions mentioned above. The questions help us to understand why the “two worlds” separation has prevailed.

2.1.2.1 *Who is the authority, who decides and has control over the territories?*

There are different levels of authority, some with more decision-making power and others with less or almost zero. Sometimes these instances coordinate some environmental projects depending on the interests, but teamwork among these levels of authority is not common because they are tied to objectives that may not always be essential for the territory where Indigenous peoples live. The group with the greatest power decides at the end. In general, the Indigenous authorities have power, but in a hierarchical system less power to decide on their own territories. This disequilibrium between levels of authorities may turn into antagonistic and violent actions. The groups in authority that play a role may include the following.

Politicians. Despite all the documents and organizations created in favour of Indigenous peoples (**Table 2.1, Table 2.2**), they do not have enough decision-making powers and are subordinated to the political infrastructure of their state governments. These legal recognitions are not clear with respect to how Indigenous peoples accomplish decision-making; instead, politicians use non-Indigenous systems, categories, and symbolic codes. Even where their rights are recognized and promoted by politicians, Gray, Parellada, and Newing (1998) observe “a legal maneuvering and narrowly applied practical principles.” In addition, the influence of the market over political decisions seems to have more importance. Alcorn (2010, 20) says that, generally, governments award resource extraction concessions and fail to prevent environmental damage and human rights abuses.

NGOs. Non-governmental organizations are managed by international principles and despite the honest commitment some individuals may have, many NGOs have used their technological powers in ways that benefit their personnel by using, whether consciously or subconsciously, Indigenous peoples’ knowledge and profiting from it. NGOs are accused of promoting “green capitalism” and distorting the Indigenous view of nature into agricultural production (Diez Astete 2015, 153). In general, Indigenous peoples do not look favourably on those market purposes. From Rivera’s (2010) perspective, NGOs helped in a series of actions

intended to “civilize” and mold Indigenous peoples to Bolivia. Following her rationale, today’s NGOs may, in the name of equality, be adapting them to fit into the global society.

Experts. International contexts reinforce that biologists, botanists, and zoologists are the only experts who can provide reliable information (Berkes 2012, 14). The conference participants and organization staff who discuss the management of natural areas are limited to specialists. Here I want to provide examples of the contradictions between what is said and what is done. The symposium “Valuing Nature: Protected Areas and Ecosystem Services,” held in Australia in 2014, recognized that addressing global challenges requires far-ranging responses from many fields including ethics, science, governance, and economics. The symposium participants called for the need to evaluate living beings aside from their utility and highlighted the sacred values of nature, making it clear that “Indigenous people profoundly understand the interdependence that exists among human beings, other living species and the planet” (Figgis et al. 2004, 4). Despite those affirmations, the symposium only gathered experts from government agencies, non-government organizations, the private sector, and universities. At this point, we can ask, why did this event not organize for the participation of Indigenous peoples? If they had, would the structure of their symposium allow Indigenous people to express what they really need in the places where they live? Or would they have been absorbed by the “experts”? Would experts be willing to re-assess their economic terminology such as “natural capital” (a stock that yields a flow of services over time), which contradicts the Indigenous view of nature?

2.1.2.2 What strategies do the international community use most for establishing a relationship with Indigenous groups?

There is a long colonial history in this aspect, but for now I will mention two of the most current and sincere approaches used by international agency staff to establish relationships with Indigenous groups. The first is the methodology of participation, which is well conceived although in its practice can entail distortions. I have identified two distortions. The first and most harmful distortion is null or minimal participation. This appears as “consultation” derived from “already-made decisions” that seek to be consolidated by the mechanism of consultation. The second distortion is biased participation in which the Western discourse seeks to consolidate the themes they like most such as ecotourism, intellectual property, or wildlife management (Zinsser 1990, 44; Gray, Parellada, and Newing 1998, 60), rather than Indigenous themes. Indigenous peoples must learn such topics in order to participate. Biased participation

also occurs when Indigenous people are considered only as useful employees such as cooks, tour guides, and park rangers. In both distortions, the Indigenous people appear as too weak to participate at a decision-making level. I suppose these distortions have led to modifying “participation” with prefixes and adjectives like co-participation, active participation, meaningful participation, and so on. Participation has been devalued.

Another strategy to establish relationships with Indigenous groups is the use of representatives to plan or make agreements based on political or territorial subdivisions that in most cases do not correspond to Indigenous peoples’ traditional systems for organization based on land characteristics and/or the culture's traditional ways. These uses of representation have brought division and abuse (see 2.1.3) to small and marginal ethnic groups and produced Indigenous elites who are tempted to seek profits in their own self-interest. However, representatives can reflect the Indigenous view of their territories if they are rooted in their identity.

2.1.2.3 What languages are used in the management of natural areas?

First, the predominant language in official international communications, including books, magazines, literature, and events is English, and translations are available in other predominant languages such as French, Spanish, and Portuguese. The use of technology to make these events accessible to Indigenous peoples (whether talking or listening) has not improved over the years, therefore the potential for dialogue was lost. The way we use language can be a way of integration. The way we use language has potential for the future of Indigenous peoples, but currently language is still a space to deny rights and show discrimination, even violence (see 2.1.3 studies), towards Indigenous groups.

Second, the most used terminology such as natural resources, management, resource management, sustainable development, conservation, and so on, do not include Indigenous terms. I identify two groups of common terminology: one group is political, legal, and administrative. For instance, the protected-areas categories used by the IUCN (International Union for Conservation of Nature)—strict nature reserve, wilderness area, national park, natural monument or feature, habitat/species management area, protected landscapes/seascape, protected area with sustainable use of natural resource—are recognized on a global scale by national governments and international bodies such as the United Nations. These categories lack Indigenous understandings and Indigenous peoples can question them because the categories

are based on agreements made without dialogue with Indigenous peoples. The other group of common terminology comes from the natural sciences. In this group, there are terms to describe nature and its functions like soil, water, air, food chain, weather, precipitation, erosion, sunlight, extinction, fossil, migration, and so on. These descriptive words, no matter the language, have a common reality that is shared between all human cultures. Now the way different human groups understand these terms is a point of departure. For instance, the word water in natural sciences can be defined as a liquid, when pure, that is an odourless, tasteless, very slightly compressible liquid oxide of hydrogen, H₂O, and constituent of all living matter (see glossary). The same word, water, for Quechua people (*Yaku*) is a body of seven levels of energy and purity (Rolando Paucar, pers. comm.)

Third, the naming of species was never discussed broadly, at least not in a formal international meeting. Linnaeus's² classification is the common language but should not be the only one. Few other scholars are interested in the linguistic diversity inherent in Indigenous languages and species classification (Kassam 2010, 52-58). The importance that names have in Indigenous contexts is barely known, not studied, and out of sight for the majority of natural scientists. The work done by anthropologists is not disseminated enough or is not considered. What some Indigenous peoples call *earned names* (see 4.1.1.3) can provide better communication and enrich conventional classification.

2.1.2.4 *Why the interest in Indigenous knowledge?*

Indigenous knowledge may have a practical use for different kinds of knowledge. Inevitably, sometimes these uses will be considered only for their practical value.

I consider Berkes's chart a good illustration that shows areas of interest in Indigenous knowledge (**Table 2.4**). He has also considered interdisciplinary areas such as environmental ethics, the role of traditional communal property institutions in the management of common property resources, and an environmental history that started to develop a dynamic view of ecological changes. This literature promotes awareness of Indigenous knowledge that can be seen as new and fresh, getting the attention of the public.

² Swedish botanist, physician, and zoologist Carl Von Linnaeus is known as “father of the modern taxonomy”; from the 1730s to 1750s he created the system of naming organisms called binomial nomenclature.

In addition to these arguments, but to a lesser degree, growing interest in Indigenous knowledge is for the satisfaction of new generations in the sense that it might be required for employment in the future, such as employment for community-based research and projects. Erroneously, this sends the message that Indigenous peoples exist only to be useful and commercially attractive, though. It is true that “practical uses” in agriculture (e.g., irrigation, terraces, rotation, natural indicators) coming from the Indigenous world could be integrated into applied sciences for many benefits, but Indigenous knowledge offers more for the social and human sciences and it has great scientific potential in subjects of natural sciences such as chemistry, physics, geometry, geology, cosmology, anatomy, neuroscience, astronomy, medicine, and others.

The literature is increasing and I differentiate authors who follow the trend of interest in Indigenous knowledge and authors who dig deeper into the Indigenous knowledge and are confident of its potential power for the development of human understanding (Boff 1998; Capra 1983; Cruikshank 2005; De La Torre 2015; Figueroa 2012; Kassam 2010; Lewis 1989; MacDonald 2000; Villoldo 2016). In addition, I find a new era of Indigenous writers who recently have been organizing the Indigenous knowledge in universities (e.g., in Canada, New Zealand, and Mexico, and elsewhere) and whose work challenges the limits of current science, describing Indigenous knowledge in their own words. (For example, Smith 1999; Cajete 2000; Ferguson 2005; Little Bear 2016; Kovach 2009; Paucar 2014).

The interest in Indigenous knowledge should be focused on more than just practical uses. Indigenous knowledge is not a static thing, Indigenous peoples are creators and re-creators of their own knowledge due to their consciousness of the environment, and they offer a step forward in all subjects, not only in specific knowledge or use, as **Table 2.4** shows. For that reason, Indigenous knowledge has the potential to contribute to the evolution of the human mind and may lead to a great advance in the knowledge of consciousness which is a blurry subject (Holmes 2017). Consciousness does not have a unified research program (Thehub 2006), and it has been called the greatest scientific challenge of the twenty-first century (Harari 2014). Vernadsky’s concept of noösphere was the first attempt using a scientific model to deal with consciousness (see 2.3.2.2)

Table 2.4 Kinds of knowledge of Indigenous peoples and their potential uses

Kind of knowledge	Nature and potential uses	References
Ethnobotany and indigenous classification	Plants used as food and medicine; plants in language, ceremonies, and narratives. May be used in support of programs for promoting traditional knowledge	Balée 1994; Cunningham 2001; Turner 2004; Alexiades 2009
Resource use knowledge and practice	The diversity of land and resource use practices, such as use of fire, succession management, selective harvesting. May be used for input into resource management; cultural preservation	Pandey 1998; Deur and Turner 2005; Anderson 2005
Social institutions for resource use and stewardship	The role and development of institutions (local rules and norms) that mediate the use of knowledge, govern environmental practices and the way people make a living. May be used for capacity building	Berkes and Folke 1998; Boyd 1999; Trospen 2009
Land use and occupancy	Harvest areas, camps, travel routes, based on integrated map biographies of knowledge holders. Used in support of land claims and to fight development projects	Tobias 2000, 2010; Chapin and Threlkeld 2001
Landscape and biophysical knowledge and terminology	Local and indigenous terminology of landforms and species assemblages; specialized terminology such as for sea ice. May be used for local education, park planning, baseline for climate change monitoring	Oozeva <i>et al.</i> 2004; M'Lot and Manseau 2003
Resource harvesting and subsistence economy	Current or historical harvesting locations and use of key species in the subsistence economy. May be used for local history and culture; input into conservation and co-management	Hart and Amos 2004; Hunn 1999
Oral history	Lived experience and elders' stories, including events earlier than living memory. May be used for local history, oral tradition and cultural documentation	Cruikshank 1998, 2005
Indigenous ideology and worldview	Ways of seeing the environment, relations between human and non-human persons. May be used in education; documenting culture and philosophy	Hunn and Selam 1990; Posey 1999; Preston 2002
Traditional knowledge education	Elders' teachings; indigenous principles for living on the land; cultural practice and environmental relations. May be used in youth education	Bearskin <i>et al.</i> 1989; Cajete 2000; Atleo 2004; Brown and Brown 2009
Decolonizing knowledge	Indigenous knowledge in the context of colonial relations; reclaiming knowledge; intellectual property rights. May be used for raising political awareness	Smith 1999; Battiste and Henderson 2000; Rose 2004
Epistemology and knowledge systems	What constitutes knowledge; role of local and traditional knowledge in pluralistic approaches. May be used in co-management, environmental assessment	Turnbull 2000, 2009; Reid <i>et al.</i> 2006

Source: "A selection of areas of Indigenous knowledge research as reflected in the literature" (Berkes 2012, 24-25).

2.1.2.5 What tools do international conservation institutions use?

Data Collection. Current methodologies regarding resource management, despite their approaches to Indigenous knowledge, rely on detailed and excessive data. In order to answer the question regarding how to gain Indigenous knowledge, Agrawal (1995, 419-20) notes the suggestion that it should be archived in databases held at national and international centers. Data collection has become a constraint because of the pressures on researchers, institutions, and organizations to find strategies for obtaining the data, which might be overvalued. The following case is an example.

We paid interviewees, but there were some concerns in the community about how it was commodifying information and how the process might be changing the nature of elders' knowledge. And that commodification itself was a danger. But I don't think our participation rates would have been nearly as good if we had not paid people. People are willing to put up with a bit more – answer a few more questions – when they are paid. (Tobias 2009, 416)

Deviation from the meaning of Indigenous participation in resource management processes may occur. In many cases, Indigenous people are asked to help in the collection of data, falsely thinking that is the way to participate in the management of their land. The study of

Tommey (2015, 30) reflects personal experience spending time with communities in the Amazon doing what the researcher thought was “correct” about data, and trying to incorporate participatory processes of data collection (citizen participation). However, convinced of its inefficiency in generating something valuable for the communities involved, Tommey changed her mind to promote impact in place of looking for data.

Maps. The use of maps and the distribution of lands or territories follow the historical objective of demarcation and thus limit the perspectives from Indigenous peoples. Any review of historic maps and the use of various types of maps will promote different analysis in many areas of action for Indigenous peoples (see 2.1.2.6).

Books. Indirectly, books are playing a guiding role. I identify the hidden curriculum when students in natural sciences—who will be working in the management of natural resources—are introduced to statistical books that are far from addressing perspectives of nature that differ from “just numbers.” The following example may appear irrelevant, but transmits certain perspectives, values, and attitudes. A prestigious statistical book, which shows methods and results about how the pigmentation of lions’ noses is related to their ages, is being used to benefit trophy hunting in Tanzania. No Tanzanian community’s point of view on lions is considered in the book.

It would be beneficial to incorporate Indigenous perspectives in required books, like in the previous example, but what can be expected if other groups of people are struggling for recognition of their different perspectives for a long time? For example, advocates in Western society have been trying to make philosophical and legal arguments about the case for animal rights acceptable for modern civilization (Waldau 2010, chap. 3-5). This movement promotes a different perspective of nature and tries to introduce animals as sentient beings so that society may recognize arguments of the animal rights idea.³ However, this perspective has no traction in academia; in required textbooks for university courses on management of natural areas, animals’ feelings are not considered. Then, the ideas of “Mother Earth rights,” “sapient animals,” or “living mountains,” which come from Indigenous perspectives (4.1.2.3), do not match with the current way that future resource management professionals are educated.

³ There are critiques to the movement because it intends to “save animals” with arguments that are not interwoven with all human societies (Wenzel 2000, chap. 2), and nature is not seen as a whole.

2.1.2.6 How are international institutions and organizations valuing Indigenous people?

I identified four ways of valuing Indigenous peoples, according to the international institutions and organizations.

Indigenous peoples are conservation-friendly. Indigenous peoples are seen as conservation-friendly people. International institutions help with strategies, so they are “recognized” or “legalized.” That is the case of Indigenous Community Conserved Areas (ICCAS), defined as natural or human-modified ecosystems that have significant biodiversity values, ecological benefits, and cultural values, and that are voluntarily conserved through traditional laws and other means by Indigenous and local communities that depend on these resources culturally or for their livelihood (Kothari et al. 2012, 16). The Convention on Biological Diversity’s Programme of Work on Protected Areas supports Indigenous peoples’ and community conserved territories and areas, so it legalizes Indigenous conservation (Kothari et al. 2012, chap. 3). Also, the International Union for Conservation of Nature (IUCN) has been recognizing ICCAS since 2004 (Borrini-Feyerabend 2017).

I also find contrary positions to this tendency. There are arguments about how Indigenous people cannot be a conservation-friendly group because they destroy their environment by themselves. The arguments point to the population growth, submersion in modern life, and both technological limitations and its current access; all of these trigger the deterioration of the Indigenous peoples’ environment by themselves (Holt 2005, 200).

These two perspectives lead to the following questions: why does an organization have the power to “recognize” the existence of Indigenous groups that have an attitude towards conservation. Why conservation? This is a concept that does not correspond to the Indigenous view of nature (see 4.1.1.8). Should Indigenous peoples fulfill some requirements to exist? How can the benefits of modern life (technology, communications, transportation, education) provoke destruction if they reach Indigenous populations? Are Indigenous peoples condemned to be isolated if they want to preserve their knowledge? This conservation-friendly concept may raise difficulties in Indigenous territories.

They are working on property rights. Piracy of Indigenous lands is part of a long history. To my analysis, the history of robbery in Indigenous territories is inconsistent with this property rights concept that international institutions are promoting. What are property rights? Basically, property rights consist of an economic good that is owned and can be used, excluding

others to do that. Its most important objective is the protection of the cultural and intellectual property that Indigenous peoples have. By doing so, Indigenous peoples could control the information they have; a big part of property rights consists of asking researchers and institutions to respect Indigenous knowledge and not abuse Indigenous peoples' trust by taking credit for knowledge that researchers acquire from Indigenous people. Also, it seems a good thing that Indigenous peoples realize that their tools, textiles, and medicine items can be marketed for their benefit (Berkes 2012, 34). To receive some profit from Indigenous items is not bad, especially for those communities that need to tackle poverty. But I see two weak points in the idea of property rights that needs further discussion.

First, how about the land? It looks like property rights consolidate a division of culture and land. Indigenous peoples' bond with land is core in their perspective, therefore why protect only the cultural and intellectual property without including the property of the land? Second, establishing the implementation of property rights for Indigenous peoples should be consistent with their perspective. It is well known that many Indigenous peoples protest the idea of selling the attributes of the land—Mother Earth is not for economic good or profit. Indigenous peoples do not consider the appropriation of the energies of the plants, the water, the air, and so on, to be a good act, if these are medicine for brothers and sisters who are in need.

Recently, a movement of women weavers have started a campaign for more than property rights; these women defend the ancestors, the rivers, and the universe (“Las Tejedoras Mayas se defienden” 2017). This example provides background to the discussion on what is lacking in the property rights concept when referring to Indigenous knowledge.

They participate in decisions about territories. The fact that each year there are more communities involved in workshops, seminars, and legal claims on their territories is good, but this does not necessarily mean that Indigenous people participate in decisions about territory as it is believed, as it is soundly disseminated, particularly when the consultation process is in progress. Berkes (2012, 67-9) notes that questions have arisen because Indigenous feelings about the land are not considered. We may observe what “territory” means to Indigenous peoples in the following three excerpts. “I never imagined it would happen—people crying—during something as cut-and-dry as a map interview. But it did happen” (Tobias 2009, 428); “[T]he lack of the sea ice in summer months made some people ‘lonely for the ice’” (Berkes 2012, 173); “Trees are our life, they feed us and protect us” (Roeder 1995, 1); “We do not go

out and pick up leaves just because we needed tea, nor cut down a tree just for firewood. We first give tribute and thanks to their beings” (World Council of Indigenous Peoples 1981, 7). Territory has a profound meaning that is being “studied,” and discussed to a lesser degree, in workshops and seminars but not yet incorporated in land management or territory decisions. Indigenous peoples want to participate on the ground, not in enclosed conferences, along with the land entities—that is, in the presence of rivers, mountains, and plants denied again and again because they are not considered subjects of the current legal system. Therefore, it cannot be stated that Indigenous peoples are participating in territory decisions while foundations of international law remain anchored in the old European legal principles. Indigenous peoples are working for the recognition of living entities in legal systems as a way to develop laws; the first case in which a living entity was recognized with the legal status of a person was Whanganui River, New Zealand, in 2017 (Pearlman, 2017).

They are involved in mapping. Mapping in general aims to illustrate quantities of resources to be used, or not, in land. Demarcations are seen as a main objective for land management plans. According to Thomas Berger, maps were used for five centuries to codify, to justify, and to sanction an often bloody—and always cruel—colonization of the new world (Tobias 2009, 8). Kassam (2010, chap 6) describes maps as an instrument of military occupation and an agent of cultural imperialism. Currently, maps have also been enlisted by multinational companies to gain concessions over commodities such as oil, minerals, and timber. Protected areas are likewise created by sketching lines on maps. Terry Tobias (pers. comm.) recognizes the huge emphasis on high tech in the presentation of spatial data, especially using geographic information systems (GIS); but for him, mapping has more to do with people than technology.

Maps from Indigenous perspectives are scarce; they are part of new strategies to illustrate the attributes of the land. For example, Aaron Carapella’s maps (**Images 1-2**) encourage historical cultural analysis; Kassam (2010, 200-220) presents mapping in human ecology; Terry Tobias (**Images 4-5**) works on a mapping methodology that is based on Indigenous surveys. Other recent mapping methodologies have introduced digital maps to reflect traditional culture. Although it is done by GIS specialists, it is valuable for Indigenous peoples (“Brazil: Indigenous People Map Heritage with Google Earth” 2013). There is a long way to go to work in these new approaches that may risk being translated into the spatial

frameworks of traditional European geography (Kassam 2010, 195) such as conservation, land use planning, and industrial development. For Indigenous peoples, space is important for more reasons than demarcation (see 4.1.2.1).

2.1.2.7 What can be concluded from the international context regarding Indigenous peoples?

International organizations and institutions recognize few aspects of Indigenous peoples that their policies allow. There are limitations to dialogue with Indigenous peoples who are calling for help to retrieve, revitalize, and preserve their knowledge and practices. International institutions are fragmented—the help they offer is *only in* human rights, *only in* mapping, *only in* conservation of protected areas, *only in* land demarcation, and so on. They have a specific framework coming from their policies, funders, or donors (Alcorn 2010). For example, organizations or institutions that work in biodiversity would be unlikely to intervene in the Indigenous diet because that would not be part of their policy. (I propose a framework in **Figure 4.7** that would allow this, along with a new organization of subjects shown in **Figure 4.8.**) Also, international institutions and organizations are under political constraints, they may fear to be accused of having covert interests. In Bolivia, the United States Agency for International Development was expelled for “conspiring against” the government (“Bolivian president Evo Morales expels USAID” 2013). The personnel employed by international institutions are limited on both sides, from their internal directives (policy, funders) and external systems (countries’ cultures, governments).

Another limit is that the people working internationally do not experience the whole life of Indigenous peoples; they “do not live” in the land for the required time to understand the complexities regarding Indigenous peoples’ demands. In some cases, personnel do make efforts to try to fit into the ongoing life on the land; but most of the time they only want to spend as much time in the communities as is necessary to collect information. So they are not submerged in the daily living of the community and tend to obtain results for their institution, not for the people or even for themselves; they seem tied to the job they have. I see that the people who have lived in the communities (not necessarily academic researchers) can understand better and they are more open to change their perspectives—examples include Adrian Cowell, who filmed a decade of devastation in parts of the Amazon (Revkin 2004, 204), and James Cameron, a filmmaker who promotes awareness of Indigenous peoples’ lives in the rainforest (Child 2011). In the specific case of the community I am working with, I can mention Lars Hafskjold, who

improved the nutrition of the community and developed agricultural projects along with the community; he also created an important video about the town (“La luna es nuestra luz – The moon is our light” 2017); Yossy Ghinsberg, who proposed the famous project of Chalalán ecolodge; and Ann Tommey, who contributed with broader perspectives for participatory research (see 3.3.2).

2.1.3 The Amazon: Protected areas and Indigenous territories

The situation in the Amazon is complex and it is hard to discuss in the international context. The continent has an “unknown story,” and much of it is misunderstood (Kramer and McNicoll 1969, vii). I am aware of this historical vacuum, the scope of which is not only anthropological, but biological, geological, and astronomical. This is a reason to listen more to Indigenous peoples so their version of history can provide much more understanding to the history of the planet. I am convinced that the understanding of the Amazon should be along with the Andes Mountains, since the separation between these two ecosystems will always constrain any analysis. For now, I will point to some actual problems regarding studies and experiences in Indigenous territories that overlap with protected areas.

The Amazon became known as a “virgin” and “pristine” forest that implicitly sent the message that no human activities had taken place there (Revkin 2004, xiii-chap.2). For a long time Indigenous peoples were out of sight of society. Projects for communities are recent, but many of these are criticized for the contradictions between what is said and what is done in real practice, and many more critiques arise when talking about the failure in purposes (Diez Astete 2015; Gray, Parellada, and Newing 1998). These projects have reached extreme inconsistencies as in the case of the Brazilian governmental institution Fundación Nacional del Indígena (FUNAI), which has been accused of ethnocide for allowing the construction of the Bello Monte dam (Sullivan 2017). This institution is supposed to work for the communities but was indicted for destroying the Amazon to benefit industrial projects not related to the welfare of the communities. The Brazilian court of justice has not yet decided if they have jurisdiction over that type of legal claim regarding ethnocide. This case also represents the paradox of global humanity’s welfare that highly contrasts the welfare of local people—the dam is said to be beneficial for the development of people, but they would die as a culture (Naughton-Treves et al. 2006, 314).

The various attempts to provide ideas about how to “manage” the Amazon ecosystem have different *levels of* community involvements, from none, which is a narrow perspective, to very participative approaches; however, most approaches lack plans for long-term dialogue and co-existence between researchers and people.

I identify the following four tendencies in Amazon research projects: Studies interested in flora and fauna only, the ones that incorporate culture along with flora and fauna, the ones that additionally deal with political work, and finally the ones that study all others and also are including the spiritual aspect.

Studies interested in flora and fauna only assume that the results will have an indirect impact on the communities providing knowledge, which “may” be useful—for example, a study on wood products that has zero people involvement in its methodology. The justification for the study highlights the benefit for Indigenous communities so they can know which tree species are more productive (Gavin 2004). Then we have studies that incorporate the dimension of culture, but with some historical gaps. These studies focus on how Indigenous peoples treated flora and fauna in technical ways, manipulating and modifying their environment. One example is the comparison of historical and ecological transformation through planting, transplanting, weeding, and burning (Amundsen 2013). Another example is the modern application of the concept of *resilience*, the ability of a system to absorb change and still persist; this approach challenges the supposed fragility and unmanageability of the forest. For example, clearing part of the forest is good, and the “natural disturbance” that people can apply will be restored by the forest itself (Berkes 2012, 79-80). These types of studies have helped researchers to understand the importance of people’s presence in the land, demystifying the “noble savage” or the idealized concept of Indigenous peoples living in complete harmony (Boff 1998; Kallant 2003). These are good examples of management, but Indigenous peoples not only live in and on the land in technical ways, they have been under political, social, and economic pressure for years, resisting missionaries who were trying to convert them, and fighting against industries seeking to exploit the land resources. Due to these reflections, that these pressures affect and change the functioning of the ecosystem, another group of studies argues for more political tasks that promote “long-term dialogue” and communication (Alcorn 2010), and more holistic and “less conservative” approaches (Reyer 2009). Studies on the aggressions that Indigenous peoples

have been resisting for centuries should be studied, recognized, and incorporated into land management plans.

Rather than doing land management, people are protecting their lands, other people, and all life in them. The colonial and the modern industrial projects are painful because of the violence and lack of understanding of the impacts of that violence. People remember murders like Chico Mendez, a leader who wanted to protect the forest from loggers (Revkin 2004); or the desperate efforts to impede industrial projects such as the case of Tuíra Caiapó taking a machete to an engineer in 1989 to protect the Xingu River in Brazil against the construction of a dam (Jansen 2017, under “During the dam project”; “Dinheriro de Belo Monty foi para na Lava Jato” 2017); and many others that are not even reported. The murders of Indigenous leaders are increasing each year. In 2015, 185 people were killed defending their land, and 200 were killed in 2016; 40% are from Indigenous communities, paradoxically seen as criminals; and 119 out of 200 were from Latin America (“Defenders of the Earth: Global Killings of land and environmental defenders in 2016” 2017).

Indigenous leaders are indirectly forced to go into discriminatory environments to conduct negotiations with governments. They politely attend meetings despite the broken promises, as in the case of the mega project of Bello Monte Hydropower, or Bello Sun Gold Extraction in Brazil, wherein authorities have to promise each other that this time “everything will be different” (Brum 2017, under “el presidente de la FUNAI”).

In addition to these painful events, Indigenous groups have become part of the programs in which they were called peasants within a state economy that promoted their development as a labour force as well as the urbanization of their lands. In the popular jargon this has been called a “creolization” or “whitening” process because Indigenous socio-economic values change. The introduction of money plays a big role in this changing process. Roeder (1995, 117) observes that the “[c]ash economy has a dominant role ... the exchange of money has supplanted the traditional value of hospitality and sharing. Fishing and hunting, once strictly subsistence activities, are now undertaken for the money they will bring.” Programs give assistance rather than self-determination. In Venezuela, a project named Southern Development Commission (CODESUR), also known as the “Southern Conquest” for its military strategies, included teaching Indians to plant crops of commercial value for the creoles and to raise domestic animals destined for market (Freire and Tillett 2007, 221). Indigenous companies grew and

were given agricultural equipment, but after CODESUR ended in 1974 a period of unemployment occurred. Indigenous peoples tried to search for alternatives in artisanal mining or ecotourism projects. From that period, the knowledge of the place has been affected; now the history, rituals, and beliefs of their ancestors are confusing and contradictory for Indigenous peoples themselves (Freire and Tillett 2007, 221-2). This type of experience has occurred in many Indigenous communities along the Amazon in different periods over the years such as the rubber boom and timber extraction (**Table 3.5** shows part of that history for the community where I did my fieldwork). Furthermore, Indigenous communities are experiencing the modern world impacting the younger generations. The Cacique Raoni recently expressed that “youngsters have lost interest in our culture, in the traditional music, clothes, dances all our traditions” (Logiuratto 2017). Indigenous peoples wish to be able to use the tools of the modern world, but not give up their practices and knowledge from their ancestors. In general, Indigenous peoples in the Amazon are looking for strategies to recover lost identity and strengthen it in the current context.

Within these types of studies, it is necessary to continue unveiling the consequences of the period of colonization that affected the areas of health, education, organization, language, law, economy, and the like. Many scientists, researchers, planners, leaders, and politicians do not pay enough attention (Kovach 2009, chap. 4; Smith 1999, 99; Tommey 2015, chap. 3). This colonial period was evident at a social and cultural level, and it reached the individual level, his or her mind and feelings. The forced evangelization and conversion of the culture had bad and awful consequences and still does today. One issue that needs to be analyzed in detail is the medieval religious language (**Table 4.1**) that prevents Indigenous knowledge being studied for its scientific potential. I address this in section 4.1.1.3.

The last group of studies is also getting focused on the “spiritual” dimension, although the majority of these researchers are still using conventional academic methods. As Riu-Bosoms et al. (2015, 318) describe, “To explore the spiritual dimension of the *folk ecotopes* recognized by the Tsimane⁴ we asked the same set of 66 informants whether each of the *folk ecotopes* identified was potentially home to one or more spirits. For affirmative responses, we also asked them to name those spirits.” This study got interested in the “statistics of the spirits” in certain

⁴ Indigenous people of lowland Bolivia.

places. There are also deeper approaches, for example Saarinen and Kamppinen (2009, 312) who discussed different mental models of nature and considered the foundation of those models. First, they remark that Western thought is highly ambiguous: “while humans have been seen as superiors to the rest of the nature, it has been the nature which has been understood to contain the absolute and objective truth, the truth that can be revealed by scientific, rational methods.” Nonetheless, “the main quality defining humanity has been reason, while nature has been defined exactly through the lack of reason.” Second, the authors describe how Indigenous peoples do not conceptualize nature and culture as two opposed realms. Plants, animals, and humans form a community. According to them, Indigenous peoples interact with non-human beings, which are considered “the guardians of the forest ... they are social, moral and intentional agents, who can speak, feel and act according their feelings or moral judgments” (Saarinen and Kamppinen 2009, 317).

All these types of studies tend to be inherently paternalistic. The benefits generally only last while the study is conducted. It is certainly possible that those studies with few variables can be improved by more dialogue with Indigenous peoples and the inclusion of their view of nature, which considers the functioning of the ecosystem as a whole.

2.2 The Indigenous view of nature (*The mystery*)

After many struggles, Indigenous knowledge, which in this thesis is also called Indigenous view of nature, has come to exist in legal and scientific documents in many countries and at an international level. However, much of it remains ungraspable. It is still “strange” for society. The recognition of Indigenous knowledge is at a very early stage if considering its inclusion in the development and evolution of humanity. Indigenous peoples in general have been keeping significant understandings that have come from the knowledge of the ancestors and the Earth itself. Many Indigenous peoples stand confident and humble in what they say about nature (see 2.2.3). In section 4.1.1 I offer considerations that may help to understand the value of this “mystery.”

2.2.1 Some depictions coming from the non-Indigenous world

I found texts that project an attitude of doubt upon both the practices and narratives of Indigenous peoples. Why does this happen? Kovach (2009, 154) says that it is inevitable to be

judged by those unfamiliar with them; in her interview with Kathy Absolon, an Anishinaabe Indigenous scholar in Canada, they freely talk about portals, dreams, fasting, sitting in circles, and engaging ceremonies as powerful methods to receive knowledge. I share what Kovach says; those who judge, even those who laugh on these topics, are not familiar with them. My point here is not to judge the ones who are skeptical, but to show some elements of the Indigenous knowledge that are still treated as strange.

2.2.1.1 Strange beings

It is a very particular feature in the literature regarding Indigenous peoples to describe entities that are not humans. They are called “spirits,” “living things,” “managers,” “owners,” and so on. These entities are seen by most “Westerners” as superstitions. If placed into that framework, it is correct that scientists in the natural sciences agree that these non-human entities do not deserve scientific study and intellectual endeavour. The studies in social sciences noticed these entities and refer to them as “spirits,” “non-human,” “inanimate,” leaving the impression that they have no explanation in their own culture. The following quotations are examples of this:

... [A] famous and influential missionary ... repeatedly [was] telling the Cree, 'there are no spirits in the bush'. The Cree elder sighed and added, 'no matter how much he repeated that we all knew that the land was sacred and full of spirits. (Berkes 2012, xvi)

...[P]articipation is characterized by relations with other humans, non-human life such as plants and animals, and inanimate entities. (Kassam 2010, 89)

Sun-Father created ... animals and plants [which are] under the constant care of specific spirit-beings who were to guard and protect them against eventual abuses ... energy of the sun ... flows continuously between man and animal. (Reichel-Dolmatoff 1976, 309-10)

For us, the animals have spiritual managers; hunting and fishing are delicate matters and no one can kill for himself; everything has its protector and you whites cannot teach us why we have to look after creatures. The spirits have made sacred sites so that we can protect ourselves from sickness and evil. (Gray, Parellada, and Newing 1998, 109)

2.2.1.2 Strange places

It is known that for Indigenous peoples the land is sacred. Part of the idea of sacred comes from the mystery that surrounds certain places. When this mystery is told to scientists, most of them prefer to avoid such descriptions and leave them for the religious explanation.

... [I]t is documented that some cultures had areas where entry was completely forbidden except with ritualistic protection. (Gray, Parellada, and Newing 1998, 112)

The construction of a temple was preceded and accompanied by practices of divination that refer not only to the location ... but also to multiple details related to the mythical traditions of the place in which it is built ... with the favorable disposition of spirits of ancestors and of nature and with the precise purpose of the temple. (Reichel-Dolmatoff 1977, 207)

Places have properties that are essential for Indigenous peoples' lives. Individuals rely on these places for balance themselves, and for the harmony of the environment. These places are not explicitly related to the religion, but the language and the modification of these places and their infrastructure during the colonial period have played a role that obstructs understanding of these places.

2.2.1.3 *Strange people*

The shaman is the “strangest” individual and certainly is a powerful character among Indigenous peoples around the world. Shamans have local names which I will not go deep into because describing them is like describing many specialties of one career. I use the word shaman because it is a general term. What is a shaman? There are many descriptions of their different abilities.

... [A] person who can see through, who can foretell, who has authority, power. ... The shaman is said to be powerful if his predictions, advice or news are correct [on the other hand he is] a person like anybody else, no particular deference was paid to him. (In André N.'s 1989 book *Shamanism among the Montagnais*, quoted in Berkes 2012, 120)

When sickness strikes a member of a group, the shaman interrogates the patient ..., then he tells the sick person and his family which prescriptions have been violated and how to make amends ... A sick person in the group is indicative of a social pathology, sickness does not affect an individual in isolation from the social and environmental context, ... sometimes the shaman declares that he is prevented from acting and predicts more sickness and death. (Gray, Parellada, and Newing 1998, 112)

The shaman is responsible for ensuring a balance of energy flows between species. If too many animals are hunted, with neither justification nor reciprocity, the shaman will surely forecast sickness. Not all 'owners' have the same language nor do all shamans know all the languages. (Gray, Parellada, and Newing 1998, 112)

Whenever the game is scarce, the shaman must visit the master of animals ... He will not ask for individual animals but rather for herds or for good hunting season. (Reichel-Dolmatoff 1976, 313)

He also controls technological activities as the construction of a communal house, the manufacture of a canoe, or the opening of a trail. (Reichel-Dolmatoff 1976, 316)

Shamans who acted as seers were said to be helped by a number of guiding animal spirits in their activities. (Kassam 2010, 101)

[S]hamans claim to have acquired part of their specific knowledge from animals which revealed to them some unexpected food resource, a cure for an illness, or a practical procedure in solving some everyday problem. (Reichel-Dolmatoff 1976, 311)

2.2.1.4 *Strange food*

The properties of food and the way it is obtained have some negative connotations. Unfortunately, part of society thinks that Indigenous peoples drug themselves to see the spirits and to be able to talk with animals. Food seems to provide knowledge to people, especially plants, but not only plants. However, in recent decades, some foods are recognized as a new source for the treatment of many illnesses due to their medicinal properties.

[I]ndigenous peoples, as intelligent human beings have studied the ... natural systems. This study is achieved through spiritual help from plants, from elders and from ancestors ... Aguaruna⁵ of Peru use the help of plants such as ayahuasca (*Banasteriopsis sp.*) or toe (*Datura sp.*) to gain spiritual power (Gray, Parellada, and Newing 1998, 282).

[M]edicinal plants that are not there for the taking, but may make themselves available to the right people” (Berkes 2012, 111).

There are ‘male’ and ‘female’ foods and food preparations...refer not only to animal-derived food but also to vegetable foods. (Reichel-Dolmatoff, 1976).

“In general, master plants cannot only heal our bodies and our minds but can be used as tools for the development of consciousness.” (Del Rio 2016, 198).

2.2.1.5 *Strange stories*

Indigenous peoples’ stories are complex. They deal with imagination and reality as one thing. I can mention three “types” of stories. There are stories about creation (Boff 1998; Roeder 1995), which can be seen as every culture’s explanation of the origin of humans, and some of these stories are similar to the Christian Bible’s version. Also, there are stories to teach behaviour (Berkes 2012; Roeder 1995) and these stories generally talk about animals (e.g., coyote, fox, frogs, cougars); plants (potato, corn, coca); and entities (moon, sun, rivers, mountains). There are stories about uncommon phenomena, and these stories talk about appearances and transformations (Portugal 2016b, “Leyendas y Mitos de La Paz” 2015); travels to the past or to the future (Portugal 2016c); writings with codes (Portugal 2016a); underground cities (Portugal 2014a; Portugal 2016d; “Leyendas y Mitos de La Paz” 2015); dwarves (“Leyendas y Mitos de La Paz” 2015); or even contact with other planets (Portugal 2014b).

⁵ Indigenous peoples of the Peruvian Amazon.

2.2.2 Consequences of keeping the idea of “the strange” over management

The perception that there is something “strange” in the life of the Indigenous populations does not justify relegating the practices and narratives only to the religious cultural dimension. In fact, we would be missing the opportunity to know the essence of the relationship of Indigenous peoples with nature, which has biological and geological implications that are important for the natural sciences. Currently, some viewpoints lead to the thinking that these people have poor, primitive technology and are not able to manage the land. Institutions are reluctant to refer to the Indigenous knowledge as a “management system.” Berkes (2012, 270-1) noted that traditional knowledge is considered a threat to environmental assessment because it is not objective and relies on “mundane explanations.” Parts of the daily life of Indigenous peoples are misunderstood as strange. As Kassam (2010, 2) states, urbanized and industrialized societies of the twenty-first century regard subsistence activities as anachronistic or obsolete cultural holdovers from earlier centuries (2010, 2). For Kassam these ideas are strengthened by a sense of superior European technology compared to inferior, inefficient, and incompetent Indigenous peoples (Kassam 2010, 8). Those tendencies do not allow Indigenous people to be part of a common management system; they make them feel “inferior” or “intimidated” (Tommy 2015, 85-6).

In addition, society’s recognition of certain knowledge depends on certain objectives. Societies, or rather specific groups with power, see the use of Indigenous knowledge as a potential threat to the monopoly of conventional resource management science (Berkes 2012, 276). These groups in power may encompass food, pharmaceutical, and related industries, and include social institutions such as religions, political parties, and others that fear the loss of their monopolies.

2.2.3 The life of Indigenous peoples related to and connected with nature

For this section, I organize two types of information. The first type is the information in which novel studies show more in-depth explanations concerning Indigenous peoples; and the second is the information expressed by Indigenous peoples themselves. I wanted to contrast the honest perceptions that struggle to understand the relationship that Indigenous peoples have with nature, and the perspectives of Indigenous peoples that carry simplicity, regularity, humbleness, and relevant understandings of life.

The following are some examples of studies that illustrate facts of the Indigenous practices and view of nature.

The Dogrib Dene⁶ (Athapascan) notion of *ndé*, which could be translated as ‘ecosystem’ except that *ndé* is based on the idea that everything in the environment has life and spirit. (Legat et al. 1995 quoted in Berkes 2012, 72)

... specifically [in] Andean cosmoexperience, there can be no legitimate division on hierarchy between the ‘social’ and the ‘ecological’ as existence unfolds in a ‘socio-bio-eco-cosmic-continuum’. (Figueroa 2012, 151)

... [T]hrough the ages only Amazonian man, with spiritual aid from plants and from nature itself, has been able to interpret the silent language of the Amazon biosphere. Only in this way has he been able to regulate its use and harvest. (Gray, Parellada, and Newing 1998, 283-4)

These examples put aside “strange” misconceptions and pay attention to the functioning of the ecosystem as a whole, and they pay less attention to separate themes such as laws, economics, religion, technical procedures for agriculture, moral teachings, and so. The main point is to see how the Indigenous peoples interact and work with nature. This new interest among academics started since 2000 (Berkes 2012, 171), due to many reasons not always in direct relation to the functioning of the biosphere but including innocence and openness to what is different. Here are some reasons:

- to be curious about pictorial representations, magical stories, spiritual dimension, rituals
- to find the meaning of handicrafts
- to understand the processes rather than inert knowledge
- to grasp the local but paradoxically universal knowledge of Indigenous peoples
- to discuss, to debate science and traditional knowledge
- to combine rational knowledge with intuitive wisdom (a concept used by Capra 1983)
- to increase literature in traditional knowledge
- to experience knowledge as lived knowledge
- to incorporate ethics when “managing resources”
- to fulfill the need to rediscover the connection with nature
- to understand the dynamic interaction between nature and society
- to review views on climate change.

⁶ Dogrib Dene is spoken by the Dene First Nations people that reside in the Northwest Territories of Canada.

In these approaches scholars have found commonalities between Indigenous knowledge and science. Kassam (2010, 86-7) refers to Indigenous knowledge's detailed insights in regards to the ecosystem, how plants and animals behave and interact with each other and are influenced by climatic or seasonal variation. He also analyzes the hunting process and how people are linked to the animals they hunt. He states that Indigenous peoples do not explore biochemistry or physiology (as topics written in these subjects), but they do really examine those properties of animals and plants in the interactions with them, and with different terminology. His work illustrates what many authors agree regarding the similarities between Indigenous knowledge and science, but the elements that are not clear are considered and explained as "beliefs." He says: "It was believed that those who did not help would embarrass the animal spirits and would consequently be hunted themselves" (Kassam 2010, 133). Likewise, Berkes (2012) has some tendency to explain part of the Indigenous knowledge as a belief; he says "Almost all traditional ecological knowledge systems may be characterized as a complex of knowledge, practice, *and belief*" (Berkes 2012, 266). He emphasizes that Western science, by definition, does not include an ethical or belief component, but traditional ecological knowledge does. In section 4.1.1.3 I explain that religious language prevents a proper understanding of Indigenous knowledge, among these words is this term "belief."

To make some sense of Indigenous knowledge Berkes (2012, 209) uses the terminology "Fuzzy Logic," which is an alternative to the conventional binary logic based on choices *yes* and *no*, replacing them with a continuum of possibilities that effectively embody the alternative *maybe*. These efforts to explain Indigenous knowledge are important because they represent sincere interest, although they are in the framework of logic, which the modern mind is very used to. Indigenous thought deals with the *non-logical* in the same way as the logical. For example, Villoldo (2016) narrates that shamans told him a non-logical thing, that they were able to journey to "a long time from now" and then bring the vision and wisdom they discovered back to the present. He admits that "this ability was incomprehensible to me, as I came from a culture where time was linear and flowed in only one direction" (Villoldo 2016, 161). Smith (1999, 74) states that "the relationships to the universe, to the landscape and to stones, rocks, insects and other things, seen and unseen, have been difficult arguments for Western systems of knowledge to deal with or accept." She adds "It is one of the few parts of ourselves which the West cannot decipher, cannot understand and cannot control ... yet." (Smith 1999, 74).

Indigenous peoples talk about their knowledge with strong certainty, confidence, and humbleness. Note that the following phrases were expressed as aspects of their daily life. The knowledge is not something that has to be studied, it is found in everyday life.

[The Cree⁷ say] All creatures are watching you. They know everything you are doing. Animals are aware of our activities. (Berkes 2012, 107)

[U]nless you're going to kill an animal, do not cause it harm ... Inuit⁸ do not endanger animals as they are lectured. It is southerners...biologists are endangering wildlife handling and tagging is what harm animals... we are told, you must not touch protected animals ... [Inuit] do not cause needless suffering. We love our animals. ("Inuit Knowledge and Climate Change" 2017)

All things come from Mother Earth. Nothing exists that is more necessary than she is. Without her, life is not possible. Our ancestor fought for her because they recognized her value. I am nothing without the earth, I would be poor without her. (Cacique Carlos Lopez, recorded by Valerio Nuñez, in Roeder 1995, 68)

May the cloud provide shade for you to rest on the hot days, that fire and water will never fail you. Do not miss the love of magic and remember that you are in the land of magic ... (Pauccar 2014, 47)

Elders talk about the world as being alive, as of spirit, it makes sense...Animals, tobacco, trees, rocks are animate and hence they merit respect. (Kovach 2009, 66)

I did organize the information in this way because I want to highlight some scientist's sincere scientific interest for the study of Indigenous peoples' views of nature. Although the scholarly explanations are "cold"⁹ to my point of view, these types of studies present a different and more complete vision of what conventional science is accustomed to consider as knowledge; also they show that Indigenous peoples do science and this science emphasizes the *process*, it is verb-based, action-oriented (Berkes 2012, 8; Boff 1998; Figueroa 2012; Kassam 2010), warm, and vivid, based in life itself.

The terminology used by Indigenous peoples is not scientific, but thanks to the work and support of some scholars of Indigenous knowledge, we are coming to a point where integration between them is occurring.

⁷ One of the largest groups of First Nations of North America.

⁸ Indigenous peoples inhabiting the Arctic regions of Greenland, Canada, and Alaska.

⁹ The use of "cold" should not be understood in poetical terms. It is well defined in physics as a low temperature in which atoms and molecules reach their minimum motion, and that means a lower number of interactions, or connections between two bodies. I decided to use it because of two reasons. 1) In addition to that definition it keeps a quality of subjectivity coming from the observer (his/her real implication); and 2) it has physiological and pathological effects on natural bodies.

2.2.4 Proposed integration between Indigenous knowledge and science

2.2.4.1 From academia

The following question is an example of those that arise from people working in Indigenous contexts: “How can we approach the dilemma of finding common ground between Western Science and Indigenous Knowledge?” (Berkes 2012, 146). The attempts have been done in that direction. According to Bielawski (2003, 323) three impediments have emerged to recognize and utilize Indigenous knowledge: “The problem of extracting empirical bits of Indigenous knowledge and attempting to fit them into western scientific categories; the problem of attempting to integrate Indigenous knowledge and scientific knowledge; and the problem of the sacred.” This occurs because the current organization of scientific categories does not allow for the recognition of Indigenous knowledge. In this hierarchical organization, nature and culture are divided and a few subjects are given preference, and the organization acts as a filter to any new knowledge entering in it (**Figure 2.1**).

The need to integrate the biological and cultural dimensions is essential (Kassam 2010, 3-4). Kassam (2010) thinks that scholars are aware of this, but since it takes time to develop a systematic body of ideas regarding the relationship between cultural and biological diversity, he proposes a transdisciplinary approach (Kassam 2010, 62). I consider transdisciplinarity an essential concept to understand before applying it, because based on that understanding we can plan and build projects. Now, the term “transdisciplinary” is often confused with “multidisciplinary,” but they are not interchangeable terms. Transdisciplinary is the most complex model, but to my experience and my analysis transdisciplinary cannot incorporate the Indigenous knowledge properly if we consider the core features of Indigenous knowledge, which are land-centeredness and a different time-space comprehension. The three models shown in **Figure 2.1** are developed in linear time and exclude land interactions. In section 4.2.3, Figure 4.8, I have developed another option to these approaches, which I called *evolving disciplines*.

For the integration of subjects, other scholars are seeking to redefine their field of study, not strictly within the Indigenous field, but starting to break old models that did not allow open-mindedness in their own disciplines. The following describes some of the recommendations for that redefinition.

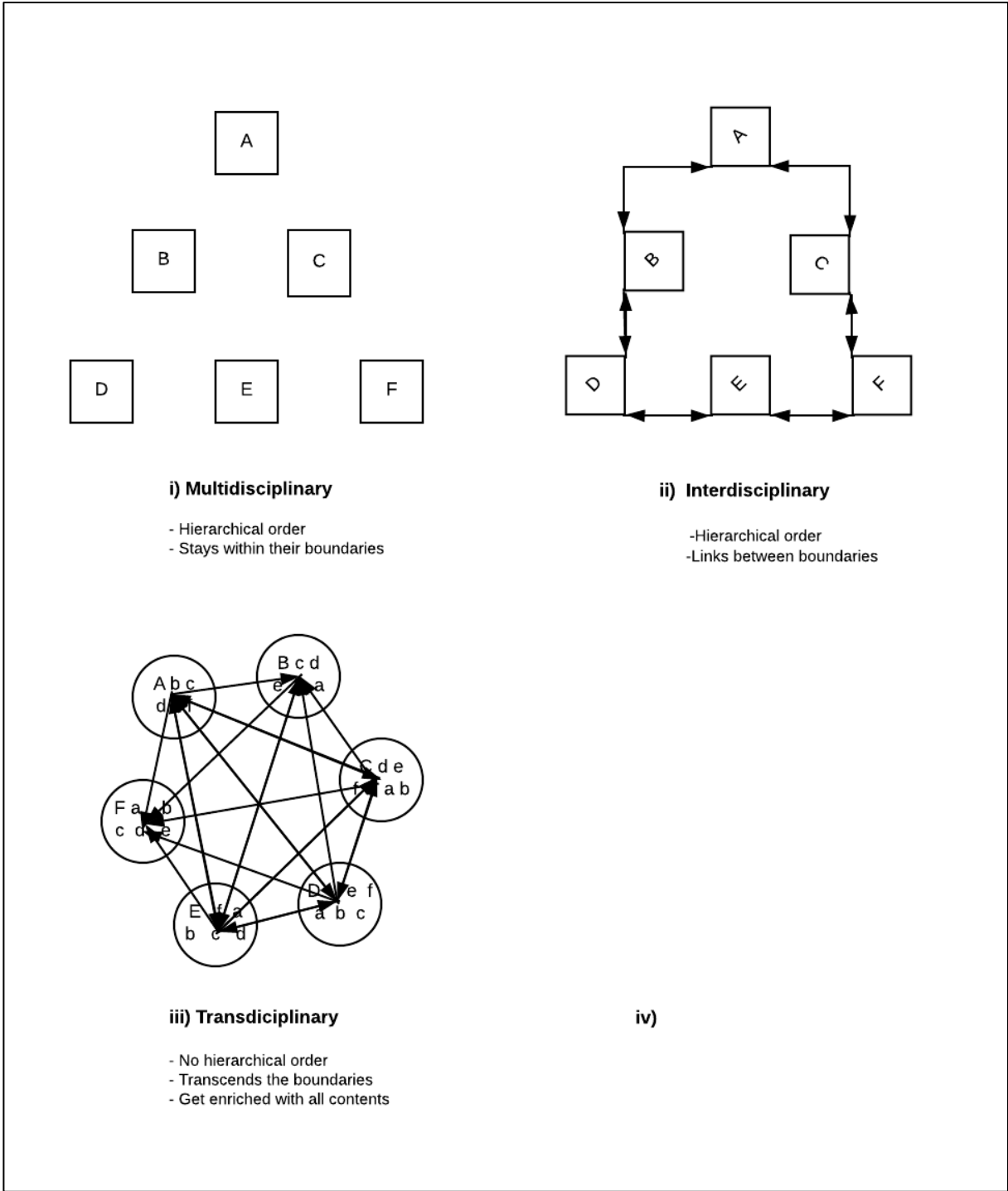


Figure 2.1 Organization of knowledge areas and their potential for integration I (plays a role as the learning methodology of the society).
Source: Own Elaboration, 2017.

Wilson (1984) wants to bring ethics to research; Machado and Zibeche (2016) and Rivera (2010) propose different models from old and failed politics; Agrawal (2005) suggests

honest self-regulation as a new form of governance; Tobias (2009), Toney (2015), and Figueroa (2012) advise the participation of people in all types of research or projects; Boff (1998) exhorts participation along with nature; Hathaway (2016) proposes to explore emotional factors in the ecological crisis; Capra (1983) and Carl Sagan (Carl Sagan, Stephen Hawking and Arthur C. Clarke – God, The Universe and Everything Else” 1988) claim for a new understanding of the physics and the cosmology of the universe.

In terms of desires, preferences, or objectives, it can be easier to agree and understand that people from different views or perceptions need to work together despite their differences, and do better research aiming at holistic approaches that will benefit more people. However, in terms of practice, agreement and understanding between the Indigenous view of nature and scientific knowledge implies more challenging changes on both sides, and those changes have to challenge the structured mind that has been shaped by the history that has profoundly impacted both of them; those changes have to be done within a process that involves more than words or explanations, but includes actions and interactions. The non-Indigenous side should immerse and stop seeing from a distance, and Indigenous peoples should embrace people of European background who are struggling to find their Earth’s roots and the same bond with the land.

2.2.4.2 From the Indigenous people

For Indigenous peoples, integration of themselves into the modern world is not only about knowledges, it is about everything else and it is harder in contrast to the enthusiasm that comes from academia that is getting support for all the reasons mentioned above. From this side, there are no bodies of knowledge, no fields of studies. Indigenous peoples are experiencing changes in their bodies, families, and land. The integration between Indigenous knowledge and science is life itself. Their steps into the modern life (voluntary or forced) bring benefits and hazards. For example, health is impacted because of the increasing introductions of different food such as oil, pasta, sugar, and substances such as alcohol and cigarettes, with disproportionate and irregular consumption that may result in “dietary deficiency and significant physiological effects” (Brown 2014, 30). Families are experimenting with new ways of schooling, forestry, fishing, and ecotourism. According to Smith (1999), there are new missionaries, traders, entrepreneurs, and consultants with no more colonization, but with “post-colonial” intentions in order to make the community a market, to pirate the forest, or to promote

Indigenous elites to divide the Indigenous nations. Men and, recently, women leave their communities for modern jobs and get pressured to fulfill the requirements of these new activities; sons and daughters study far from home losing emotional support, the language, and traditions. In addition to the breaking of family and community, the changes to their environment impact their sources of water, the stability of soil, and the seasons of hunting and fishing. Indigenous peoples are aware of these multiple social and cultural impacts and have expressed their concerns internationally, from their own perspectives, since the 1920s (**Table 2.3**). The documents presented are not sufficiently disseminated though.

In recent years, Indigenous scholars are working in universities, helping to expand their knowledge and views of nature in academia (Smith 1999; Kovach 2009; Little Bear 2016). Some of these scholars are working specifically for the integration of Indigenous knowledge with science, such as Ferguson (2005) who analyzes Western science, native science, and the quantum physics paradigm; and Cajete (2000) who pioneered the exploration of equivalencies between Indigenous science and Western science.

The conditions for this integration are necessary and should grow. I see the work of scientists and Indigenous peoples moving in that direction. In the coming years, this integration will develop a better shape and will stand by itself. Golovánov (n.d., 5) states that “It is not a new conception to which one has to adhere or that gains adherents of the academies or universities ‘converting them to their faith,’ it is a matter that there is an objective maturation of conditions for its recognition.” I find the conditions for working the integration of the Indigenous view of nature with science. The starting point of my analysis is the concept of the cultural-biogeochemical energy proposed by the well-recognized scientist V. Vernadsky, and this is followed by considering the notions of space (see 2.3.2.3) and left-handedness and right-handedness (see 2.3.2.4).

2.3 The cultural-biogeochemical energy (*Evolution of scientific thought*)

2.3.1 What matters in Science?

I need to point out that it is not a matter of judging the theoretical approaches (the idea of order, the idea of causes, and the idea of chance, and so on, as central to science). In the eyes of critics, there will undoubtedly be errors and failures of concepts. The motivation that has led

to different scientific achievements is what is important for my thesis. I want to reflect that “ignorance” is the seed¹⁰ of that motivation so that the human understanding can reach the truth.

This motivation is the seed of change, transformation, and evolution, and has led several scientists to contribute to the human understanding of the planet. It was important to have the curiosity, imagination, and creativity to break out former statements to open the ways that have led to the generation of new concepts such as Galileo’s *heliocentrism*, Darwin’s theory of *evolution*,¹¹ and so on (**Figure 2.2**).

The great imagination and creativity of scientists necessarily imply the ability to identify and recognize errors and omissions of the previous knowledge before them. It should be perceived that after the new idea appears, the mental discomfort comes immediately. In **Figure 2.2** I show three periods of transition after a critique was done. Boff (1998) emphasizes how the change from understanding the planet was flat, to understanding it was a spheroid, was a transformation in the human mind. Similarly, the idea of a changing Earth from an inert body to a living and sentient organism or, following Indigenous knowledge, to a conscious organism, may cause discomfort because those views are not easy to grasp. To think in more dimensions and variables is difficult.

In another example I am going to refer to the biophysicist Chizhevsky who made a significant contribution to science. He posed the heliobiology and sowed the beginnings of science on life cosmically (relating to universe), overcoming the dichotomy between the terrestrial and the cosmic, according to Chizhevski:

[N]ot only did geomagnetic storms resulting from sunspot-related solar flares affect electrical usage, plane crashes, epidemics and grasshopper infestations, but human mental life and activity. Increased negative ionization in the atmosphere increased human mass excitability. Chizhevsky proposed that human history is influenced by the eleven-year peaks in sunspot activity, triggering humans in masse to act upon existing grievances and complaints through revolts, revolutions, civil wars, and wars between nations. (“Alexander Chizhevsky” 2017)

¹⁰ Terminology such as “seed,” and “sow” should not be confused with poetical words. I use terms of organic processes rather than mechanical processes because we are organic bodies (“Bring on learning revolutions” 2010).

¹¹ I am using general examples and avoiding details to discuss the story of the concepts. For instance, in the case of “evolution,” I am not going into the work of Alfred Russell Wallace (1823-1913) as the conceiver of the theory of natural selection.

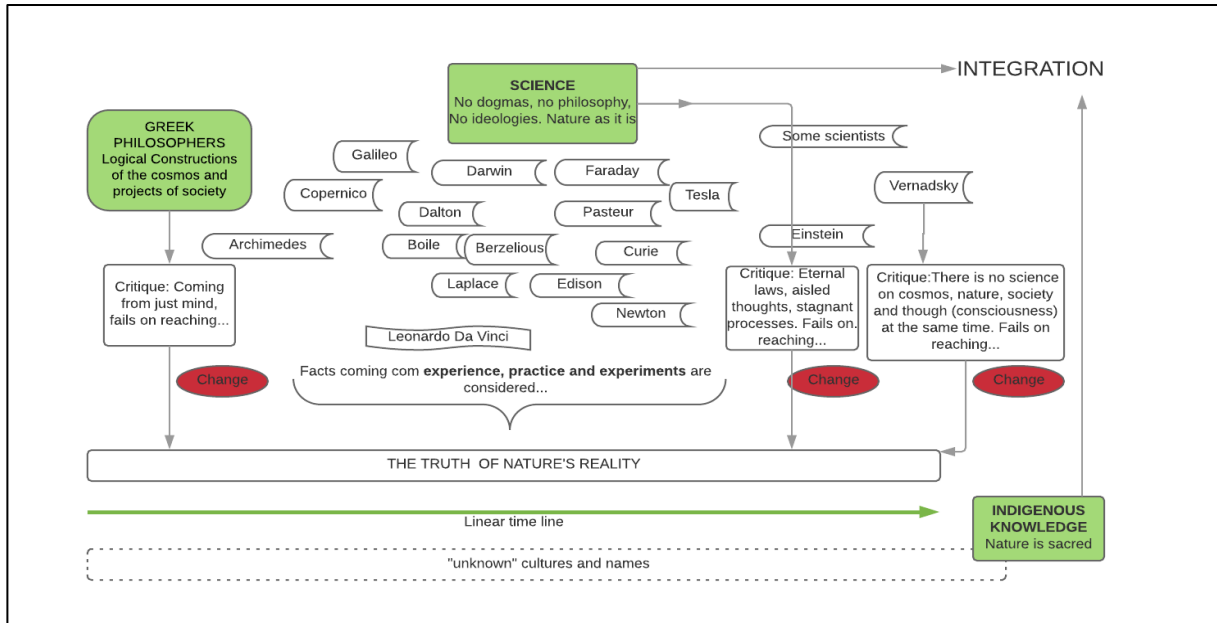


Figure 2.2 Scientists who have contributed to the human understanding of the planet.
Source: Own Elaboration, 2017.

Today the National Aeronautics and Space Administration (NASA) tracks this eleven-year peak, and the year 2019 is predicted to be a new cycle (Hathaway 2017). With that example, I want to illustrate the idea that if a scientist does not dare to sow the seed, science cannot continue. Paradoxically, science now seems a barrier to creativity due to the methodology of testing hypotheses in short periods of times, and forcing equations and curves so the result fits specific objectives. The effort of natural sciences students to get these data is a priority, but it seems to have little impact for solving the problems they identify.

To my analysis, science has fallen into the domain of philosophy because the “facts” have erroneously become argumentative points (dogmas?) and science does not challenge itself anymore. If scientists do not see knowledge as a matter of change, science will not go further and may stay incomplete. Science should not become a philosophy or a dogma for people. Science is to experiment, to observe with freedom and creativity, as great scientists did (**Figure 2.2**). Vernadsky once asked: “But what is the task? Only to describe and systematize?”

2.3.2 Vernadsky's work on biosphere and noosphere

2.3.2.1 Noosphere

The concept of noosphere appeared in the 1930s. It was a time of discussions about how the development of science should be in the modern society (Winkler 2014, 65). The concept is the first approach of science to deal with consciousness (Vernadsky 2001, 22). Three personalities of that time put efforts into developing this concept. Edouard Le Roy, a mathematician and philosopher, disciple of Henry Poincaré and member of the *Academie des Sciences in France* who presented a philosophical line of thought on science and morality questioning their relationship, and author of *The Idealist Requirement and Fact of Evolution, 1927; Noosphere, 1927; Human Origins and the Evolution of the Intelligence, 1928; Intuitive Thinking, 1929*, among others (“Édouard Le Roy” 2017). Teilhard de Chardin was a Jesuit priest trained in paleontology and geology who took part in the study of Peking man after Davidson Black (“Peking man” 2017); his best-known book is *The Phenomenon of Man, 1955* (Grim and Tucker 2017; “Paleontologist, Mystic and Jesuit Priest” 2017). Vladimir Vernadsky, a disciple of Dmitri Mendeleev and Vasily Dokuchaev (Wolf and Mülleer 2014, 11-12), became a pioneer scientist who created the field of biogeochemistry and dug into a variety of studies in genetic mineralogy, geochemistry, hydrogeochemistry, hydrogeothermy, oceanography, radiogeology, cryology, cosmo chemistry, chemistry of other planets and others. He was said to be author of more than 500 papers (Winkler 2014, 66); and over 700 titles were recently counted (Ivanovskaya 2014, 69) including *On the States of Physical Space, 1938; On the Fundamental Material Energetic Difference Between Living and Nonliving Natural Bodies in the Biosphere, 1938; and The Transition from the Biosphere to the Noosphere, 1938* (Jones 2012, 11). His work has largely been ignored but it is of tremendous importance for science history because he laid the foundations for several new directions of scientific evolution—from having seen a new way of looking at minerals (genetic mineralogy) to analyzing the importance of human activity on the biosphere, which is developing under human reason and thinking (Wolf and Müller 2014, 14).

Teilhard and LeRoy became friends in 1921 and discussed the evolution of humans, and influenced their ideas mutually; Le Roy intended to specify the humankind without separating us from nature, Teilhard worked on what he called the “omega point” only possible through Jesus Christ (Sequeiros, Medina, and Medina de la Fuente, 2009). Together they attended

Vernadsky's lectures on biogeochemistry in the 1920s. Teilhard and Le Roy elaborated the concept of “noösphere” along with those brilliant expositions of Vernadsky (Wisseman 2006, 127); Teilhard attributes the terminology to his own thinking according to his biographer Cuénot in the 1965 book, *Teilhard the Chardin: A Biographical Study* (quoted in Samson and Pitt 1999, 4; Grim and Tucker 2017). But in new publications of his letters, in 1954 when Le Roy passed away (Sequeiros, Medina, and Medina de la Fuente 2009), Teilhard himself attributes the development and the elaboration of the theory of the noösphere to Le Roy and Vernadsky:

Yes, I was shocked by the death of this great Edouard Le Roy, whom I owe a lot. Not because he has provided me with a particular idea, but because he has helped me to develop what was in my head, he directed me and gave me confidence ... We have met many times when he wrote *L'exigence idéaliste et le fati de L'évolution* ... and by that time I wrote a long article on the Hominization (I cannot remember the title) that Le Roy, I think, quotes somewhere at the foot of page in *L'exigence idéaliste*, ... I have collected the influence of Le Roy in my articles later. The term 'hominization' existed before me, I found in an article published in 1920 by an anthropologist, German (Von Eckstedt?). But I think it was in that essay that the word and notion of Noösphere first appeared, which was fortunate thanks to Le Roy and the Russian sage Vernadsky (who was by that time in Paris). (my translation of Sequeiros, Medina, and Medina de la Fuente 2009)

Teilhard's ideas were highly criticized by both the church and the scientific community. The 1960 Nobel Prize winner in Physiology or Medicine, Peter Medawar, found Teilhard's book as “tricked out by metaphysical conceits” that uses “euphoric prose-poetry” and “adjectives of excess”; he says “[w]hen something is described as merely huge we feel let down” (Medawar 1961, 99-100). Although Medawar recognizes Teilhard's work in “the evolution,” he thinks Teilhard “has no grasp of the real weakness of modern evolutionary theory,” and his book is anti-scientific (Medawar 1961, 104-5). The church denied him publication many times (Samson and Pitt 1999, 53). Despite those critiques, the concept of noösphere as told by Teilhard influenced the New Age movement (Harry 2010) and other influential people, for instance Catholics such as Thomas Berry who considers Teilhard the father of environmentalism (“John Grim: Cosmology and Ecology: The influence of Teilhard on Berry” 2017); the Alternative Nobel Prize 2001 winner, Leonardo Boff, mentioned Teilhard in his book *Ecology* (Boff 1998, 108, 226); even Pope Francis cited his ideas in his last encyclical, *Laudato si*, in the section “The mystery of universe” (Francis 2015, [83]).

The work of Le Roy on the concept of the noösphere is different; he was clear and provided a high level of synthesis (Samson and Pitt 1999, 51) that might have called the

attention of Vernadsky who highlighted LeRoy's ideas on two subjects: the vitalization of matter and the hominization of life.

Vernadsky attributes the concept of noösphere to Le Roy, as the word appeared in Le Roy's book *Human Origins and the Evolution of the Intelligence* (Vernadsky 2012a, 16). Vernadsky used the noösphere concept with a straight commitment to science.

The two ways that the concept of noösphere has followed are different in essence. While the idea of Teilhard relies more on cumulative ideas of phrases added with adjectives, the one that LeRoy and Vernadsky developed is based on the firm ground of science for observation and experimentation. For the purposes of my research and to avoid distortions, I will not be using the word noösphere but the phrase that Vernadsky himself created to refer it—the cultural- biogeochemical energy of the biosphere (Vernadsky 2012a, 18).

2.3.2.2 *The biosphere*

Vernadsky's concept of the cultural-biogeochemical energy is the result of his many years of analysis of the biosphere. He published *The Biosphere* monograph in 1926, using the term biosphere that had been used by Lamarck and by the geologist Edward Suess's books *Die Entstehung der Alpen*, 1875 and *Das Antlitz der Erde*, 1923-1928 (Vernadsky 1997b, 9). The book's data content may not be relevant today, but the notion of life as a geological force is fundamental to understanding the impact of human life on Earth. He formulated objectives for biosphere study, and this is known as biospherology (Winkler 2014, 67; Vernadsky 1997b, 10). He also proposed its transition to the noösphere. Vernadsky's analyses are valid today, and more scientists are now studying Vernadsky's proposed ideas (Ivanovskaya, Irina 2014; Kautzleben Müller 2014; Wolf and Müller 2014).

Vernadsky (1998, 47) defines the biosphere as “the region of transformers that convert cosmic radiations into active energy in electrical, chemical, mechanical, thermal, and other forms. Radiations from all stars enter the biosphere, but we catch and perceive only an insignificant part of the total; this comes almost exclusively from the sun.” And he adds, “this penetrating cosmic radiation determines the character and mechanism of the biosphere.” The biosphere is dynamic, and includes mental and spiritual activity (Vernadsky 1997b, 9-11; Vernadsky 2012a, 16, Vernadsky 2005b,19).

In the following quotations Vernadsky explains his ideas further:

[T]he biosphere is equivalent to ‘nature’ in the ordinary sense of the term, as this term is used in the deliberations of the naturalist and in philosophical discussions, where it does not refer to the cosmos at large, but rather to phenomena contained within the bounds of Earth. In particular, it corresponds to the naturalist’s nature.

Not only is this ‘nature’ not amorphous and without form, as was thought for centuries, but rather it possesses a determined, well defined structure ... In scientific investigation it is especially important not to forget this and to examine it, since unconsciously, scientist and scholars, when contrasting the human individual with nature, are overwhelmed by the grandeur of nature against the human individual.

But life in all its manifestations including the activity of the human individual, radically transforms the biosphere to the degree that not only the aggregate of indivisible life, but even some problems of the solitary individual person in the noosphere, cannot remain without consideration in the biosphere. (Vernadsky 2012a, 16-17)

When Vernadsky refers to the well-defined structure of nature, he clarifies that “structure” is not a mechanism nor is it something stationary. It is dynamic, ever-changing, and mobile, in each instance changing itself and never returning to a previous form of equilibrium (Vernadsky 2012a, 16). He also says:

[If] this structure is called a mechanism, it would be as special, very peculiar mechanism ... never reaching a state strictly identical in the past and in the future. At every moment of the past and of the future time the equilibrium is different but closely resembling. It contains so many independent variables, that no strict and precise return of some state in its previous form is possible. An idea of it may be given by comparing it to the dynamic equilibrium of the living organism itself. In this sense it is more convenient to speak of the *organized state*, rather than of the *mechanism* of the biosphere. (Vernadsky 2005a, 42-3)

Vernadsky says that the biosphere is the envelope of the Earth as the place, which life not only inhabits (as the biosphere is currently narrowly defined in most reference books) but also develops and modifies.

I observe that the current study of the biosphere is skewed to the degradation, but the other direction, the evolution of the biosphere by human action does not have the same attention. I consider another merit of Vernadsky is seeing the biosphere’s evolution towards the cultural-biogechemical energy. In this thesis, the integration of science and Indigenous knowledge deals with the evolution.

The degradation of the biosphere is studied concerning pollution, biodiversity loss, depletion of resources, misuse of energy, social deterioration regarding consumerism, diseases, and exploitation of life in numerous means (Quiroga 2007). International institutions have been working to tackle these problems, but as analyzed in section 2.1.2 they are failing to reach their

objectives. Fields of applied science have not addressed the issue of the biosphere as a whole. They maintain a perspective within their disciplines (**Figure 2.1**).

When Vernadsky states that scientific cognition is “indissoluble” linked to the biosphere because it can be seen scientifically as a geological force, he offers more perspective to think about the evolution of humanity. Vernadsky's biosphere description is without adjectives, not negative, nor positive. To the question “how can thought change material processes,” he states that thought is not a form of energy; but the “empirical results” of that incomprehensible process is the basis for the cultural-biogeochemical energy (Vernadsky 2005b, 20). He describes facts as the creation of new elements on the surface like aluminum, the plant and animal life being changed and disturbed, new species and races being created as a result of human labour and consciousness (Vernadsky 2001, 22). He points to agriculture and livestock as great manifestations of the cultural-biogeochemical energy (Vernadsky 2012a, 27-28). He also emphasizes the role of a single individual as a cultural-biogeochemical force when he says: “[it] is not the mass actions of humankind, smoothing and refining the details, but rather the expression of separate human individuals” (Vernadsky 2012a, 22); “The individual personality sometimes becomes vividly apparent and is reflected in large-scale phenomena of a planetary character. The individual personality changes, accelerates, and causes geological processes of enormous significance, through its presence in the biosphere” (Vernadsky 2001, 22). Therefore, scientific disciplines concerned with the biosphere have to deal “with the ‘spiritual’ creativity of the human individual in his social environment, the sciences of the brain, of the problems of psychology or logic, will condition the fundamental laws of this scientific cognition of Humans” (Vernadsky 2012a, 16).

Vernadsky lived in a very special time for the development of science and collaborated with great scientists such as Dmitri Mendeleev, Vasily Dokuchaev, Marie and Pierre Curie, Ernest Rutherford, Albert Einstein, and others. He was fascinated with revealed facts that were creating new notions and “new conceptions of the world, which went far beyond the specific facts, but do not contradict them in the way the facts are contradicted by the scientific and philosophical notions that reigned unchallenged, during the 19th century” (Vernadsky 2007, 11).

The notions he refers to are time, space, energy, life, geometry, and so on. According to Vernadsky these are critical concepts in order to understand the biosphere. In this thesis I only analyze the states of space and the left-handedness and right-handedness.

2.3.2.3 States of space

Vernadsky insisted that the state of space is fundamental to understanding reality:

Space that can be investigated empirically is distinct from the space of geometry. That is a consequence of the inadequate depth of geometrical analysis.

Geometrical space is isotropic; for example, it lacks any manifestation of right-handedness and left-handedness.

This does not flow from how things essentially are, but is a consequence of the insufficient deep analysis of reality by geometric thought. (Vernadsky 2007, 12)

I present his analysis of the states of space in **Figure 2.3**, in which he shows the Euclidian geometry as insufficient to represent reality and proposes the need for a new geometry for living matter that considers the symmetry of the left- and right-handedness properties.

In the 1930s, the proposed alternative to the limits of Euclidean geometry was Riemannian space. Scientists have worked for decades on alternate representations of space. In 1975 Mandelbrot coined the word “fractal” and illustrated his mathematical definition. The fractal is at the cutting edge of the analysis of geometry, but in the words of Vernadsky I can say fractals are like a mechanism that has a state strictly identical in the past and in the future. So the geometry to represent the state of space is still missing.

2.3.2.4 Left-handedness, Right-handedness

It is common sense that left and right are different sides, but this poses challenges in science because of the complexity in living matter. The complexity is related to the geometrical representation for symmetry, which is a property that only can be found in living organisms. Crystals have a special symmetry (anisotropic) explained in **Figure 2.3**.

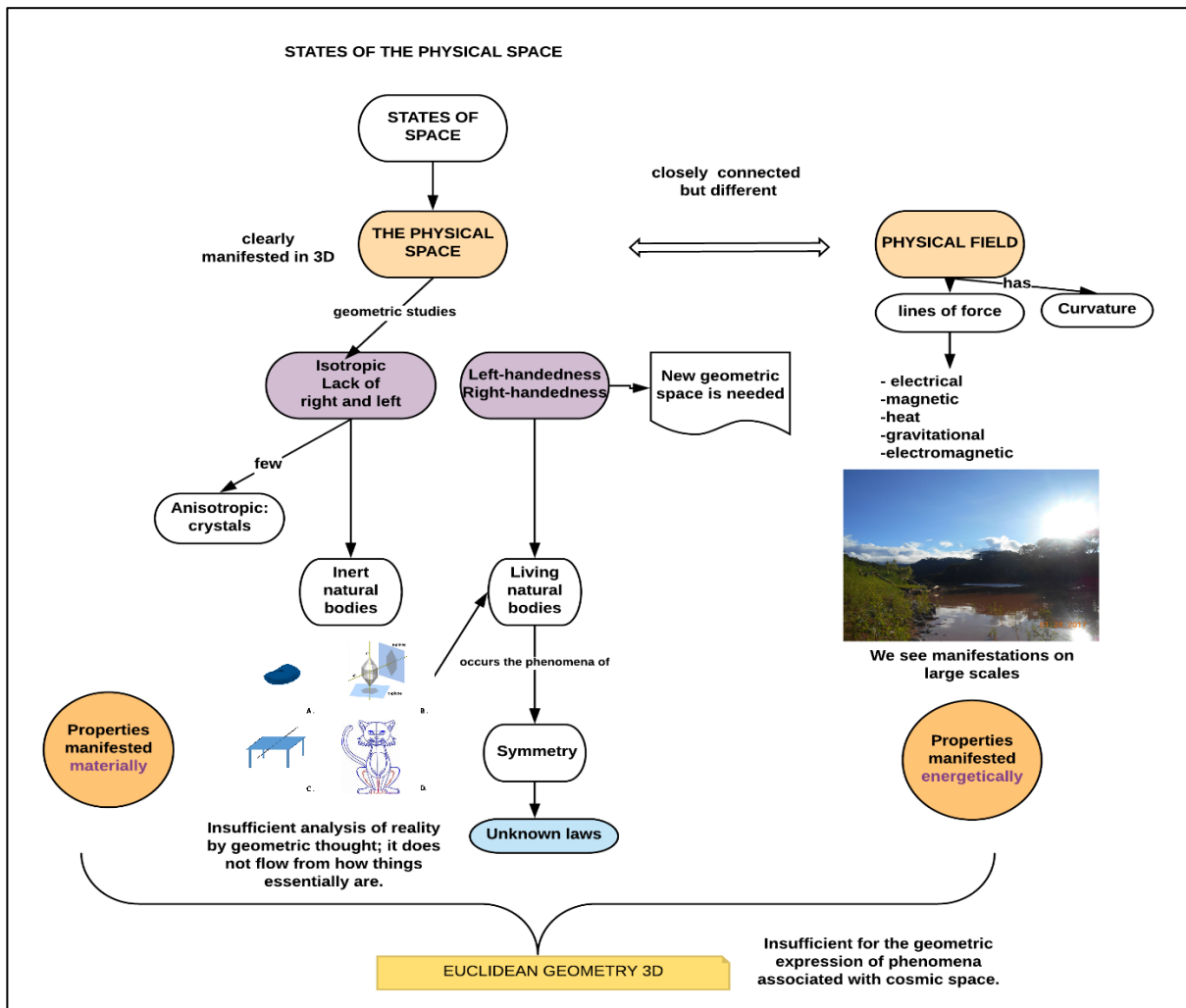


Figure 2.3 States of the physical space.
 Source: Own Elaboration, 2017. Based on Vernadsky, 2007.

Vernadsky (2007, 14) explained that “in the three-dimensional Euclidean geometric space, right and left-handedness are geometrically and physically equivalent in material processes.” Vernadsky bases his explanation in the work of many scientists: Louis Pasteur, Auguste Bravais, and others. He also observes that only crystals present left-handedness and right-handedness in non-living matter: “the numbers of crystallographically right and left-handed polyhedra that are formed during crystallization are identical (in the absence of living organisms in the medium).” In other words, the symmetry we have in mind, that is the left and right representation, corresponds to a geometry in the absence of forces of life. He highlights

Pasteur as one scientist who intended to explain the biogeochemical formation of right- and left-handed molecules in living organisms, but he also notes that Pasteur's work was limited:

He ... supposed that, in cosmic space, right and left-handedness spaces are separate. As we see, for three-dimensional Euclidean space, and for Euclidean space in general, this cannot be the case with respect to matter. Energetic manifestation in space does not give us the possibility to judge. The division into right and left, corresponding to life, i.e., the inequalities of right-handedness and left-handedness, have to be established not in the energetic, but in the material properties of space. (Vernadsky 2007, 14-15)

Vernadsky argues that the existence of the atoms is irrefutable, so it is in physical space in which the entire scientific reality is constructed.

Vernadsky (2007,16) looked into the scientific research that had been done regarding the geometry of symmetry in living organisms; he found that the French scientist and crystallographer Auguste Bravais was the last scientist to do that (in the first half of the nineteenth century). After Bravais's work, the study into the laws of symmetry of living organisms remained in a state of chaos according to Vernadsky. And so it does today. Why is this so difficult? Vernadsky argued the following:

It can be clearly seen, however, that between the symmetry of crystalline polyhedral and the symmetry of living organism, there exist a fundamental, deep distinction. In the first case, we are dealing with the expression of the atomic structure of solid matter, while the second involves a striving towards organization on the part of living matter, which exist in an isolated and separate way within the alien, inert environment of the biosphere.

Symmetry here is expressed in the external form of that eternally mobile, dispersed element of living matter –a large or a negligibly small living organism- which is created and maintained by the biogenic migration of atoms, and is revealed as a body that is sharply distinct from the nature surrounding it. Symmetry is expressed also in its internal, its organization, and its macroscopic and microscopic cross-sections.

To represent this, see **Figure 2.4**. I draw an object, a rock, which does not have symmetry. The only natural non-living bodies that have symmetry are crystals, but currently and erroneously we are representing living organisms with the geometry of crystals.

If I draw a table, it is possible to express the symmetry in which one half is identical to the other half. If I draw a cat, it is more obvious that if I follow the symmetry with the rules of crystals, it will not represent the true symmetry of the living body of the cat. The left and the right of a cat are never identical. What rules should we follow to have a geometrical representation for the symmetry of living matter? According to Vernadsky (2007, 16), those laws are unknown, but its existence, the existence of morphological regularity, is beyond doubt.

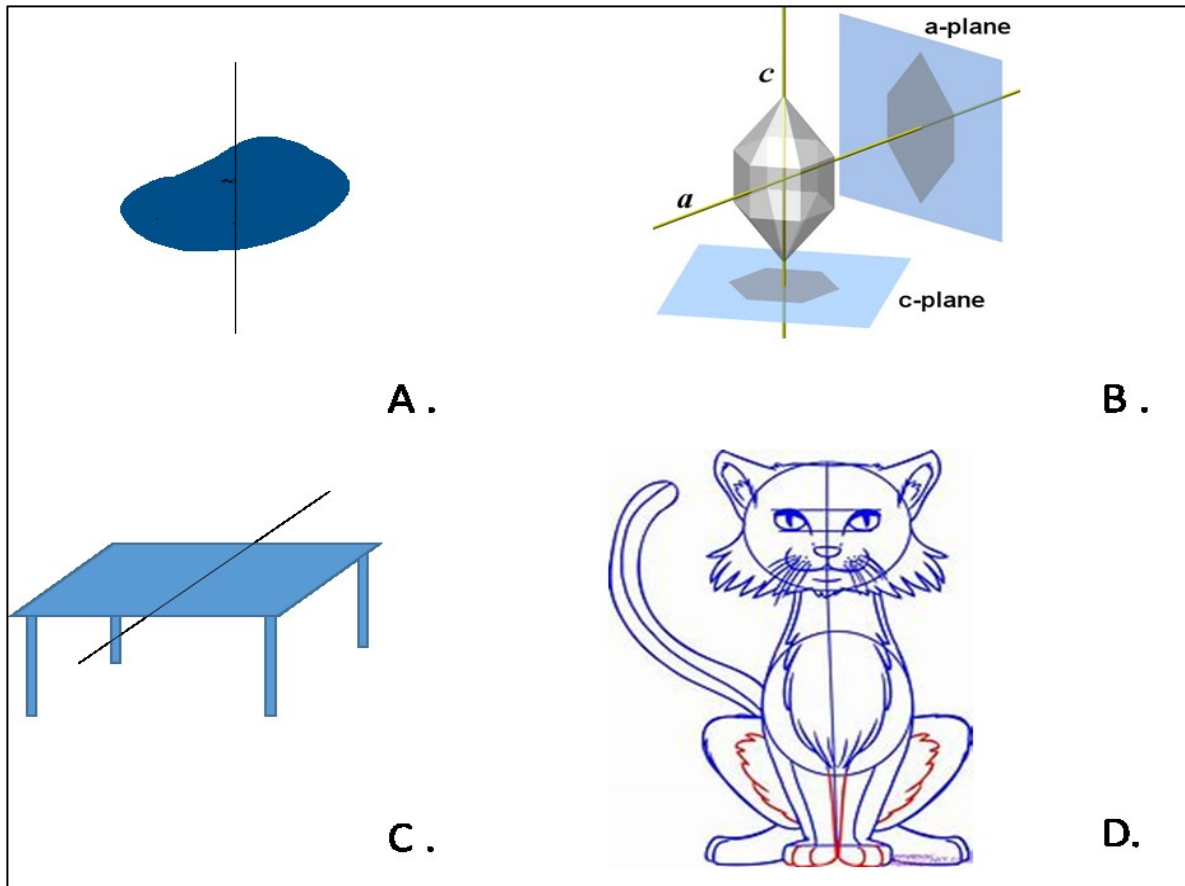


Figure 2.4 Symmetry in non-living and living bodies. A. This rock does not have symmetry. B. Crystals are the only non-living bodies that have symmetry. C. A table may be represented with Symmetry. C. A cat cannot be represented with symmetry because is a living-body.

Source: Own Elaboration, 2018.

There is more to be said about symmetry in living organisms. Vernadsky (2007, 17-20) also observed that “All proteins exhibit a left rotation of the plane of light, both in animals and in plants,” and concluded that “Only left-handed isomers enter into the composition of a living body. This explanation is a simple statement of fact and, essentially, cannot be considered an explanation. It is just as incomprehensible to us as the fact itself.” I will present the Indigenous version about this incomprehensible issue in the textiles of the Quechua people (4.1.2.2).

Vernadsky indirectly recognizes the Indigenous view of nature when he states that “the biosphere is at least the creation of the sun as a result of the terrestrial processes. Ancient religious intuitions that considered terrestrial creatures, specially man, to be children of the sun

were far nearer the truth than is thought by those who see earthly beings simply as ephemeral creation arising from blind and accidental interplay of matter and forces” (Vernadsky 1998, 44).

For the relevance of humankind as a cultural-biogeochemical energy that shapes the biosphere, I propose to analyze the Indigenous view of nature in those terms. Indigenous groups have demonstrated an understanding of nature in a different way than the Western view.

The Indigenous group I was able to visit for this analysis is San José de Uchupiamonas. I will describe in the next section the reports written during my fieldwork in 2017. The reports are descriptive rather than explanatory of the Indigenous life and Indigenous view of nature among Tacana-Quechua people living in Madidi National Park. The roots and essence of the knowledge of these people in relation to the concepts of space and left-handedness and right-handedness will be addressed in chapter 4.

3.0 FIELDWORK

I did my fieldwork in South America, in a remote area of the Bolivian Amazon. The place is both a protected area and an Indigenous territory, and so I refer to it as a double category area in Bolivia.

The protected area is called Madidi National Park and Natural Area of Integrated Management (PN-ANMI Madidi). It was founded on September 21st in 1995 by Supreme Decree 24123, and it is located in La Paz Department, Bolivia, South America (67°30'–69°51' West, 12°30'–14°44' South). This area covers approximately 1,271,500 hectares. Madidi was created as a protected area without consensus between government and Indigenous peoples. The Bolivian context regarding protected areas is a true reflection of the international and Latin American situation; it is less documented though. Local researchers are not able to publish broadly internationally. In Bolivia, the discourse about nature as Mother Earth has grown beyond the country with recognition and impact at the United Nations regarding sustainable development, climate change, biodiversity, forests, and the environment in general. This was recognized in a special manner at the twenty-first and twenty-second Conferences of the Parties (COP 21 and COP 22 Climate Change conferences) (Ministerio de Relaciones Exteriores Bolivia 2016; 2017). However, when considering the internal situation, natural areas in the Bolivian Amazon may be at risk of destruction according to some experts, after the announcement of the Chepete-El Bala Dam project and the Tipnis Road (Molina and Espinoza 2016; Ministerio de Obras Públicas 2010). The Indigenous peoples' voices on these issues are minimized, ignored, or divided (Ochoa 2017).

The category of Indigenous territory is a combination of two historical designations. Indigenous peoples have long lived in the forest but it was after 1990, as a result of the “Marcha por la Tierra y el Territorio” (March for Land and Territory), that the Bolivian government recognized, in 1996, their legal existence in the *Tierras Comunitarias de Origen* (TCO, Spanish acronym for Native Community Lands), according to the Law 1716, Ley del Servicio Nacional de Reforma Agraria, INRA. In 2006 the New Political Constitution of the state changed the TCOs to *Territorio Indígena Originario Campesino* (TIOC, Spanish acronym for Indigenous Native Peasant Territory). These TIOCs acquired dual character—they are seen as TCOs and also constitute a territorial unit where an Indigenous peasant government can be established (Bol. const. art. 393-404).

San José de Uchupiamonas (**Figure 3.2**) is the only community entirely inside the park and was the first community to obtain its Entitled TCO Collective Rights (Title N°TCO-NAL 00081 y TCO-NAL 0082 and Jurisdictional Personnel N°91/2002, May 30th, 2002. Municipal Resolution N° 008/2002 April 19th, 2002). Other communities touch the park partially (**Figure 3.3**) and started their claims for territorial titles after San José de Uchupiamonas received this status.

The following are the four reports I presented after three months of living in the Indigenous Town of San José de Uchupiamonas (Saint Joseph of Uchupiamonas) in the heart of the Madidi National Park. These reports are based on the three fieldwork diary books I wrote during my experience there. The reports keep the original structure, with a few modifications to be consistent with this thesis.

3.1 First report: Departure and community engagement

3.1.1 Summary

This report is the first out of four activities I planned for my fieldwork (Appendix C4) in Madidi National Park, Bolivia. These were: **1) Departure and community engagement**; 2) Living in the community; 3) Preparing future contact; and 4) Formal meetings and interviews. Although these activities were planned in chronological order, they overlapped during my fieldwork there. For this report, I have organized the information separately, regarding each planned activity, to describe it clearly.

I had three objectives for this activity: 1a) Formalize permission with the community, 1b) Explain purposes of the research, 1c) Receive feedback from the community about the research. All the objectives were successfully reached. The permission was obtained in a public assembly and formally presented to the main organizations and different leaders. I have explained the purposes of my research many times in the community. The leaders were very receptive, and I have received constructive feedback in an informal but sincere meeting with the president of the community and most of its members.

In the introduction, I narrate the steps before my departure to the community. The next sections will describe how I succeeded to reach my three objectives.

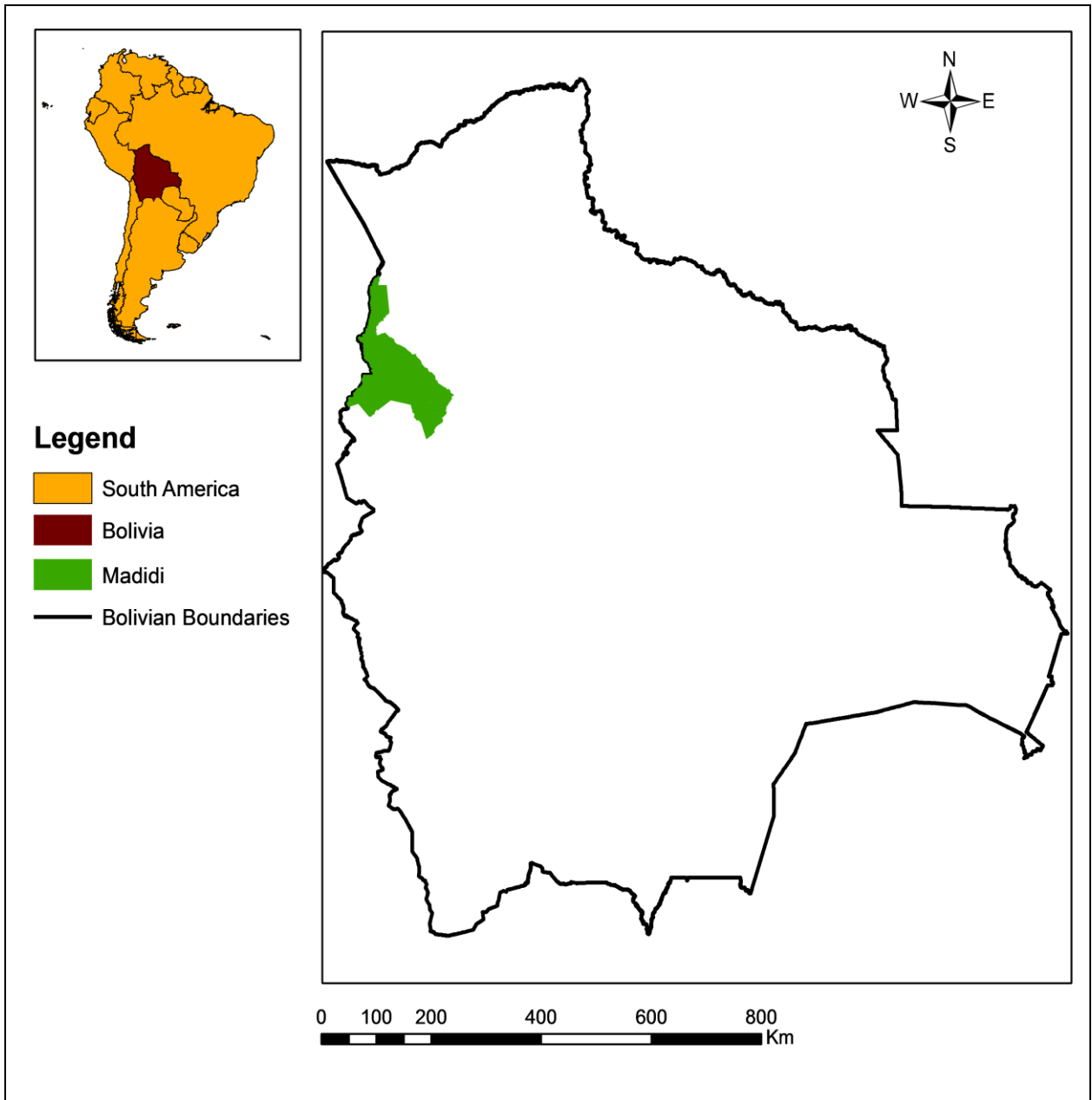


Figure 3.1 Madidi National Park and Natural Area for Integrated Management (PN y ANMI Madidi).
Source: Own elaboration, 2017.

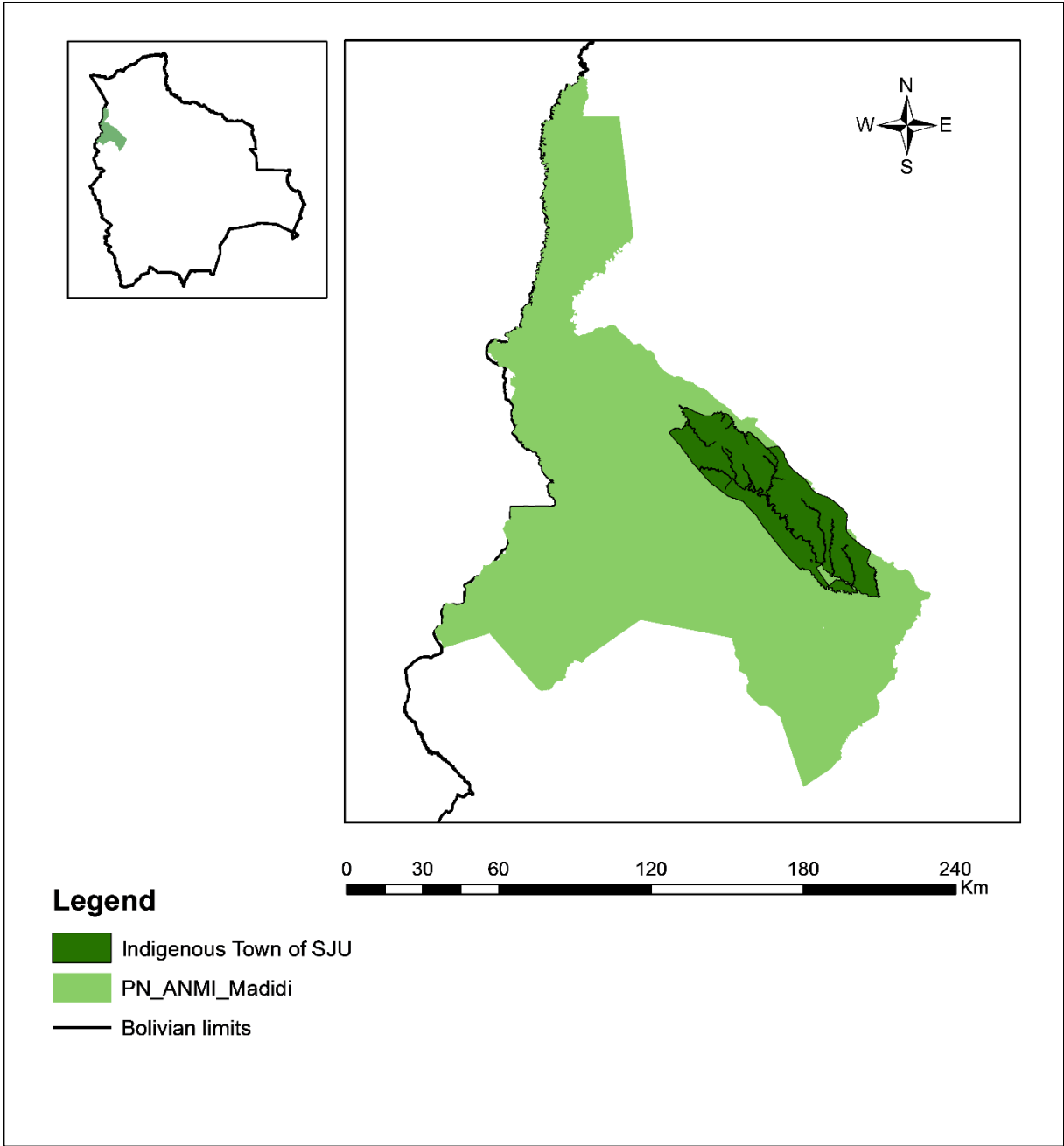


Figure 3.2 Location of TCO San José de Uchupiamonas.
Source: Own elaboration, 2017.

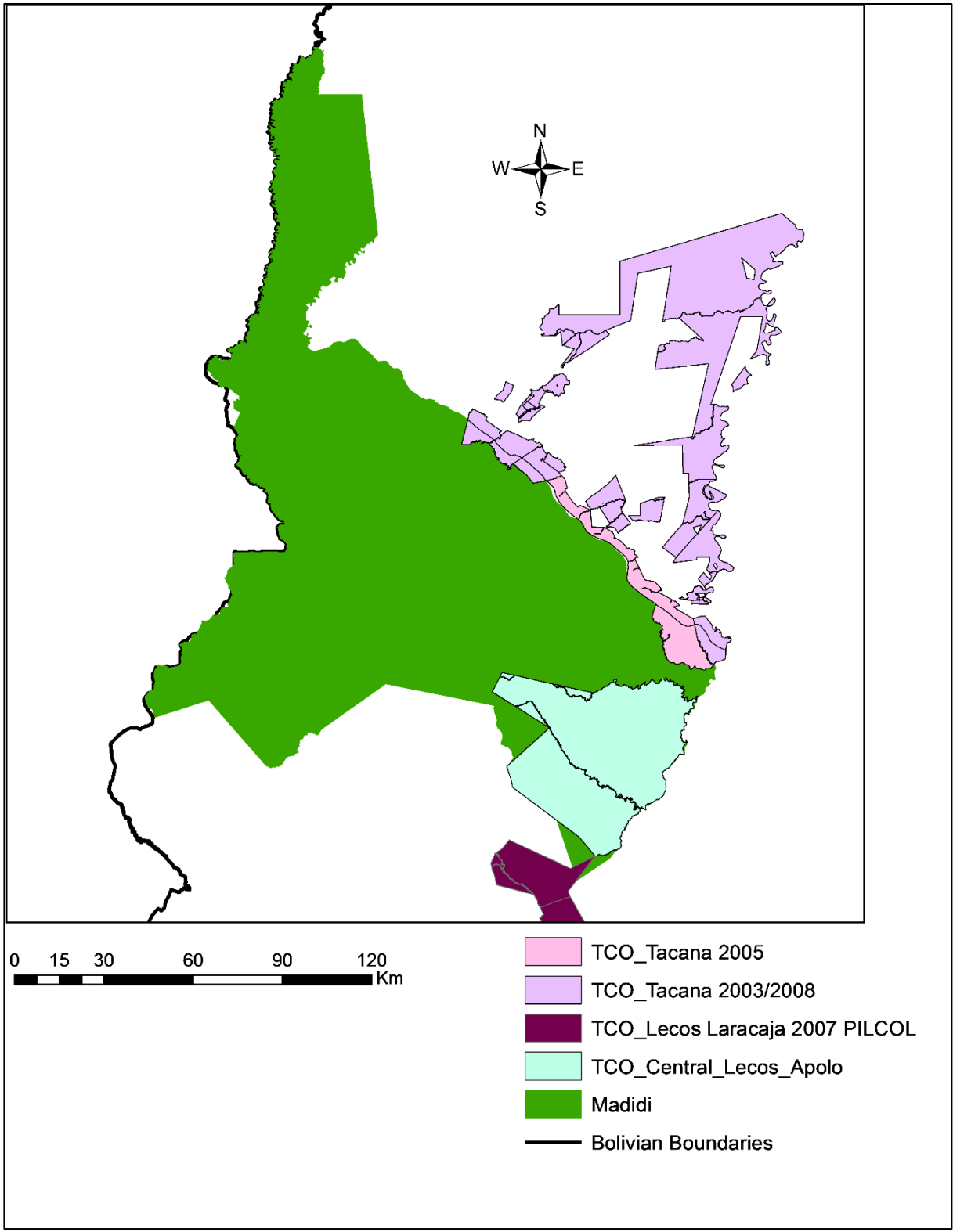


Figure 3.3 TCOs overlapping Madidi National Park, with titles.
Source: Own elaboration, 2017.

3.1.2 Introduction

To properly engage the community you need to do more than simply obtain permission from an institution or only request it from the main leader of the community. Institutions have numerous and often bureaucratic steps to follow. Bureaucracy happens in part because the main representatives change positions in short periods of time and adjustments should be done for compliance with requirements of the new staff. The bureaucratic challenge also happens in part because there are no norms yet for the type of research I am doing. In the community, the head of the town's board has to consider the majority's opinion, so it is very important to have dialogue with each individual even if this seems exhausting. In the end, people will thank and help you.

How did I start the community engagement while being in Canada? Although Madidi National Park is internationally known and tourist companies offer services on the Internet, the contact with the specific community is quite difficult. Before my departure, I spent a lot of time searching possible contacts among friends who studied ecology in Bolivia with me. There seemed to be no other way, but finally I received the email of Rosamaría Ruiz.¹² She is recognized because her organization EcoBolivia was part of the process to create the Madidi National Park in 1995 (Sartore 2000). Also, she was key for the international recognition of Madidi National Park as the place with the most biodiversity on the planet because of her participation as a guide for *National Geographic* magazine in 2000 (**Images 5-6**).

On December 6, 2016, I exchanged emails with her. She provided me her rich knowledge of the area and suggested I make contact with the town of San José de Uchupiamonas. Luckily, one villager was working with her at that time.¹³ The villager contacted me back through email and provided information about the procedures to enter the community. That was the first step for my community engagement. The villager said clearly that I need to send a written request to the president of the town¹⁴ so he can consider it with the community.

¹² **Rosamaría Ruiz** was my first contact. She owns the *Serere Ecolodge* very near to Madidi National Park. She is vast experienced in working many years during 1990s incorporating the participation of communities in the National Park decision making.

¹³ **Elio Valdez Amutari**. A villager from San José de Uchupiamonas with many years of administrative experience in the community and tourism as well.

¹⁴ **Guido Mamani Capióna**. The president of the Directory of San José de Uchupiamonas, 2016.

Soon, on December 14th, I learned that the president of the town did not find opposition to the type of research I wanted to do, so I moved to the second step: accommodation.

The only contact I had by that time was the villager. He kindly offered to make arrangements for housing. I needed to prepare a list of basic supplies (**Appendix A**) and think about health and safety procedures for the tropical rainforest. Also, I searched for transportation and various options to get to the community (**Appendix B**).

I arrived at La Paz city on December 22nd. Coincidentally, my contact person from Serere Ecolodge was in La Paz. She was in the hospital receiving treatment to her hand and head because a monkey had attacked her. I thought about her braveness to live in the jungle without being Indigenous. I decided to evaluate my possibilities to survive in the jungle by first visiting Serere. There I experienced the jungle for the first time. It was nice and hard (**Picture 1**), mosquitos devastated me, but I could overcome them with natural medicine and get used to it. I was ready to go, and kept in mind Ruiz's advice to be close to villagers more than institutions. She told me that NGOs have failed and villagers do not trust strangers. On January 20th I was on my way to San José de Uchupiamonas.

3.1.3 Background

San José de Uchupiamonas is about 30 km from the nearest town, Tumupasa, where it is possible to find transportation by motorcycle (rare) or travel in the municipality's tractor (rare). To go by walking takes eight hours through trails. The town is located near the Pavi River (**Figure 3.4**). By boat, it takes eight hours from Rurrenabaque through Tuichi River, passing the famous Chalalán Ecolodge (**Figure 3.5**).



Figure 3.4 Satellite view.
Source: Google Earth, 2017.

The community was founded in 1516 with the name of San José de Uchupiamonas by Spaniards, but it existed before this time. The Franciscan Mission arrived to convert the Indigenous people, but history says that the Uchupiamonas people were brave and resisted the colony over time. Nonetheless, new diseases killed them, and they almost disappeared. Few Tacana families were left (Tacanas were living with Uchupiamonas tribes), and Franciscans brought a new contingent of Indigenous peoples, which included many Quechuas (“La luna es nuestra luz – The moon is our light,” 2017). The original town was relocated to another spot and more people from Apolo, who were escaping from governors who made them become slaves, started to arrive. Since that period (early eighteenth century), the town has half Tacana people and speakers, and half Quechua people and speakers; the Uchupiamona language is lost.

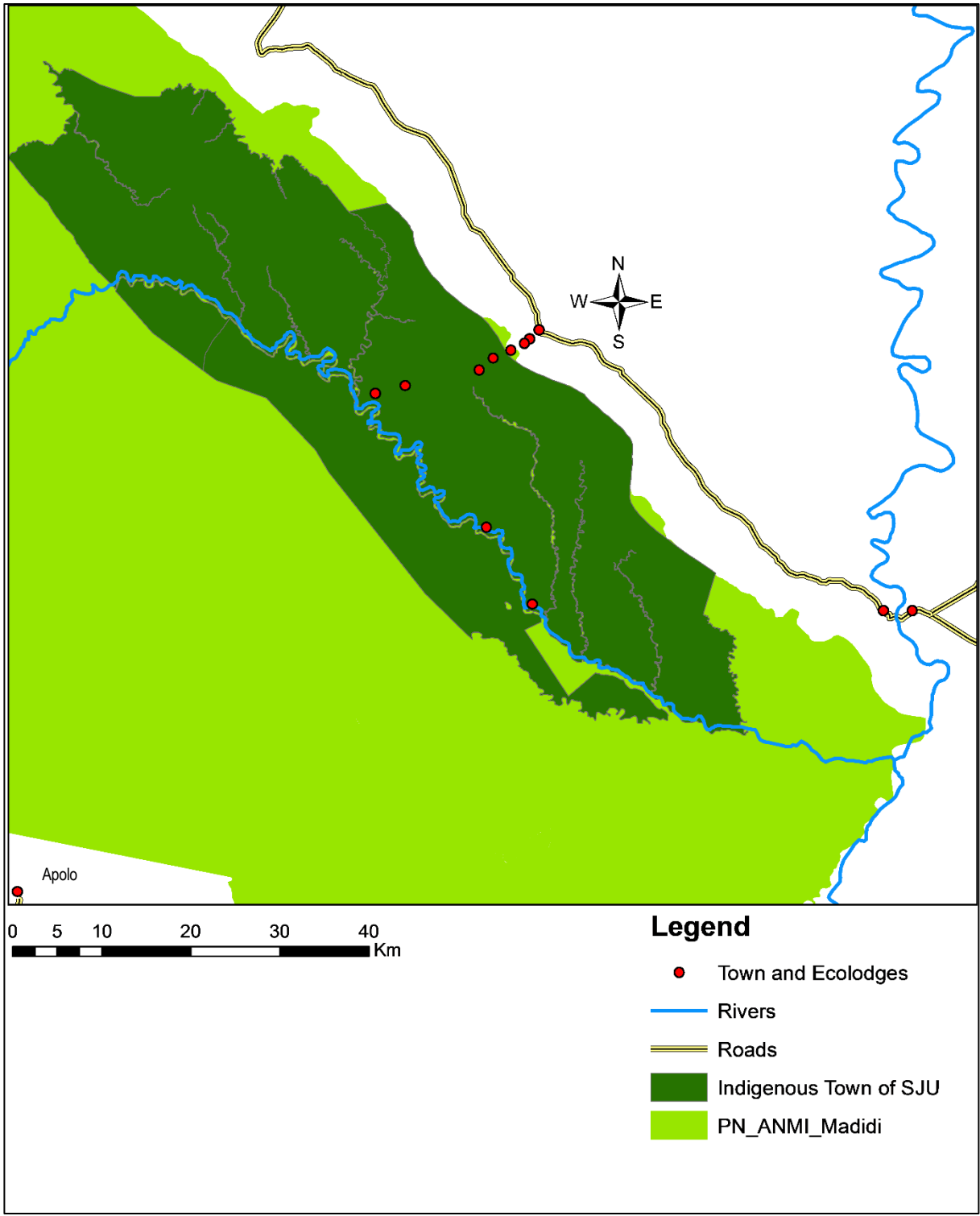


Figure 3.5 Roads, rivers, towns, and cities surrounding the Indigenous Territory of San José de Uchupiamonas.
Source: Own elaboration, 2017.

3.1.4 Description of activities

3.1.4.1 *Objective 1: Formalize permission with the community*

The oral consent I received in December 2016 was a small step to really get permission to enter into the Madidi National Park's only community. San José de Uchupiamonas is a little town that has not just one single internal organization, but seven: 1) The Town's Board, 2) The Magistrate and the Cacique, 3) The Sub-Mayor, 4) The Civic Committee, 5) The Women's Head, 6) The Water Agent and, 7) The School Parents' Board. Also, there are many other external organizations that work very closely with the community for decision-making processes.

The next table (**Table 3.1**) summarizes what I did so that each of the external and internal organizations knew about my fieldwork and accepted my presence in the community. The annotated date is the formal date of acceptance after several letters, oral requests, failed meetings, and many postponements. Formal engagement was meant as a sign of respect; documents are not that necessary, but people appreciate it when it comes along with personal communication.

To ask permission from all organizations is very important in order to gain confidence for researching in a free and helping environment. Most of the time, researchers see these previous steps as time-consuming and choose to ask permission from the central institutions only. It is true that, legally, external institutions are in charge, but Indigenous territories have a different structure not yet considered by the state. If we only rely on one authority's permission, this may bring confusion and susceptibility (suspicion) among people in the community and their internal organizations. Plan your time for requesting permission from many people is one of the recommendations I strongly advise if working in Indigenous communities (see recommendations section).

Table 3.1 Formal engagements with external and internal organizations and institutions

Organization	Date	Type of Organization	Formal engagements
SERNAP	Apr 18 th	External. National Level	<p>I sent my request on December 28th. (Appendix F). It called to my attention that the institution does not have procedures for research related to Indigenous territories as part of their regulations. I had to follow procedures for environmental monitoring which does not include people as part of the environment. However, after a couple of days in different offices, they let me send a formal request to consider it for approval (Appendix C). The Monitoring Technician¹⁵ provided me not only with written recommendations in order to work inside the community, but also excellent advice due to his experience with other researchers in a similar attempt like mine. He explains that in the past some researchers found it difficult to be accepted and they had to leave the area. He strongly recommended to me that I present my research to the chief and the whole community as well. It took many days to have the document approved (Image 7). This sheet is a requirement for all researchers to enter to Madidi, but this time the research objective was different from flora or fauna studies. There are expectations of my results due to the social and cultural values that it focuses on. It was necessary to go to the SERNAP local office in the city of San Buenaventura to contact the park rangers in person.</p> <p>By that time, the director was Mr. Felix Gonzales Bernal.¹⁶ When I returned to this office by April to present the documents they have requested of me after living in San José, another director was designated.¹⁷ I needed to explain my work again, so they can continue with the previous support I had received. That is how I had the opportunity to interview the principal advisor¹⁸ of the new director. He is pleased that formal procedures were fulfilled and will wait for the results of this type of research.</p>
SERNAP San Buenaventura	Jan 18 th	External Local Level	<p>The local office of SERNAP is located in San Buenaventura and Park Guards work in different areas coordinating conservation activities with other stakeholders related with Madidi. I talked with the Protection Chief.¹⁹ He has helped people to research Madidi. He told me the last experience they helped with social research was not long ago, and they see the importance of this type of study. He welcomed me and explicitly stated that the community has their own organizations and it is necessary to get a permit from them. SERNAP does not make decisions for the town of San José de Uchupiamonas, the authorization sheet I</p>

¹⁵ **Jhonny Alaya**. Monitoring technician at SERNAP. The person in charge to follow my work in his institution.

¹⁶ **Felix Gonzales Bernal**. Previous Executive Director of SERNAP.

¹⁷ **Abel Mamani Marca**. Executive Director of SERNAP, designated in April. It is the highest authority in National Protected Areas. His office is in La Paz city. 2904 Francisco Bedregal Street. Sopocachi Zone.

¹⁸ **Antonio Pereira**. Main Advisor of Abel Mamani who is Executive Director of SERNAP.

¹⁹ **Marcos Enrique Usquiano Howard**. Protection Chief of PN-ANMI Madidi, SERNAP. His office is in San Buenaventura. He is an experienced guard park, most of the time he is the jungle supervising and patrolling.

			have is only valid for SERNAP. Finally, he invited me to present my research to the park guards once it is finished; most of them have Indigenous roots.
The Magistrate (He rules the <i>Corregimiento</i>)	Mar 10 th	Internal Local Level	San José de Uchupiamonas keeps traditional names and positions that Spaniards used to refer to main leaders. The Magistrate ²⁰ (<i>Corregidor</i>) accepted my apologies for not having enough copies of my documents. He listened to my explanation in Casa Grande all the times I did it. I promised a copy of them after my short trip to the nearest city. On March 10 th we had a meeting at 7:00 a.m., in his office along with the other members of the <i>Corregimiento</i> (given name for colonial administrative districts that still they use). Outside there is an old intimidating guillotine ‘to correct’ people if they do not behave properly (Picture 4). I could provide all documents (Appendix D, E, J, L, M). All members of the <i>Corregimiento</i> , who are called “bailiffs” knew me well and liked the idea that San José could have the opportunity to be known through my thesis. The Cacique is part of them too. It is not clear to me why is the Cacique attached to the Magistrate. In the past, the cacique was the highest Indigenous authority to deal with the Spanish Magistrate, but today’s Cacique seems that is losing the hierarchy it had in the administrative pyramid, but it still is a strong moral authority.
The Cacique	Mar 17 th		The young Cacique ²¹ feels enthusiastic about the work he is doing for his community. He is difficult to find because he is busy and not at home most of the time. He is rigorously patrolling the community and serving to solve problems that neighbors may have between each other. He welcomed me since my first explanation in Casa Grande. After days of trying to set an appointment, we had a meeting in his house. I gave him my documents (Appendix D, E, L, M) to show respect and he agreed with my research because he considers that knowledge of Indigenous people are “secrets.” He, himself considers to own secrets. He will wait anytime for my return.
The Civic Committee	Mar 4 th		I met the head of the Civic Committee ²² on my first trip to San José on the tractor. I thought he was just a student, but in Casa Grande, I realized that he is the youngest of all leaders. He was not directly elected, he was part of a provisional Civic Committee whose president quit, and no other wanted to assume his position. He wants that all research done in his community bring benefit. He wants to learn from this experience and is very willing to help and provide information and share time to understand what he himself is losing because the new generations are experiencing different life than their parents. New technology is significant for him and he enjoys all the videos that NGOs and

²⁰ **Leoncio Navi.** He is the Magistrate, the maximum authority for inner problems inside the town. The “bailiffs” help him to patrol the town. All of them are part of the “*Corregimiento*” (Colonial administrative district name)

²¹ **Raúl Apana Cuili.** The Cacique of San José de Uchupiamonas.

²² **Erlan Quetehuari.** President of the Civic Committee. The Civic Committee promotes actions or projects in accordance with the Sub-Mayor and Mayor of San Buenaventura. It is a non-political organization and support all the other organizations in the Town.

			Channels made about San José de Uchupiamonas. We were supposed to meet again in La Paz city to enrich our points on Indigenous knowledge, but we couldn't since an unexpected important meeting regarding the construction of a dam was held in the community at the time we had set.
The women's council	Feb 12 th		<p>Only when I talked with women, I noticed they have an organization that is dissolving as the time goes by. There is no elected or designated female leader like they used to have in the past. The reduction of tourists and the bankruptcy of the Chhalán ecolodge caused that women find other ways to help and support their children and families. Eventually, that period provoked no more women meetings. Nonetheless, the women leaders have recognition in the life of the town. I could identify 4 of them. I was able to talk with three old happy and wise ladies.</p> <p>It was their initiative to come and talk to me (maybe to dialogue with me rather to understand what I explained in Casa Grande). Emerenciana²³ is the oldest and as a result, she is a natural leader for women. She and I had a nice dialogue on February 12th and she told me about her family, her sons, the town's past, the knowledge that she is forgetting. She does not like the fact that people came to ask her about medicines and left nothing to her. She invited me again to her house. I assumed her invitation was an acceptance of my presence. The other lady is Beatriz Amutari²⁴ who is part of the Town's board and well recognized because of her honesty and ability to achieve goals. I learned from her the very life of San José de Uchupiamonas through her stories and her way of living. Felicia²⁵ also came to visit me, she wanted to know who I am. This type of leader's acceptance is different from the ones who are under rules of an institution. It is very personal, the dialogue face to face is highly appreciated.</p>
The San Buenaventura Major	Jan 20 th	External. Departmental Level	<p>The Madidi is located in San Buenaventura Jurisdiction which is an autonomous external government under the policy of the state. It distributes money to all communities in its jurisdiction which has four districts, one of them is San José de Uchupiamonas. The letter I sent was to request help, no permission. Also, it is an explanation of my presence in Madidi so they can collaborate in any activity favourable to my research (Appendix G)</p> <p>The meeting I had in San Buenaventura with the Mayor²⁶ was fruitful. He immediately offered help for transportation in the municipality tractor (Picture 5) and welcomed me to his office at any moment of my research which was not possible due to my short period of time in San Buenaventura.</p>

²³ **Emerenciana Quetehuari Sea.** The last elected leader of the women's board.

²⁴ **Beatriz Amutari.** She was part of the women organization many times and got experience in Indigenous events.

²⁵ **Felicia Zambrana.** Respected woman because of her guidance to youth.

²⁶ **Javier Delgado Callisaya.** Mayor of San Buenaventura elected for four years.

The Sub-Major	-	External. Local level	The Sub-Major is linked to the Mayor decisions. By the time I sent my letter (Appendix G) the Sub-Major was a woman ²⁷ , but on Sunday 22 nd she renounced, and people did not agree on who was going to assume the position. They proposed just to choose the next in the list that was elected when she won. That man was absent. It took time to really know who was going to be the Sub-Major. A young man ²⁸ that assumed does not live in San José de Uchupiamonas, and I was not able to have a formal meeting with him, but the few times we see each other he showed sympathy, most people in the community know me, and I suppose they provided him a brief reference to my research.
Others	Jan, Feb, Mar	Internal. External.	<p>There are more organizations in this small community, but I do not need formal permission from them because their activities are very specific. I talk with all of them though because they are part of the community and deserve an explanation of my research and my presence as well. The community has organizations on different matters such as the Chalalán ecolodge, CPILAP, livestock association water system council, school parents' board.</p> <ul style="list-style-type: none"> - Right now, Chalalán is not important for the community as it was not long ago in which community's life relied on it. However, some people support preservation and conservation through Chalalán and hope it will rise again bringing a better life for the community. I meet two leaders of Chalalán, the General Manager²⁹ and the Trustee³⁰. - The <i>Central de Pueblos Indigenas del departamento de La Paz</i>, CPILAP is linked to bigger Indigenous groups, and therefore it assumes major challenges for future and has the responsibility to represent the Indigenous interest to a higher governmental level as a group. I invited his representative³¹ to attend to my presentation in August and provide suggestions or corrections to my research. - <i>The livestock association</i> is relatively new. It was created to give more economic opportunities to the town. The president of this association³² is sage in administration because he managed Chalalán in its maximum economic peak. His opinion on my research is not bad. He wants people to know the history. He himself provided me with nice detailed stories about the

²⁷ **Rosario Barradas Cuqui**. Ex Sub-Mayor of San José de Uchupiamonas. She does not live in San José.

²⁸ **Denis Lucia Aliaga**. Current Sub-Mayor of San José de Uchupiamonas.

²⁹ **Rodrigo Mariaca**. General Manager of Chalalán ecolodge. Lives in Rurrenabaque and is an independent professional under a contract with the Community.

³⁰ **Martin Laura**. Trustee. The community has a particular body to control Chalalán. The highest authority is him. He was a teacher for many years and got married to one villager. He is considered part of the community.

³¹ **Lino Illimuri**. Secretary of Education and tourism of the CPILAP. A young leader working externally with other Indigenous groups to have common benefits.

³² **Cesar Mamani**. President of the livestock association. Ex-manager of Chalalán Ecolodge.

			<p>old traditions in the town.</p> <ul style="list-style-type: none"> - <i>The water system council</i>³³ has a very specific objective which is to control and look after the provision of the water in the houses. Meetings can be convoked any time. - <i>The school parents board</i>. This organization only has relation to the school. It has only three members³⁴ to benefit them because they are paid for the breakfast to the students.
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Source: Own elaboration 2017.

3.1.4.2 Objective 2: Explain purposes of the research

I have explained the purposes of my research many times to different people and organizations. I did this oral process because I wanted to give a sense of friendship rather than an unreachable explanation of the common endless “a, b, c” points. People can read documents anytime, but they want to talk, need to ask, need to see me.

I followed the same strategy for most of my explanations. I started in Casa Grande and continued through all people who had the patience and curiosity to listen to me.

First is to greet people and talk about my family roots rather than my grad student background. Who am I? A student who wants to understand Indigenous knowledge in a better way and as much as possible. I explain that results will be shared with them so they can consider and make corrections. I point out that to the outside society Indigenous knowledge is seen in the anthropological, historical, or folkloric way and may be found useful if it is incorporated in economic activities such as agriculture or medicine. Also, it is seen as a romantic and impossible knowledge for modern living. In my study, I plan to analyze and organize the bases that would allow comprehension of Indigenous knowledge from its roots, and by its integration with science, work together. I mention that this is an academic step that will allow me to finish a Master’s degree, and that I want to make something relevant for them that comes from their own past. Also, I will show to the public the peoples' needs, wishes, initiatives, and wisdom, especially from old healing men and women.

I explain that this final document will be presented to the Ministry of Education of Bolivia because it is under a National Scholarship and will become a document that shows an Indigenous view of nature at a high level of knowledge and paired with the language of science.

³³ **Manuel Cuili**. He was elected for a second time because of his good work.

³⁴ **Francis Macuapa**. President of the school board.

Table 3.2 Recommendations from the Town’s Board.

1.	To talk with the Elders because their knowledge is being forgotten.
2.	To be natural. Some people in the community are susceptible (suspicious) because strangers come and leave nothing to people. “Last experience we participated, but nothing for people they can really see.”
3.	To start English Classes in the school (they knew about my wish to give lessons) “Children and youth need more learning of English.”
4.	To help with obtaining information about the <i>Hydroelectric Megaproject Bala y Chepete</i> “We want to be cautious about expressing our points of view on something that we are not completely informed.”
5.	To participate in all the parties. “You are welcome and that will help you to understand better our traditions.”
6.	To do a good job so they can benefit from the study in the long run because they are Indigenous too, but as a young generation feel they are losing their knowledge.
7.	To consider that “conservationism” does not contemplate their human needs and sometimes makes them feel guilty for burning a small piece of land.

Source: Own elaboration, 2017.

I give the address of my housing (**Picture 5**), so they can reach me there if they want. I make clear that I have no intention to ask for changes in their daily activities, nor ask extra time for the fulfillment of questionnaires or interviews (they feel relief!). I will participate if there is the opportunity and if they allow me to. I express my gratitude to all of them.

3.1.4.3 Objective 3: Receive feedback from the community about the research

I will summarize the main point straight in one sentence, so it is clear. Nonetheless, consider that each one took time, and in some cases they were told in various informal dialogues. I am paraphrasing them or commenting on their feedback. **Table 3.2** focuses on recommendations from the town’s board at the end of our meeting on January 28th. **Table 3.3** shows informal and essential feedback I received from the community. Not all of the feedback appears here, just that which I consider worth mentioning according to the objectives; but any others are written in my diary fieldwork and considered for the management principles in section 4.2.

Table 3.3 Spontaneous recommendations given in informal dialogues

1.	<p>“...-People will appreciate if you can teach us English-...,” said one of the men in his workplace while “talking with coca.” “-Do it at night, because we come back from the forest very late-”</p> <p>I learned that it is essential to have something in common, something that is a fact in our lives. I mention the 'coca' because conversations in 'its' company are more natural, more familiar.</p> <p>I am the one who appreciated that idea a lot and it was very useful to spend time with youth and children; it allowed me to organize my Free English Course.</p>
2.	<p>“...- Come, I know how to help you to improve your work, the one who is upwards of Earth knows-. I offered him “coca,” and he said: - He is watching...one of these days I will show you... in addition, I can show you some of my plants-...”</p> <p>This recommendation provides an understanding that I am related to the whole existence and my work depends not only on me but also in the unseen world. I will be analyzing this message in section 4.1.2.4.</p>
3.	<p>“...-If you have a chance with the government, show them what they did with Indigenous peoples, how we have been forgotten, we are disappearing-...”</p> <p>The concern for the future is high. In some way, my work cannot be only for me; they are asking that it would be useful not only for people of the university or the scholarship agents and me but at least to show the government the situations they are facing.</p>
4.	<p>“-Avoid talking about the impacts of the road or electricity-”</p> <p>Some time ago, teachers were trying to decipher the implications of the development but were told off by the community that was struggling to have electricity. They want students on their side, not against.</p>
5.	<p>“-There are places we cannot go...My grandfather knows-” “-There are shadows walking in some places at nights-”</p> <p>To be in the Jungle is a place to walk along with somebody. Adventure is not good. I can lose my life or my spirit.</p>

Source: Own elaboration, 2017.

3.2 Second Report: Living in the community

3.2.1 Summary

This report is the second out of four activities I planned for my fieldwork (Appendix C4) in Madidi National Park in Bolivia, which were: 1) Departure and community engagement, **2) Living in the community**, 3) Preparing future contact, and 4) Formal meetings and interviews. Although these activities were planned in chronological order, they overlapped during my fieldwork there. For this report, I organized the information separately, regarding each planned activity, to describe it clearly.

The objectives of the second activity were the following: 2a) Coordinate activities with the community, 2b) Observe-Participate in relevant activities, and 2c) Observe-Participate in daily activities. These objectives were central in my fieldwork and were reached during my time living in San José de Uchupiamonas. In general, the community was constantly commenting on my work and sharing their suggestions. That is how I could coordinate smoothly. Their recommendations were used to develop my activities naturally and with no pushing of their activities. The two other objectives enriched my life as a person and as a researcher. My experience of the broad perspective of the Indigenous view of nature is written and registered in my fieldwork diary and the pictures I was able to take.

In this report, I will list the activities and make a description of them. They provided me the context to formulate the management principles in section 4.2.3.

3.2.2 Introduction

I had never been in the Amazon part of Bolivia before, although while I was a small child I visited the Yungas³⁵ area for a few weeks. I remember that people had changed the landscape almost in its entirety by planting crops, and I could not enjoy the fruits of the forest or see wild animals. By that time, the coca crops “fever” was starting to impact the soil. I listened to stories about how Yungas was years ago, and the richness it used to have. Using my imagination, I tried to figure out how a pristine Amazon wildland could be. Living in the isolated town of San José de Uchupiamonas for three months, I experienced a place concerning culture and nature that my imagination could never have drawn. The beauty of the wild forest that provides everything for living touched me. It keeps a history of the Earth; you can experience the structure and functions of the wild nature. When I say wild, I mean a sense of complexity and unspoiled beauty. I ate the wild fruits of the forest including many types of meats and fish; I drank clean water in surrounding streams. I enjoyed the unpolluted air with green flavours. I saw wild animals living free and making the sound of the living forest.

I arrived to San José de Uchupiamonas at a time that I could experience the paradoxes of this beautiful environment and the hard work of people. It is both a nice and risky place at the same time. It is totally possible to die due to the impossibility of getting out from there because

³⁵ A transitional zone between the Andean highlands and the eastern Amazon forest.

of no transportation. This may happen in cases such as deep wounds, painful bites or diseases, or getting lost in the jungle (Group 3 personnel, pers.comm; Jungle 2017). People treat themselves with traditional medicine, though. In addition to this paradox, the same people who love relying only on the forest now feel the need to change that way of life. They were fine with no electricity and no roads; now, those are extremely important for the survival of the future generations. They are aware that the development could end their traditions since this is already happening. Nonetheless, people also feel they should recover and preserve the knowledge of the ancestors.

The people of San José de Uchupiamonas have pioneered many types of projects by themselves, expanding their opportunities to grow and to incorporate, in a broad perspective, the modern world. These projects are unique. No other community in Bolivia has similar achievements. They have opened the first Indigenous bank account. They worked to install a modern antenna for telecommunications. They have the first international model of communitarian ecotourism embodied in the famous Chalalán ecolodge. San José de Uchupiamonas is the first Indigenous community in Bolivia to master English spoken language (Group 1 Villager, pers.comm.). They graduate high school students. They have a complete body of laws and regulations according to the New Constitution. They have participated in international events such as COP18. They have guided many NGOs and biologists to publish in international magazines about the many natural wonders (Group 1 Villager, pers.comm.) They have organized themselves in several businesses and political organizations. They demonstrate not missing any opportunity in the changing country and changing world. Nonetheless, they keep ancient “magical” traditions in the rituals in simple daily life. I met and talked with the shamans and was delighted by the wonderful stories of the town in its historical and magic ways. Indigenous peoples of San José de Uchupiamonas are generous, unoffensive, and respectful. They have taught me the treasures they have, the view of nature in their routines, the harshness and beauty of living in the Amazon.

3.2.3 Living in the community

3.2.3.1 *Objective 1: Coordinate activities with the community*

The ethnographic methodology I chose allowed me to be part of the community in a natural way. I was considered a daughter of the family I lived with, and I was treated as such.

After I introduced myself to the community and followed the formal steps, my activities followed the family and the community routines. I did not need more meetings. My activities depended mostly on the weather. People naturally invited me to join them at their workplaces, to fish, to hunt, to harvest, to celebrate rituals, to party. Other times, depending on what was going on, my activities were dependent on peoples' external visitors who brought something: food, tourists, messages from leaders, and so on.

I made friends, from children to old people. Men and women guided me well and shared their daily activities, their experience. The mother of the house I lived with was a guide for me in all the topics I needed to know in order to live in the Amazon.

3.2.3 2 Objective 2: Observe-Participate in Relevant Activities

I planned to include relevant activities such as fishing, agricultural labours, sports tournaments, community meetings, traditional ceremonies, and so. For this report, I describe these activities briefly in a list to highlight the variety of actions that I performed, including a few honours.

a) I attended numerous meetings in Casa Grande regarding different issues and needs (**Table 3.4**); most meetings are held at night after work or Sunday mornings. I observed that punctuality is not the rule, but people are flexible enough to ensure all required people are there. They will not proceed, or they will even suspend the meeting if the crucial individual is missing. The personal voice is vital (**Picture 7**).

b) I participated in traditional hunting and fishing activities with some families. I visited the places and received an explanation of the techniques they use. It is common to share what is hunted or fished. I can say everybody knows who is hunting and if success is achieved or not. They prefer to hunt and fish at night. The skill of being quiet is necessary, as well as the connection between the weapon and the animal. This should be learned by young people who sometimes are not aware of these abilities. Some old people are worried that new generations will forget this (**Picture 8**).

Table 3.4 Description of issues addressed in communal meetings

Topics	Remarks
Election of new authorities	From January to March there were meetings to elect and re-elect different authorities, most of the time the elections are orally based, after discussion and/or detailed reports, they propose names and ask if they agree. Many times, it happened that there were no more people to assume one position. There are many organizations that everyone has a responsibility and do not want to assume two. On January 21 st the election of the Town's Board, currently the most important one, was held.
Electrification	There is no power in the community and people are requesting to all their organizations to bring it. This is the priority in all meetings and the primary goal for the new Town's board.
Road maintenance	This issue is the main reason for many meetings. All the organizations must deal with this need. The town is convinced that nothing can be possible if they do not have road maintenance at first, other projects are just illusions. The expectations on this project arise from different interests. The livestock farmers want to transport cows and stop walking 30 km along with them. Women want to transport supplies without carrying them on their backs. Elders want to sit comfortably while travelling. The school needs to be repaired and construction material is needed. Relatives want to visit their family without too much effort on transportation. Parents want their children studying far to come for vacation, etcetera. There have been strong disagreements between people who promote this project and the ones who not. I observed that all people agree and apparently only some people who live outside of the town are pointed to as being opponents. I never heard somebody in opposition. The few people I met who live outside was in favour of this project. They said they are tired of the extreme conditions to arrive to the community crossing rivers, paying the expensive cost to motorcyclists, having accidents with motorcycles, waiting hours for the tractor to be available, having a hard time moving and cutting fell trees on the way, and so on. I also listened to the nostalgia of some women when there used to be no way, just a narrow trail. People enjoyed travelling together and sharing food, even in pregnancy, people used to be stronger. Now there is no other alternative than to work for a good pathway.
Water distribution	The water system they have is manually made and controlled. The stream is about 2 km from the town and sometimes it gets damaged because it is old and has never been replaced. The water system council informs door by door if help is needed to fix broken parts. They propose to have a room in Casa Grande for storing important material for fixing.
School	The community is proud of the school because it has 12 grades. This was an achievement that brought happiness to families that could stop sending their children far away to another town to graduate. At least now the young students can be with their families until they obtain a high school certificate. The problem this year is that the student population went down and the most probable cause is the loss of 2 teachers' items (paid positions) and the principal's item (position) as well. That meant the secondary school will be closed. They are worried about this and encourage people to not take their children to study far if they can study in the town. Why do people think education out of the town is better? People are destroying their own confidence and causing this damage to the community. They are planning strategies to retain students.

Animal health	<p>There is a pest/infections among dogs, and this can infect pigs. The municipality does not know how to investigate or solve the problem. Especially women complain about this. It is really painful to see dogs and cats bleeding and dying and have no tools to help (I did what I could, my own thoughts are written in my diary). There is no control on pets, people bring dogs for hunting or company for children and lonely people. If these animals do not work, they do not eat, get sick, are attacked by all types of bugs and die in suffering conditions.</p> <p>Pigs are better treated for the meat they provide, but still, the tendency of keeping them in cages is growing. Women protest, they feel pigs are like humans and their muscles will pain. They pushed for one free-day so pigs can walk freely in the town as before. Nonetheless, men are pushing for a total ban of “free day” for animals and install in their noses an iron circle, so they do not sniff and remove soil.</p> <p>Cows must be shut to avoid diseases, but they do not know the procedures and are requesting for help, some of the villagers do not even know how to “lace” them. It is the first time they are in this type of work and invite veterinarians to come, but still, they consider they should have their own material for this shooting. This shooting is for contagious sicknesses and the evaluation of the veterinarian is that the cow population in San José is healthier compared to other places and encourages them to keep that way in order to obtain better prices and better lives (Herlan Surco pers. comm.) The cows are not with contagious illnesses. However, they get “boros” (bugs under the skin) that are painful according to the people who also got them.</p>
Company Chalalán Ecolodge	<p>Even though Chalalán is in a bad moment, still it is owned by the community. The few activities that Chalalán can congregate people is only when there is some good news like supplies or jobs. Not only the corruption affected the ecolodge, an administrator robbed money and deteriorated the image of the company (Group 1 Villager, pers.comm.), but also nowadays Chalalán cannot provide jobs and does not care about peoples’ economic and medical urgencies anymore. The mission in the past was clear: first the people, even if they do not have money to pay. Now the money is first, if there is no money there is no help. The modern businessmen have lost the sense of being a community (Group 1 Villager, pers.comm.). Chalalán's recovery is hard after its dismantling by those irresponsible young administrators. At least now it is not going down in economical terms and it is expected to rise, with the help of international organizations, the new image of the Chalalán and the tradition of working with the community as a primary feature of the ecolodge (Group 3 Personnel, pers.comm.)</p>
Participation in other institutions and organizations	<p>Leaders have to ask people to participate in events that are organized by other institutions. They have to discuss what to say. What is their position to present or defend? They cannot talk individually without the consent of the community. There are activities in other communities regarding development, and they are asked to give an opinion because it might affect their environment as well. People are reluctant because of the waste of time in travelling to other places. They prefer authorities to do that.</p> <p>Same happens regarding workshops from other external institutions like SERNAP, the municipality, and so on.</p>
Organization and discipline of the people in daily living	<p>The community has rules to “improve” daily conviviality like keep horses away from the town or have them chained. Keep pigs in corrals but respect their free day in the town, clean the front door of the house. The cacique has to make them effective with strong punishments that people themselves put. The case of killing a pig if it is caught outside of its cage in a day that is not allowed, brings bad</p>

	feelings against him. People are not clear about these rules, some people want to follow them, but others want to change because there is no basis for the type of good they get.
Festivities	Festivities are organized a year before they take place. The two main festivities are the Carnival around February or March according to the Catholic calendar and the Town's anniversary on May 1. All people collaborate with the ones that are in charge demonstrating a high value of solidarity. People feel proud of these activities although in some way they are changing the very values when activities hurt people. That never happened in the past (Group 1 Villager, pers.comm.). These parties are a mix of Catholic celebrations and Indigenous traditions. The differences are not that noticeable because they use religious language adopted hundreds of years before.
Health house	Supplies for the health house are insufficient in the perception of the people. They want to have at least one doctor working there. The building is half constructed, and only one man has to deal with all injuries and sicknesses. This man they call "sanitario" is worried about how new generations are losing the knowledge to treat themselves and how NGOs are changing the behaviour of people with "easy" and risky medicine that are distributed once with no preventive information about its use (Anastacio Cuqui, pers. comm). Many voices rise to bring back the experience of SAFCI (<i>Salud familiar comunitaria intercultural</i>), Intercultural Community Family Health). This experience was unique because it was an attempt to combine Indigenous knowledge and conventional medicine. This program honoured the shaman's powers, and the doctor in charge was systematizing it. Shamans can communicate with the whole cosmos in a way conventional medicine still does not understand. For instance, the procedures for a safe birth are done with a blanket and special summons (Dr. Jose Llerena, pers. comm.).
Telecommunications	The communication antenna service has one year of operation but it started to fail, people want it to be normalized, others claim for the older cubicle. Because the town is small people communicated immediately if there was a phone call. Now they get used to the cellphones, almost everybody has one and because there is no electricity most people send their cellphones with the students, so they charge the cellphones at school. Few have their own gasoline generator. A technical team came to fix the antenna, but the signal got worse. They will keep working to improve it.
Village economy	In conventional terms, there are no conditions for markets, but some women wish to open them to have a variety of food in one place. They remember they were doing well when they had the help of Lars Hafskjold (Table 3.5), but unfortunately, no one followed his innovative propositions of greenhouses. They agree that it was good to have their own vegetables. The Chalalán Ecolodge is failing to support the community, others are private. Also, many livestock producers wish to expand their outside cow market. The economy of the forest is valued and appreciated. Indigenous peoples say that they love to live without money. Delicious and healthy food is there, they just need to work, whereas in the city one cannot even drink water without money (Juan Aliaga, pers. comm.).
Village identity	People say San José de Uchupiamonas is a town, not a community arguing that a community does not have rights the same as a town (Group 1 Villager, pers.comm.) How is the development of the community/town going to be like? Currently, they share the land, no one is the owner, and the idea to have property documents are

	<p>not yet strong enough. That is the legal reason they are an Indigenous territory. They would like the idea to have an urban design in the future and progress like a town, then like a city, but will they lose something? The ex-president of the board has experienced that being a leader of the Indigenous territory gives him a sign of respect that no other urban position can ever (Guido Mamani pers. comm.). In meetings, they discuss the future and have started agreements with Wildlife Conservation Society (WCS) for the design of the <i>Plan de Vida</i> (Life's plan). In this document, they will be proposing the type of life they want in the territory. In the past, they worked on the <i>Plan General de Desarrollo Territorial PGDT</i>. The experts of the United States Agency for International Development (USAID) did the work with an inadequate description of the people's own vision. Now they want something that allows them to not be left behind the modern world and at the same time recover the Uchupiamona identity with respect for the ancient knowledge. One day one villager said "this is the most important thing, but yet we are not giving the proper attention." My thesis can contribute in shaping this <i>Plan de Vida</i>.</p>
Others	<p>Other issues in the meeting can be distribution of donations, organizing the village for emergencies, invitations for other personal activities, request land, request housing, etcetera.</p>

Source: Own elaboration, 2017.

c) I visited areas of "chaqueo", which is the act of burning the forest. These areas are destined for agriculture and cattle raising. Every family needs more land each year, and they are free to choose a spot as long as they do not bother others. I heard various perceptions and perspectives regarding this activity. There are special trees that must not be burned because they protect the place. These areas are very hot because the radiation of the sun hits straight and there is no shade cover. Some people told me they get constant headaches after work. It is a common complaint in the afternoons. **(Picture 9)**.

d) I collaborated on the creation of a database for the documentation of San José de Uchupiamonas. I got all the documents of all the activities that the town's board has performed since 2013. I classified by topics and rebuilt the folders. I labelled and fastened carefully. I delivered this in a timely way, including the index printed and in digital form. **(Picture 10)**.

e) I participated as a sponsor of a child's "Rutucha" (haircut of a child). This is a very old tradition in which guests pay for the right to cut the hair. The sponsor has to add enough money so the child receives a whole number. Money is used for his food or is invested to buy a cow or horse depending on the parent's best wish for the child. **(Picture 11)**.

f) I followed up on the Carnival party and its meaning and implication in the life of the community. Carnival is a Catholic feast, but more than that, lying hidden in this practice, I observed a profound interaction with nature and the renewing of the place. (**Picture 12**).

g) I participated in a ceremony of healing. (**Picture 13**).

h) I conducted interviews with key persons under the strict format of the university presenting the information and consent booklet. (**Picture 14**).

i) I did service to the High School Senior Class with a seminar on vocational guidance and provision of technological tools to search for future careers. (**Picture 15**).

These activities with the community can be seen from three perspectives. First, most of them are service rather than strict research (observation, application of research tools, and so). When doing fieldwork under the ethnographic method, you may imagine that service is a voluntary aspect that you would like to make or not depending on your time and objectives. However, I learned that service becomes fieldwork itself. The knowledge and abilities you freely share become part of the people and you are part of the community in the sense that service exists for the benefit of all. There is no other way to respect and be thankful to the community that is welcoming you. I remember the first day I was in Casa Grande, authorities complained about how difficult it is just to write a letter. They wanted students to help. One of the school teachers wrote the minutes of the meeting. As far as I remember, they always felt relief when somebody else helps. I had my turn to write down the minutes.

Second, some of the activities may require additional expenses and if viewed narrowly this may represent an extra budget. When you are considered a part of a family you have to share the expenses. I do not mean for the payment of the food or accommodation, which I was doing already. There are some special days such as celebrations of birthdays, anniversaries, beginning some activity, and supplies are needed— for example, food, clothes, tools, objects, and so on—for the activity to be realized. To ask you for money is not an offence, it is an honour because you are trustful and they know you will share all the worries and concerns, all the happiness and joy of that activity, as we are all one family. They will call you godmother or godfather. In dialogues with them and reading papers regarding this issue (Tomey 2015), I knew that some researchers get offended thinking that people want to take advantage when they ask for just money. Researchers may not accept, arguing that they live far and are just staying

for a short period. For this community, the family links are forever even if you are very far. They do not understand those “excuses” (rejections of being part of their family).

Third, the activities were not explicitly planned, but the ability to incorporate them, not as extra work but as a significant section of the fieldwork itself, is very important.

3.2.3.3 Objective 3: Observe-Participate in Daily Activities

It was expected that I would share time in daily activities such as preparing and participating in meals, contributing to household chores, visiting schools, visiting health houses, etcetera.

These activities are part of the Indigenous knowledge analysis in chapter 4. The richness of the daily activities impacted my own capability of understanding complexity even while I was walking on the trail: “never drop peels on it, this may cause disaster for others,” they advised. The way I was drinking was different—“turbid water is healthy.” I listened many times to them talking with objects for its better functioning. All these types of activities are linked to knowledges that I analyzed in 4.1.2.

a) I volunteered at English classes in the afternoon because of the interest from children and youth (**Picture 16**). It was a very short time, but children did speak the basics (**Appendix N**). I had a hard time with adults because of their work schedules, but still, we had at least some English time.

b) I visited and spent time with old women. We talked about current knowledge and the knowledge that they wish to recover, revitalize, and preserve. The topics were plants, ceramics, weaving, food nutrition, political life, proper washing of clothes, baby and child care, and husbands (**Pictures 17 and 22**).

c) I participated directly in the harvesting and preparation of food. I obtained sugar cane (**Picture 18**); processed chocolate from starch; harvested maize and rice; picked fruits of the forest like *chima*, peach palm (*Bactris gasipaies*), and motacú (*Attalea princeps*, *Scheelea princeps*); butchered giant armadillo (*Priodontes maximus*); cooked in fire; and did other chores.

d) I observed housing infrastructure and roads. I noticed the use of *jatata macho* (*Geonoma stricta*), *jatata hembra* (*Geonoma deversa*), and motacú (*Attalea phalerata*). Their qualities are different—while *motacú* can last six years, *jatata* can last twenty years. I also followed the manufacture of adobe (**Picture 19**).

Table 3.5 Economic periods in San José de Uchupiamonas

Forest use (1 st period)	Communitarian model of eco-tourism (2 nd Period)	Livestock production (3 rd period)
<p>The first period was the forest use, they were planting and harvesting native trees such as Cinchona (<i>Cinchona ledgeriana</i>), Rubber (<i>Hevea brasiliensis</i>), Mara (<i>Swietenia macrophylla</i>) and others species, but when the timber extraction rush finished they knew they had to start a variety of other economic attempts including crops of fruits and vegetables, build local greenhouses, start to raise small livestock. It was in this period when Lars Hafskjold³⁶ lived in the town and brought agricultural initiatives that worked along with the Indigenous people who highly appreciated him. People still hope to welcome more foreign people to work together.</p>	<p>The time for NGOs help came. Another adventurer, Yossy Ghinsberg³⁷, rescued years ago by Indigenous peoples of San José de Uchupiamonas, designed a project and found funds for the biggest project that pulled up the economy of the town. This project is the Chalalán Ecolodge, unique because its management approach is a communitarian model of tourism. The incomes supported San José de Uchupiamonas for at least 15 years. People got used to Chalalán and worked for protecting the Nature. This model allowed them to study outside of the Park. However many threats from outside and inner problems have lead Chalalán to lose money and deterioration of the infrastructure. The new regulations prevent Americans and Israeli people to enter to Bolivia without Visa and that reduced the flow of tourists dramatically. Corruption among Indigenous peoples (Martin Laura, pers. comm) brought disappointment on Chalaláns’ workers who decided to move to new activities.</p>	<p>The livestock production is starting the third stage in the economy of San José de Uchupiamonas. It is true that in the past they grow small quantities for consumption, this time the goal is to produce for the market.</p>
<p>Note. The development of these three significant economic periods transformed the native economy based only on what the forest can provide (Group 1 Villager, pers.comm.).</p>		

Source: Own elaboration, 2017.

- e) I visited communal spaces of the community such as the cemetery, church, court, old hostel they call “casa prototipo,” and asked questions about their meanings and history (**Picture 20**).
- f) I had conversations with different members of the community about the history of a variety of topics, religion, politics, culture, and economy (**Table 3.5**). Also, we talked about the future and projection they want for the community, and their needs and wishes for the Tacana-Quechua people (**Table 3.6**). They have an interest in preserving the languages and the richness they have for the description of their world views. They would like people to remember how wisdom was used for health and balance with nature (**Picture 21**).

³⁶ **Lars Hafskjold**. A Norwegian biologist lost within an unexplored territory in 1997 while searching for the Toromona uncontacted tribe.

³⁷ **Yossy Ghinsberg**. An Israeli adventurer, author, entrepreneur, humanitarian, and motivational speaker. Ghinsberg’s survival story was enacted in the 2017 movie *Jungle* (“Jungle,” 2017).

Table 3.6 Future projection

Now	Future
<p>The Uchupiamona language is lost, and most children and youth are forgetting Tacana and Quechua languages. Few individuals practice accurate knowledge about healing plants; all people rely on it. Family unity is breaking because many are migrating and leave their relatives to look for jobs, even small children are growing with only grandparents. Women are forgetting the activities that were common, such as ceramic, textiles, sewing, food preparation, cleaning, and picking forest products. Traditions of ‘talking with nature’ are still practiced but are losing the essence and becoming a mere saying. Hunting and fishing are done by adults mostly, and it is a decreasing activity among youth. Few children are learning from parents or grandparents. New food is being incorporated with negative impacts on human and environmental health. The NGOs USAID (United States Agency for International Development), WSC (Wildlife Conservation Society), and CI (Conservation International) for decades have worked for the conservation of Madidi following the Sustainable Development model. Although they started to recognize the importance of the participation of people in projects, they have poor results in preserving nature or improving the life of the communities, except very few separate service projects. The government assistance is weak in education, health, and basic services. Megaprojects may pressure their natural environment and provoke confusion, ambition, and division.</p>	<p>People are not against development. Actually, they demand a better pathway and electricity. To live in the modern world is a challenge they are aware, but this development is not always under their control. To increase livestock production, they are burning each year about 2 hectares of pristine forest per family (Sandro Alvares, pers. comm.), and as a result there have been changes to the water and natural streams. People want to open markets for their products. Two celebrations, the carnival and town’s anniversary are still considered original and are practised each year with high pride for its unique antique characteristics. People from San José de Uchupiamonas cannot stop the impacts on their current way of living. Many have lost faith in institutions and feel threats from the outside world, which brings poverty that needs to be tackled. They are sure that the future will be blurry if they do forget their traditions and knowledge. They want to survive with their own work and initiatives, with the help of Nature which is part of their daily lives.</p>

Source: Own elaboration, 2017.

- g) I was told about the perception of animal life and its message to people, and did my own evaluation of the environmental dimensions and spiritual dimensions (**Picture 23**).
- h) I observed the link and dependence on some plants: Coca (*Erythroxylaceae*), Bibosi (*Ficuss spp*) (**Picture 24**). For instance, the traditional Kichirakui (“Nature’s help” in the Quechua language) is practiced every labour day.
- i) I inquired about the perception of governmental and non-governmental institutions regarding their coordination and collaboration with the people (**Picture 25**)
- j) I observed and had conversations with teachers and the community about the formal and traditional education (**Picture 26**).
- k) I raised and fed chickens from eggs.
- l) I co-existed and shared life in informal spaces of impressive wealth described in my field diary (**Picture 27**).

3.3 Third report: Preparing future contact

3.3.1 Summary

This report is the third out of four I planned for my fieldwork in Madidi National Park in Bolivia (**Appendix C4**). These were: 1) Departure and community engagement, 2) Living in the community, **3) Preparing future contact**, and 4) Formal meetings and interviews. Although these activities were planned in chronological order, they overlapped during my fieldwork. For this report, I organized the information separately, regarding each planned activity, to describe it clearly.

The only objective for this third activity was to set up means to present the results of the research. Although this objective is short compared with all others, it implied a lot of analysis of the context so that my contribution to the community was appropriate. I knew of the susceptibility (suspicion, mistrust) that was caused by other researchers and the controversy about conservationism. In the meeting of March 20th I approached the community with respect and sincerity. I was able to put forward my work to be considered as a comparative document for the *Plan de Vida* in reference to its principles. This *Plan de Vida* is the future management plan of the town and is supposed to be done with the help of the Wildlife Conservation Society (WCS) in the short-term; hopefully they will start in 2018.

Once my thesis is defended, I will be delivering the final document to the community. That stage is out of my academic work, but part of my commitment to them.

3.3.2 Introduction

While I was preparing the literature chapter, I read phrases like "... [She] has spoken all nice and promised things too but [she] had left and not left anything behind" (Tomey 2015); or "'research' is probably one of the dirtiest words in the Indigenous world's vocabulary ... it stirs up silence, it conjures up bad memories, it raises a smile that is knowing and distrustful" (Smith 1999). Perhaps many researchers would get surprised with those phrases, to me those critiques were familiar. For years since I graduated I used to ask myself if there would be researchers seeing the lack of research having good impact for the people and the communities, as I did. The problem seems new in international academic contexts where providing something back to the communities is not a priority, not even a requirement. Some genuine interest is growing though. I witnessed the appreciation of the community for an American researcher, Ann

Tommey, who sent many small booklets in Spanish language to the community with a summary of her thesis results, even though it was not an academic obligation for her (**Picture 22**).

I am convinced that research should respectfully impact the places where it is done, and most of all it should consider the local people not merely as sources of information. It is true that research is important for academic purposes, but it is also important that researchers make all efforts so their work and results bring benefit in people's real life.

At the time of this report, I thought about why I wanted to research this threatened Amazon area where many conservation projects and research programs apparently do not have significance and are not a priority for people. Would my thesis bring benefit? Indigenous peoples feel that conservation plans deprive them, make them feel guilty, and reduce pride and love in their own knowledge and way of living. I will be satisfied if my work can support the protection of their knowledge and promote respect for it in future planning and development of the area.

My visit back to the community in August of 2017 was important to consolidate the relationship I started with them, and I got the green light to continue my analysis. The delivery of a copy of my thesis will fulfill the minimum of procedures to give something back to the community.

3.3.3 Future contact

Why did I have to go back to the community after my fieldwork? Because I needed feedback. And why do I plan to go back after I finish my thesis? To fulfill my commitment to deliver my thesis.

I had to think about my thesis in relation to the community's needs during my stay there. It is true that I have research objectives, but also the process of my thesis has to benefit the community in some way. I found that there are different management plans for the Madidi National Park. The difference is not only in level. The management plans are different because regulations overlapped under different governments. It is not clear how these management plans can work together; each institution prepares plans following the regulations they are governed under. I can mention the following plans: 1) Plan de Manejo Integrado (Integrated Management Plan) for Servicio Nacional de Áreas Protegidas (SERNAP, Spanish acronym for National Service for Protected Areas); 2) Plan Territorial Municipal (Municipal Territory Plan); 3)

Programa de Operaciones Annual (Annual Operations Program) for the Municipality; 4) Plan de Vida (Life's Plan) for the Indigenous Territory; 5) Plan General Territorial Indígena (PGTI Spanish acronym for Indigenous Territorial General Plan) for the TCO's (Spanish acronym for Native Community lands or Communal Lands of Origin). There is no consistency between them. It happens that the continuous change of authorities of these different governmental and non-governmental organizations do not allow proceeding with agreements that were already achieved in meetings to solve the inconsistencies and differences in regulations. Unfortunately, the previous agreements are not in the plans of the new authorities and they start from the beginning again (Group 3 Personnel, pers.comm.).

In the beginning, I was planning to complement one of these management plans by adding to it. I chose the *Plan the Vida* that is going to start soon with WCS's help, but due to my learning about the Indigenous view of nature, I needed to make a clear distinction about the roots of its principles. So if I make additions to another work (a typical, classic management plan), the potential knowledge that I want to argue may not match this or get confounded. Furthermore, if I become part of the traditional planning, the community might misunderstand and believe that I am trying to "find a job." I want Indigenous people to be confident about their knowledge. That is why I have preferred to leave my research as a comparative document. I provide a new management framework that takes into account Indigenous principles in an integration with science, as the basis for future planning processes.

I needed a meeting in which I could clearly set up my research for future uses. This was done on March 20th. That day a leader from Central de Pueblos Indígenas del Norte de La Paz (CPILAP, acronym in Spanish for Central Indigenous Communities from Northern La Paz) came to announce a visit of government staff who wanted to talk about important issues that affect the community. He also came to listen to people's demands to present proposals to the big organization he is part of.

One of the main points of that meeting was the collaboration agreement between San José de Uchupiamonas and WCS made by the previous town board. The agreement is signed and seemingly not assured until they confirm their will to work with WCS. The budget is approved, and people want to benefit from that. The current town board is not sure if this agreement is convenient yet; they want to look at it in detail and expose the pros and cons to the community in another meeting.

This agreement with WCS will update the old Plan General Territorial Indígena (PGTI, Spanish acronym for Indigenous Territorial General Plan), which was a management tool for TCOs and was first made with funds from the United States Agency for International Development (USAID). Now the new name for the Plan General Territorial Indígena is *Plan de Vida* and it is supposed to be a document that reflects the way people want to organize the community for the future: “This is the most important issue we have! But yet we are not paying attention because we have this other limitation such as the electricity and the road, please let’s give the importance that it deserves for our own wellness,” said one man in the meeting, and the rest agreed.

I had the opportunity to talk on that topic. I stated that my main thesis point is about the roots of the Indigenous view of nature, and they can consider it as a comparative document for the *Plan de Vida* that they will probably do with WCS. I said that when I am back in August I can show them the preliminary ideas. They thanked me for my proposal and participation.

This commitment allows me to contact people from San José de Uchupiamonas again to receive feedback. It was not said how I was going to present the preliminary results, but based on my experience it could have been in a meeting with the leaders, or in a presentation in Casa Grande, or delivering a document to them, or in simple informal discussions. I am in touch with some people who use cell phones; they are young, and from time to time we exchange emails.

3.3.4 The feedback in August 2017

I went back to San José de Uchupiamonas for almost a week in August 2017. I needed to present the previous insights of my thesis to the community and receive feedback. Most of the feedback that I received was in informal dialogues as expected, but I had the chance to explain part of my research chapters at a communal meeting on August 27. The meeting was not exclusively to listen to me. I requested to include my point in the *Orden del día* (a list of issues in a meeting). After I explained briefly, there were no comments because I suppose the final document is what they are awaiting. Also, I renewed my commitment to bring a copy of the final thesis. They agreed and that was all of the formal part.

Table 3.7 Dialogues on Indigenous knowledge and science

Dialogue axis	Examples
States of space dimensions of Earth	There was a man in Tumupasa village, that was waiting for the taxi for his wife in order to go to San José de Uchupiamonas. I was doing the same. While we were waiting, he talked to me. He said he knew about the Indigenous knowledge in the past and how difficult can be for others to understand it. He himself would not give credit to it if he did not see with his eyes. The Shamans know about other worlds thanks to tools they have. They can access to other dimensions more than us and that is why it was effortless to arrange nature if there was unbalance.
The power of shamans as a geological force	We had enough time to talk about San José de Uchupiamonas and issues related to my research. I briefed him on the main points, specifically: Space-Dimensions, Right and Left Handedness, and the importance of the shamans as a geological power to shape the biosphere. We talked about how and why this is important for future generations... He is firmly committed to taking care of the environment. He knows shamans are getting lost. His experience with shamans is deeply in his memory and he shared some stories with me. "My uncle is one of them. Mr. Reymundo." Reymundo's father had 7 stones of power. "He was aware of what was going on in the Planet without travelling. He knew about the procedures of calling the rain." Indeed he was the last of the wisest men in San José de Uchupiamonas. His language was Tacana. When he passed away the stones were inherited to his son, but he could not control them, so he threw them away. All the community knew about his powers and he was very well respected. He (the villager) was happy to listen to the explanation I gave and said he feels the connections that are present on the Earth and no act is without purpose, even our encounter seemed planned by the energies.
The use of sound	Reymundo was a humble man that said to me the knowledge is not lost. The thing is that people are guided with not enough trust. For example, people are requesting electricity and roads, but if they unite to pray to the Earth following the traditions, the electricity and roads are here. No need to do nothing else. Unfortunately, they have changed and because they have forgotten the connection with nature they suffer. But that is something that has to happen, maybe there is a big purpose. He hopes that shamans can get together once more, if not, he will help from his own. Respect the powers, the ancestor, the powers of Earth come with humbleness, care, and affection.
<p>Note. The original dialogues were spoken in Spanish. These stories were transcribed from my fieldwork diary.</p>	

Source: Own elaboration, 2018.

The richness of the feedback can be appreciated in the informal dialogues I had with the people. When I explained the main points of integration I see between Indigenous knowledge and science, they quickly wanted to provide me with more examples. I will illustrate some in short stories (**Table 3.7**).

These dialogues assured me that my work is worth continuing. The scientific language I am using seems comfortable to them and much better than religious terminology. When I listen to the stories, I see a source of “new” material for science, too.

Before my departure, the senior class students honoured me with a gift, which was a T-shirt of their group. They wanted to know about me and thanked me for the time I was there. They hope my thesis will also be delivered to the school.

3.4 Fourth report: Formal meetings and interviews

3.4.1 Summary

This report is the fourth out of four I planned for my fieldwork in Madidi National Park in Bolivia (**Appendix C**). These were 1) Departure and community engagement, 2) Living in the community, 3) Preparing future contact, and **4) Formal meetings and interviews**. Although these activities were planned in chronological order, they overlapped during my fieldwork there. For this report, I organized the information separately, regarding each planned activity, to describe it clearly.

The objective of the fourth activity was to interview staff from institutions related to Madidi National Park and Indigenous Territories. These interviews were conducted following the procedures from Research Ethics and Management Online (REMO). I was able to interview 17 people from 12 institutions from group 3, and one independent professional from group 2, as planned (**Appendix G, Appendix H**). Interviews of group 1 were carried out during daily life in the community. I have the information in my fieldwork diary. All of these interviews were carried out successfully (**Figure 3.6**)

The information letters and consent forms (**Appendix J, Appendix K**) were delivered and signed when possible. In some cases, the consent was oral because of the hard conditions to carry documents in a remote area. Only after I was out of the community and had access to the internet, was I able to send the forms to the emails of the interviewed people.

3.4.2 Introduction

I had started a human study in REMO in December 2016 and I had been submitting requested changes. My research was approved on March 20, 2017. I translated the forms into Spanish and used the Information Letter for group 1 (**Appendix J**) and the Information Letter and Consent Form for groups 2 and 3 (**Appendix K**) to conduct the interviews. The interviews were conducted informally since the beginning of my fieldwork and formally since February 24th.

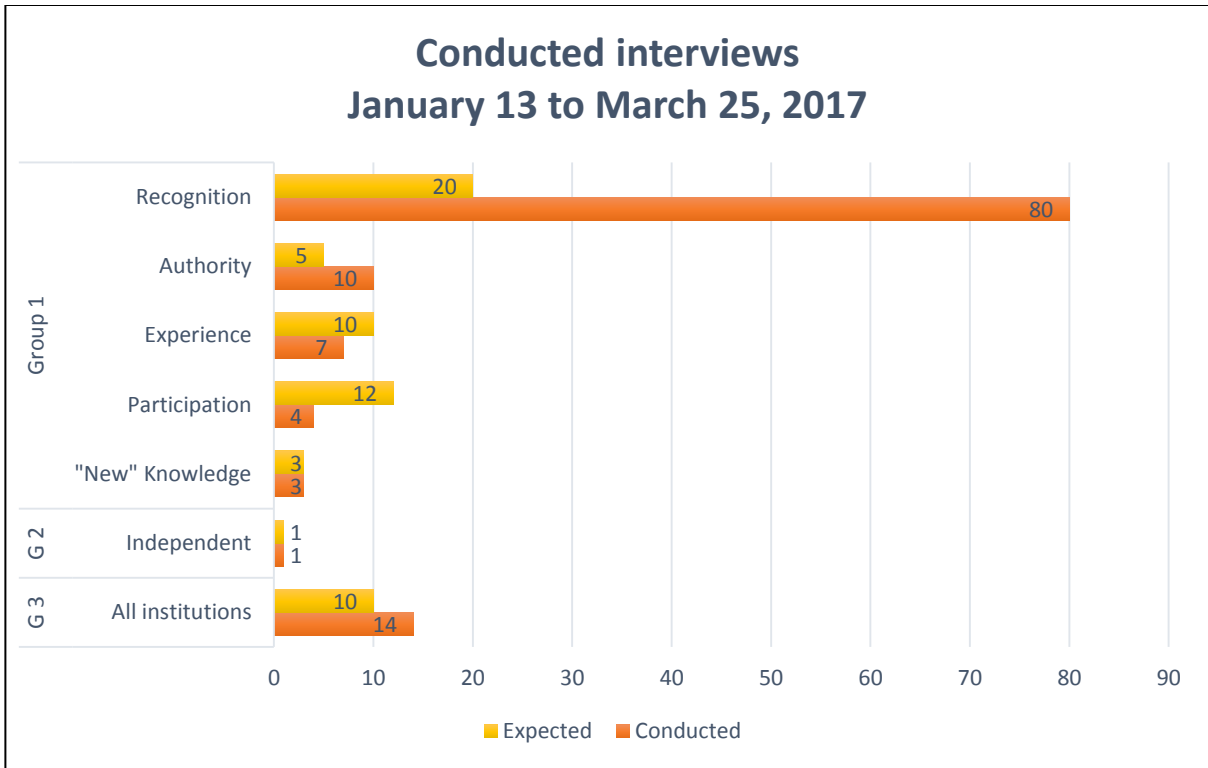


Figure 3.6 Conducted interviews.
Source: Own elaboration, 2017.

After I made a formal request for permissions and received them, I had to request extra permission to conduct interviews. I had to go back to the offices many times to set a day and hour for an interview. It was more difficult to interview people from governmental institutions because they have no extra time, and some explained they are not authorized to provide information. Nonetheless, after reading the privacy policy all of them accepted to meet and to respond questions.

Most of the interviews lasted 45 minutes. The shortest was 18 minutes and the longest was 1 hour and 39 minutes. All of them were carried out in people's workplaces except for the ex-members of the town's board.

In the beginning, I was using a recording device that is easy to carry in the jungle, but I lost it on one trip I made on a tractor (**Picture 23**). Two initial interviews were on that device, including some life stories from elders and a healing man.

3.4.3 Interviews

I built up interview cards (**Appendix O**). Each interview record card has a brief description of the main points during the interview. The Information letter was provided and adapted to the institution. I asked additional questions according to the flow of the issue we were talking about.

Some interviews do not have a written signature for consent; due to the difficulties in the places that the interviews were carried out, it was impossible to have paper sheets. But to replace that inconvenience, interviewees gave explicit oral consent at the end of the recording. All of them were provided with either hard copies of the “Information letter” (group 1 or groups 2, 3) or it was sent through email for their records, except the ones who do not have emails.

3.5 Searching the roots of Tacana-Quechua people

During the fieldwork time I lived a vivid involvement with the Tacana-Quechua people that provided me with examples of the problems they face as a community, their daily view of nature, their perspectives, and their values. For the purposes of this thesis, in addition to the experience during the fieldwork, and in accordance with the people’s eagerness to recover the “lost” knowledge, I studied the roots of the Tacana-Quechua people, specifically in the textiles and the understanding of the space they live in. This will serve for future planning in their territory and as a way to survive and provide future generations with the knowledge of their ancestors.

I learned from Quechua people regarding their textiles and use, and this understanding is supported by a pilgrimage I did in Los Andes from November 2017 to February 2018. I found that those textiles preserve the main organization of nature, the space in which they live, and their view of nature as Indigenous peoples is represented in those. Because Tacana people were allies of the Quechua peoples in periods before colonialization (Hohenthal 2009), I also found the same representation, not in Tacana textiles but in some arrangements in the space that Tacana people make in order to represent the same elements in a place they set and call “Respeto” (Quenevo n.d.).

This important aspect of space is the starting point for the integration of science and Indigenous knowledge that I propose in the next chapter, along with the management principles derived from that in agreement with the view of nature that is at the core of the Quechua peoples.

4.0 DISCUSSION AND CONCLUSIONS

I have two points for discussion. The first one is the integration of science with the Indigenous view of nature. The second one is the proposed management principles for Madidi National Park and Indigenous Territory of San José de Uchupiamonas, which emerge from that integration.

The first part is an analysis of the concept of cultural-biogeochemical energy, which Vernadsky proposed in two senses. As a concept, the Quechua textiles have the same understanding of the biosphere. As a power, the Indigenous knowledge is a different cultural-biogeochemical force than the “universal” knowledge promoted historically by Western culture. These two senses can be observed in the representation of states of space and in the geometrical representation of the left-handedness and right-handedness. Before fully explaining these notions in Quechua textiles in the context of Vernadsky's explanation, I offer some concepts to think through about the openness of Indigenous peoples to know and experience nature.

Science and the Indigenous view of nature (knowledge) both have nature as a common ground of consideration, and together they can evolve human knowledge of the biosphere and offer humanity the possibility of a further evolution of our species.

For the second part, I present a planning framework and principles for the community of Madidi National Park and Indigenous Territory of San José de Uchupiamonas based on the insights coming from the integration of science and Indigenous knowledge. Fundamentally, the management framework is rooted in Indigenous knowledge. The design of that framework is illustrated in **Figure 4.7**. The framework I propose is not about joining together two world views, it is a proposal to work with the elements and the energies of the biosphere, which are recognized by both Indigenous peoples and science. For that to be possible, I have conceived a different organization of subjects and knowledge areas than the common multidisciplinary, interdisciplinary, and transdisciplinary, which I named *evolving disciplines* (**Figure 4.8**). In my proposal, practitioners of science would see each human being as part of geological power, never isolated from the ecosystem. Indigenous peoples would appreciate all the natural sciences and the benefits of technology with the awareness that this is consistent with their purposes. They would want to be part of the modern world—not as inferior but rather as making a great contribution.

4.1 Analysis of the integration of science with the Indigenous view of nature

For integration, I do not mean to fit Indigenous knowledge into academic science. Rather than ideas of replacement, confrontation, or fighting, there is a need to change the tradition of considering science in opposition to Indigenous knowledge. It is true that there are differences between these knowledges, especially when asking these questions: what is its purpose? And how do you produce it? The very difference between science and Indigenous knowledge is in the vision of what is done with the knowledge and how to obtain it. Debates arise such as the idea that current science's purpose is to know, to make use of, and to dominate Earth (see 1.5.2), whereas for Indigenous peoples the purpose of the knowledge is to connect with and love the Earth, participate in the energy processes for the evolution of humans and the Earth, and be thankful for that. However, the history of science demonstrates science's contributions (see 2.3.1), and not all Indigenous populations preserve the connection with Earth. For my analysis I do not focus on those debates (although they exist); rather, I focus on what both science and Indigenous knowledge share, which is a common ground for understanding the biosphere and the great potential to evolve together.

4.1.1 Concepts that prevent understanding of Indigenous knowledge

I have considered some concepts that can act as barriers to grasping Indigenous knowledges—for example, the history of humanity; animism; the medieval language of religion; superstitions and taboos; cultural symbols; paradigm and cosmovision; conservation; and sustainable development.

For me, it is critical to be attentive to these barriers during this analysis because these concepts have played a role in molding people's understandings for centuries. So that my readers do not misunderstand my approach, I must point out that none of these concepts is mistaken, but they correspond to levels (or degrees, sizes, scales of perception) that are limited by the defined structure of their nature. For talking about Indigenous knowledges, the fixed structures and rigid boundaries do not work. The purpose of reviewing these concepts is to open a broader panorama and attempt to unveil preconceptions and biases so that new insights can be possible. The concepts are presented in general terms, but in my analysis I use examples of the living context of the Tacana-Quechua people and South America in general, including both the

Andes and Amazon regions because Tacana people historically inhabited the Amazon, and Quechua people inhabited both regions.

4.1.1.1 *The history of humanity*

The Neolithic is considered the era in which humans started their journey on Earth. To give dates may trigger a different and endless discussion. What I want to point out is that Indigenous peoples, in contrast, have a different history, stories that are not mere myth for them. When Indigenous peoples refer to the past, the time they use is apparently longer than the history of humanity as it is known. Cities like Tiwanaku, Cuzco, and Sierra Nevada are places that suggest hypotheses of lost civilizations before our species. The stories of the beginning of the human species on Earth have even been linked to extraterrestrial events (Portugal 2014a, 2014b, 2016a, 2016b, 2016c, 2016d). Some of these stories have been written by non-Indigenous authors due to the access they had to writing/literacy and publishing. According to Portugal (2016d), these stories are told only with the “permission of authorized entities.” These days, young Indigenous peoples in Andean communities have learned Spanish and with that “permission” they are unveiling to other cultures the older stories about the many human species on Earth (“Descubre que eres, y de donde vienes por Nicolas Paucar, historia de la creación andina” 2017). These stories remain oral and are not written; maybe in time they can be available in other languages. During my fieldwork I was amazed by the way Indigenous peoples of San José de Uchupiamonas told me stories about the uncontacted people who might be protecting a city of gold where a different species of humans lived long ago, and still live.

My point here is not to speculate, but rather to show the role that history/stories play in the way we perceive the world. The author of the international bestsellers *Sapiens* and *Homo Deus*, Harari (2014), examines the future projects that humanity will be facing in the 21st century. He challenges the public to imagine if other human species had remained co-existing side by side with *Homo sapiens*—how this would have changed the perception of religion, politics, and society. What kind of cultures would have emerged? Would human rights be only for Sapiens or for Neanderthals as well? Would Karl Marx have requested only Sapiens workers to unite? Harari claims that the disappearance of Neanderthals changed the way we *Homo sapiens* think and understand ourselves. According to him, *Homo sapiens* is too accustomed to being the only species around; it is hard to conceive a possibility other than us (“A brief history of humanity” 2014). The majority of Indigenous peoples have more than only the conventional

history. They have their own. The aim of their stories is not to get the correct story, or to discuss or possess the truth, but to get the benefits that come from the stories. The Quechua people say that the reason for telling stories is to expand the imagination: “Every night there is a familiar movie. Parents always tell stories to their kids, why do we do this? For the kids to have higher imagination, to expand mental capacity, to open it [the mental processes]” (“Códigos Andinos por Rolando Paucar” 2017). What Harari is doing today—that is, to reflect on the consequences of other human possibilities and their impact on our perception of the world—has always been done among Quechua people, at least in the populations less impacted by colonialization and the ongoing colonialism.

Similar open-mindedness happens with respect to the future. While it is true that there is a lot of science fiction produced about other worlds and aliens, it can also be argued that few scientists think hard about some questions referring to other living species in outer space. Carl Sagan was an exception; this astronomer and cosmologist promoted the scientific search for life in the universe. He stated, “The search for extraterrestrial life and especially for extraterrestrial intelligence is one of the key philosophical, scientific and human questions that have been posed” (“Carl Sagan, Stephen Hawking, and Arthur C. Clarke – God, The Universe and Everything Else (1988)” 2011). For Western cultures, the future carries uncertainty—there is the sense that it will be tragic, and also a hope to know it one day. On the other hand, stories of Quechua people offer a future carrying prophecies that will be fulfilled, rather than a future of uncertainty. In these prophecies there are species, alongside humans, coming and going from past and from future; those species are part of human life not as science fiction, but as very deep-rooted in the culture (Portugal 2014a, 2016c, 2016d; “Leyendas y mitos de La Paz” 2015; Hohenthal 2009). The return of the *Pachacuti* (the earth transformer) or the *Encounter of the eagle and condor* are among the best-known prophecies in Andean nations, in which love will be brought back to humanity. Most Indigenous nations around the world have similar prophecies. The stories are not fear-, fun-, or intimidation-oriented—the purpose is to recognize that in ancient periods people were wise enough to leave stories to guide the coming generations. The prophecy becomes part of the life. Again, my point here is to consider the different way that Indigenous peoples’ minds work. Indigenous peoples grow up with broader perspectives of the past and the future than are commonly taught in Western society.

Another important element about history/stories is the way they are told. While conventional history is written and read, the stories in an Indigenous context should be orally transmitted. Indigenous authors in different places around the world agree on the importance of oral storytelling (Means 1980; Smith 1999; Cajete 2000; Ferguson 2005; Little Bear 2016; Kovach 2009; Paucar 2014). Kovach (2009, 96) protests about the underlying assumption that oral tradition is of preliterate tribal groups. She states that storytelling is never decontextualized; it engenders personal meaning, and stories teach consequences, medicines, and gather peoples together (Kovach 2009, 94-108). Storytelling is not only about literature, it is the sound of the story from both the one who is telling and the one who is listening. That is why it has rules. A story is not something to be told by people who don't understand what they are saying. Not anybody can be a storyteller. Therefore, not everyone can listen to the message. The storytelling is not about telling the story just for information. There is knowledge and power in it. In the words of Kovach, "the 'truth' is bound in a sacred commitment" (Kovach 2009, 101-2).

The physical and emotional places are also important because they will bring a deeper implication. During my fieldwork, I was told one afternoon, in the company of coca leaves, that animals can dance and bring people to the forest if they want. The elder shared with me two beautiful stories about animals and said that I was told about those stories "because I am not a biologist" who is enclosed in concepts, and that "different stories will be told to biologists."

The stories were the following:

I am a hunter. I have always listened to older people that animals disappear when they want to protect themselves. I never believed that until I have seen it with my own eyes. I was chasing a pig, there was place for him to go, it was a kind of swamp and suddenly I saw it, he disappeared exactly as the old people used to say, then I knew It was that way. How can I make this understandable for biologist? I am a hunter and even for me at the beginning was impossible.

Animals live here and they have intentions. I remember when the community was working to open Chalalán, that time I was on the shore of the river and I saw many animals' footprints, as never before, even the jaguar's was there. It was like the animals' party. It was a message, it was clear for me that animals have brought those people to protect themselves, to have a protected place. Then, I agreed to open Chalalán.

When listening, you realize more than the story itself. That moment was a profound sharing from individual to individual. It was not triggered by a research question, it just came because it was needed. If somebody reads that story it will not have the same impact compared with the experience of listening to the storyteller in the right moment. The space of storytelling

is a time for commitment. At this point there are no worries about ownership of the stories, no proper rights; stories become life itself and have chosen to flow.

4.1.1.2 Animism

This concept acts as an adjective to qualify Indigenous descriptions of nature when Indigenous peoples express that “x” or “y” is alive. The letters “x” and “y” refer to mountains, lakes, places, stars, earth, and so on. While this adjective shows some degree of ignorance of society about the new physics (quarks, quantum organization, quantum cosmology, indeterminism, the uncertainty principle), for the Indigenous view of nature it has always been clear that everything moves and interacts with everything else. Tacana-Quechua peoples do not need to explain the new physics; among them it is common to talk with animals, plants, stars, and even to objects. It is not because of the “souls” these elements have, as is believed in animism, but because Indigenous peoples’ experiences with unseen forces are common. During my fieldwork, I listened to phrases that can illustrate those experiences: “Say to your rifle you are sorry for lending it to other people and then promise it that you would be nice with your rifle next time ... that way you will succeed in hunting,” a mother told her son who was learning to hunt, with no luck in his first attempts. I also listened to another villager: “I talked with the motorcycle before my departure in order to motivate it to keep me safe during the trip and resist until ‘we’ arrived. I sprinkled alcohol to it and my talking worked, ‘we’ arrive safely ... My mother used to teach me these things.” He felt very proud while telling me his achievement.

These examples may trigger a discussion on psychology, linguistics, and other subjects of the mind. However, my aim is to explain the examples from the representation of the state of space and the use of sound (see 4.1.2) as a physiological sensation and as a wave motion; Indigenous peoples naturally experience connections with the environment in the form of waves from subatomic levels to cosmic levels (see 4.1.2.)

Also, it is important to discuss the concept of inertness. Here I will examine it only in physical terms regarding locomotion. Commonly we are taught that inert bodies lack the power to move; in such terms, only the ability to perceive movement can tell the truth of a body’s inertness. In the past, science had defined the soil as an inert substrate, but after more studies it changed that definition and now the soil is defined as a living organism. V. Dokuchaev demonstrated in 1870 his thesis that soil is a special natural body, called “bio-inert natural body” (do not confuse with bioinert material) (Vernadsky 2001, 24, 25), that is distinct from

other rocks and with properties of living matter. That concept is applicable to terrestrial waters as well, and Vernadsky adds “this basic concept ... is usually ignored and not subjected to serious logical analysis. And yet, scientists use the concept almost unconsciously” (Vernadsky 2001, 24). The bio-inert processes are only manifest in the course of geological time (Vernadsky 2001, 33), caused by the flowing impact of energy from multiple superior forms of life upon matter.

The ability to perceive movement is special in Quechua culture. All things on Earth and in the universe are in movement with different vibrations that are only perceived through people’s interaction with them, and where the attitude is fundamental to reach that experience (Paucarr 2014, 117). The Quechua people consider some elements and places as everybody’s grand-grand-grandfathers/mothers. In an active Indigenous world, the idea of animism or inertness (no movement) is absurd and damaging. The use of the phrase animism may deter Indigenous people from continuing any conversation about the relations they have with nature. I experienced that discomfort when people asked me about animism or when I read in current papers describing Indigenous views as animist. An Indigenous person told me: “foreigners³⁸ simply do not understand, it is better not to talk about life” (Zenon Limaco, pers. comm.). If society keeps calling the idea of a living sun, living mountain, or sentient animals, primitive or unscientific, and even laughing at that idea, misunderstanding and silence will persist.

It is a long way for our modern minds to approach the new physics concepts. It would be much easier to experience them as Indigenous peoples do. They do not need new physics concepts, they naturally interact with everything and feel that everything moves. For sure, Indigenous peoples appreciate the new physics concepts more than the animist theory with respect to integration.

³⁸ The ‘foreigner’ is not a definition of people who live outside the country. In Indigenous contexts the colony invaders received names because they were disconnected from Earth and could not understand the Indigenous nature and values. The most common name given to them is ‘whites.’ Other terminology is ‘settlers,’ ‘pale people.’ In Bolivia they are called “k’aras,” ‘mist’is’. These words do not point a physical or geographic feature, but the culture that lacks awareness and interaction with Earth. Indigenous peoples do not take offense, it is a world view applicable even to Indians themselves. A famous Lakota, Russel Means, explained: “It is possible for an Indian to share European values, a European worldview. We have a term for these people; we call them “apples” – red on the outside (genetics) and white on the inside (their values). Other groups have similar terms: Blacks have their “oreos”; Hispanos have “coconuts”; and so on. And, as I said before, there are exceptions to the white norm: people who are white on the outside, but not white inside. I’m not sure what term should be applied to them other than “human beings” (Means 1980).

4.1.1.3 *The medieval language of religion cleansing*

The language of religion is unhelpful for understanding Indigenous knowledge. The majority of the world's Western population has grown up in a context of established institutions of religion centred on a language with implied degrees of fear and fantasy. The meaning of the religious words has been and is passively accepted. I infer that Western society has had, and still has, the tendency to consider that every other culture has a religion with similar ways of learning. The colonialization period in Indigenous communities brought the religion as it was known in the European context. When Columbus first came to America he could not find religion; his diary repeatedly states:

[T]he Indians know no religion at all and that 'they will become ready to the holy Christian faith.' The evangelization of the inhabitants of the lands that are discovered is a primordial motive, never secondary, of this expedition, so we cannot forget it. However, Columbus occasionally finds some evidence suggesting that Indians worship some deities ... [he] sets a huge cross in the square of an Indigenous village and everyone adores it ... the cross should be some symbol of the Indigenous cult and hence its worship. (Las Heras 2017) (my translation)

Indigenous peoples' own ways of living, thinking, and acting were under suspicion as Boff (1998, 101) states: "[their knowledge was] relegated to the field of subjectivity, the world of magic and superstition ... [and] was arrogantly despised." Colonialization devastated Indigenous cultures in today's South America and imprinted its own language. I see two reasons for this: the fact that colonizers could not understand the complex Indigenous world and so overlapped their religious language over similar Indigenous concepts. This religious language was used for convenience during the large process of evangelization. Another reason is that the colonizers were afraid of the power of the Indigenous language and so wanted to eliminate it for their own security and benefit. As a result, the Indigenous language is now mixed with religious words, making a scientific approach impossible. I consider it critical to "clean up" the religious language in order to express a more accurate description of the Indigenous world. Indigenous peoples may currently use the religious terminology because their ancestors were forced to do that. Here I present a chart of some words coming from the religious language that contrast with the Indigenous language (**Table 4.1**). Be aware that I only analyze these words in the context of my fieldwork and experience in San José de Uchupiamonas in the Amazon and Andean Mountains, in the roots of the Quechua culture, and considering the difficulties of my Spanish mother tongue to translate these words.

Table 4.1 Religious language vs. Indigenous language

The religious language		The language in Indigenous contexts	
Word	Details	Word	Details
Spirit	Same as Soul. A belief in the incorporeal essence of a living being. “Vital” energy. Science cannot study spirit in those terms	Fire + Air	Fire + air represent the <i>energetic body</i> . Both elements can be studied in science. In a living organism, the air is related to the action of respiration. In such terms, it can be studied by Science because it corresponds to Biology. Etymologically the word “Spiritus” is the Latin for breath. Air has different compounds in variable amounts, and electrical discharges may happen in it (atmospherics). It is relevant for Indigenous peoples the interaction with these compounds and discharges in ceremonies. How the air works inside us is important for Indigenous peoples, and the breathing is not only by our nose. Fire etymologically has two roots "inanimate," referring to fire as a substance, and "animate," referring to it as a force. To study fire in living processes is also possible in science as a substance. The ignition of fire is more complex. As a living force, it should be studied as a property of living organisms in contrast to non-living organisms. For example, the state of the inert body to a living body will imply fire as a force to produce the mechanism not yet explained by science. Indigenous knowledge about fire should become a matter of interest in science. Fire in Indigenous knowledge implies transformation. This energetic body together with the <i>physical body</i> (soil + water) produces the vibration which is the connection with the environment.
Sacred	Divine. Hallowed by God	Energetic point	Where energy is in a higher degree, so it has power. These points can be places, objects, unseen objects, plants, animals, and so on. They can be old or new points or even chosen by the individual. Eventually, geodesic points on Earth are science interests.
Soul	Same as Spirit. A belief in the incorporeal essence of a living being	Does not exist	It is the union of the physical body with the energetic body. It is the feeling of being human and disappears when dead.
Life	Triggers philosophical issues.	Vibration	Wave propagation effective to impact the biosphere. The living matter has vibration and does not trigger philosophical issues
Intuition	To know something because of a feeling rather than by considering the facts and/or reasoning	Intuition	It is not a word used in Indigenous language. Feelings are not separated from the actions of seeing and touch. Also, the act of reasoning on fact is an isolated cognitive process. Reasoning and thinking for Indigenous peoples also include body as explained in my single analysis of “belief” at the bottom of this chart.
Divine	God’s act. Something nice and precious	Perfection	The perfection is seen in a mathematical order. The Chakana is the representation of that.
Magic	Supernatural methods for witchcraft	Response	Science that has not been grasped yet. It is the answer of elements on Earth to your own conscious power and your working with natural elements on Earth.
Spell	Summon to make magic	Sound	The verbalized intention with full confidence allows managing the sound to cause different vibration.
Invisible	Fantasy. Ghost	Dark matter/energy	The most probable words to describe the unseen world are dark matter or dark energy. They have in the textiles a complete representation of the universe, and the obscure side is always present.
Belief	The idea that something is true or definitely exists	Does not exist	The word has been forced into the Indigenous language. The opposite of belief is a certainty. The emotional certainty is part of Indigenous peoples. See the analysis of this word below the chart.
Heaven	Place to go after death if you do good things. Located in an upper place	Earth	Earth is the place where we live. It provides food and energy for our development (evolution). <i>Note.</i> Heaven, Earth, and Hell are also wrong compared with the Andean trilogy of three worlds: Condor, Serpent, and Cougar. Andean people refer to the energy, vibration, and matter in correspondence
Hell	Place where fire burns people and is punished for the Demon. Located in a bottom place	Does not exist	Is a wrong concept created in mind and bad feelings. Own suffering and punishment with ideas and thoughts on natural and even nice things. <i>Note.</i> Heaven, Earth and Hell also are wrong compared with the Andean trilogy three worlds: Condor, Serpent and Cougar—Andean people refer to the corresponding energy, vibration, and matter.
Supernatural	Does not belong to the laws of nature	Does not exist	Everything is natural. There are phenomena that the mind cannot explain in the framework of logic. What is nonlogical is part of the Indigenous knowledge, and should not be considered negative for understanding.
Prophecy	A divine revelation that will happen in the future	Evolution	A different level of consciousness to reach, the possibility of evolution. This evolution is not in morphological terms
Pray	Question, plea, or thanks to a deity/object of worship	Sound	Talk consciously from your vibration

Source: Own elaboration, 2018.

Each of these words deserves a deeper discussion because they are words of common use and deeply pinned in the minds of modern society as well as in Indigenous communities—not only for religious purposes, but also in many dimensions of their daily activities.

The purpose of this chart is to “clean up” Indigenous knowledge of religious language. These words do not allow for expressing the richness that the Indigenous knowledge has developed about the planet and our relations with it (her). These words also deny a scientific approach. On the other hand, the comprehension of the Indigenous language, specifically these words, may take years. Even for Indigenous peoples it is a difficult process because in the last decades the process of learning is at risk. Learning the Indigenous language implies more than just cognitive processes, it requires one’s own experience immersed in the practices of the culture—but communities are losing much of their culture in which that learning is developed.

I did a single analysis on the word “belief” because that is the most detrimental of all of the religious terms. The notion of belief became important to me because I needed to participate in rituals and be taught sacred things, so I did not want to assume in advance that those are beliefs to be accepted or denied through mental logic processes. I could realize that sacred things and rituals in Indigenous cultures carry an understanding of the universe in time and space beyond the common and limited human perception and current consciousness. Beliefs did not happen in the Quechua culture if looking into their roots. My assertion may sound contradictory to the traditions and studies that consider Indigenous cultures full of beliefs. I will explain. A belief is something that an individual is not sure of. There is uncertainty in his or her mind, but the word provides the support, either positive or negative, in order to pretend to be confident. I offer examples to understand this: 1) I believe in heaven, 2) I do not believe in heaven, 3) I believe I love my son, 4) I do not believe I love my son, 5) Do you believe that tree exists? (**Figure 4.1**).

In both examples 1) and 2) the uncertainty is clear. The individual does not know or have the evidence of heaven or evidence to refute it. There may be some mental creations or dogmas to affirm (either to believe or not to believe) in order to give the impression of knowing and to look confident. Today there is more analysis to be done on beliefs. In the words of Harari (2015), “beliefs” can be whatever construction encourages people to cooperate together, for good or bad, in flexible and large numbers such as religions based on gods, states, companies, money, that become superior external authorities. In his book *Sapiens*, Harari explains that

beliefs are fictions (“Why humans run the world” 2015) and have power over humanity because they give legitimacy to human laws based on those superior external authorities (“Techno-Religions and Silicon Prophets” 2015).

From a semantic point of view I had a hard time reading the word “believe” in the literature. When I compare the verbs “to believe” and “to think,” there is distance. It strikes me that important literature use them as synonyms or equivalents. I have read researchers stating “I believe” instead of saying “I think.” The verb *to think* is complex compared to a belief that might come as a replica of a borrowed thought. In other words, to believe is to say that I accept what another individual has thought; whereas thinking is not a replica, it is original and the result of complex mental processes. The semantic distinction between “to believe” and “to think” is not enough. In my analysis the Indigenous knowledge is developed in the Indigenous view of nature in which the process of thinking is not only a mental task. To *believe* and to *think* come from the domain of the mind; the Indigenous thinking implies the whole body and their perceptions in the right moment of the interaction and intentional and direct sensory experience with the environment. This feature helps me to differentiate Indigenous knowledge from distorted meanings of Indigenous thinking. Indigenous thinking has been called instinct. For instance, when Villegas (2014, 15) describes the taxonomy of plants of Indigenous peoples, he protests that in modern society, in the best of cases, it was recognized that among the plants and animals, an Indigenous person does not name more than the useful or harmful species. He says that “it was intended [to prove] that the savage was only guided by his animal instincts. However, many researchers make evident ... that Indigenous peoples had sophisticated classification systems.” Villegas (2014, 16) cites Louis Girault’s 1987 book *Kallawayas: Curanderos itinerantes de los Andes. Investigación sobre prácticas medicinales y mágicas* (Kallawayas: Traveling healers of the Andes. Research on medicinal and magical practices):

Kallawayas have identified 170 genera of medicinal plants, and of these, 158 names are in Quechua language. Of the 158 names, only 25 have meanings that respond to different values; 132 are proper names with no other meaning. These names do not respond to a utilitarian value, nor to a mere reduction, nor to symbolic values or metaphor. They are names strictly appropriate to the plants themselves, that is, proper names. (Villegas 2014, 16) (my translation)

These are the earned names. The Indigenous classification is not an arbitrary human desire or an agreement. The names that Quechua people assign come from the plant itself: “the plant reveals the name to you if you can really contact with its essence” (Rolando Paucar,

pers.comm.). With these examples I want to show that when the body intervenes in the process of thinking, it is commonly judged as *not thinking*. As I observed, Indigenous thinking does not only deal with a separate (or disjointed) cognitive process; the Indigenous thinking is also related with body, its memory and alertness. After my experience within Indigenous communities I found that there is no such dilemma as “*cogito ergo sum*” (I think, therefore I am). The complex process of thinking of Indigenous peoples cannot be considered belief.

In examples 3) and 4) above, I want to reflect that when a certainty exists, there is no room for beliefs. The phrases are disturbing because a mother sure of her love will never express such confusion. When you are sure of something you do not need to believe or not believe. It is unnecessary.

As explained before, not only does the mind intervene to make us realize that we are certain of something. Certainty has to include the body and the feelings. Some individuals may protest that their beliefs come from the heart, but I would say that “I feel” is semantically better. Also, if there is confidence, “I trust” is appropriate. Feelings play a big role for an individual’s certainty. The shaman Nicolás Paucar explains: “to be sure I had to see, touch and feel, to see is only 33.3% of certainty. To see and touch is 66.6% of certainty. To see, to touch and to feel is 100% of certainty” (Paucar 2014, 34). Beliefs are not thinking, not touching, not feeling; they are borrowed ideas for a mind to pretend to be confident. Eventually beliefs become obstacles to studying and to understand nature.

In example 5) (**Figure 4.1**) (Do you believe that tree exists), I want to illustrate how we are used to asking mechanical questions without paying attention to the present facts. If we pay attention to the present time and space, that specific question becomes absurd. It does not matter if you believe or if you do not believe, the tree in the picture (General Sherman) exists. Beliefs cannot decide its existence.



Figure 4.1 General Sherman is the largest currently living tree on Earth.
Source: “World’s Largest Tree General Sherman Sequoia National Park” 2015.

Beliefs and facts do not get along, and science and Indigenous knowledge have each arrived at this conclusion independently. Indigenous peoples do experience the world with more open minds. Their bodies and feelings make them sure of the environment in which they live. When they are asked if they believe in spirits of the forest, the question and the answer become absurd. They are certain of that. But again, here the religious language acts as a barrier. If spirit means soul for the one who is asking with medieval religious language, and it means fire plus air for the one who answers, the gap preventing dialogue is huge, and discomfort will arise from both sides.

4.1.1.4 Superstitions, taboos.

The word superstition is offensive and distant from reason and religion, and from Indigenous knowledge as well. It is a belief based on ignorance and fear, therefore it is a disapproving adjective. In terms of beliefs, again my above examination applies. However, superstition is what Indigenous peoples are said to practice (Saarinen and Kamppinen 2009), so it became part of a deeper analysis. I found that in the best case, superstitions can be seen as taboos.

Taboo is a more elaborated concept and prevents researchers from just avoiding or ignoring some phenomena that do not appear logical (such as superstitions) and makes it accessible to study. Some studies done on Indigenous lands regard taboos that are related to impacts on biodiversity (Carey 2013) and that can promote or discourage the depletion or conservation of specific species and ecosystems. Taboos protect not only threatened and endemic species, but also keystone species. Harvesting coconuts at inappropriate times is another example (Colding and Folke 1997).

In addition to those examples, during my fieldwork I listened to phrases such as “Do not ever burn the Bibosi (*Ficuss spp*)”; “Do not start a “chaco”³⁹ without paying the earth”; “Do not leave the peels on the trail.” So, I needed to revise the taboo concept. I found that S. Freud worked with two meanings: the common one that is the idea of forbidden, unclean, uncanny, and dangerous, and the other one that is sacred and consecrated, which is less known. I want my research to not be confused with the most common meaning of taboo, which is just prohibition. I analyzed the concept in a chart (**Figure 4.2**), where the meaning of taboo as only prohibition (orange colour) may put limits to understanding the Indigenous knowledge. My analysis is closer to the least studied type, which is the sacred meaning (green colour). If a taboo is sacred in its meaning then it is not imposed, not acquired, not communicated, it is a result of a mysterious power inherent in a person or thing, thus it is natural. It will protect people not property. Society cannot sanction through penal systems, the violated taboo will avenge itself unless a treatment like a ceremony is performed.

³⁹ Slang in San José de Uchupiamonas to refer to a place to burn and cut trees to grow crops.

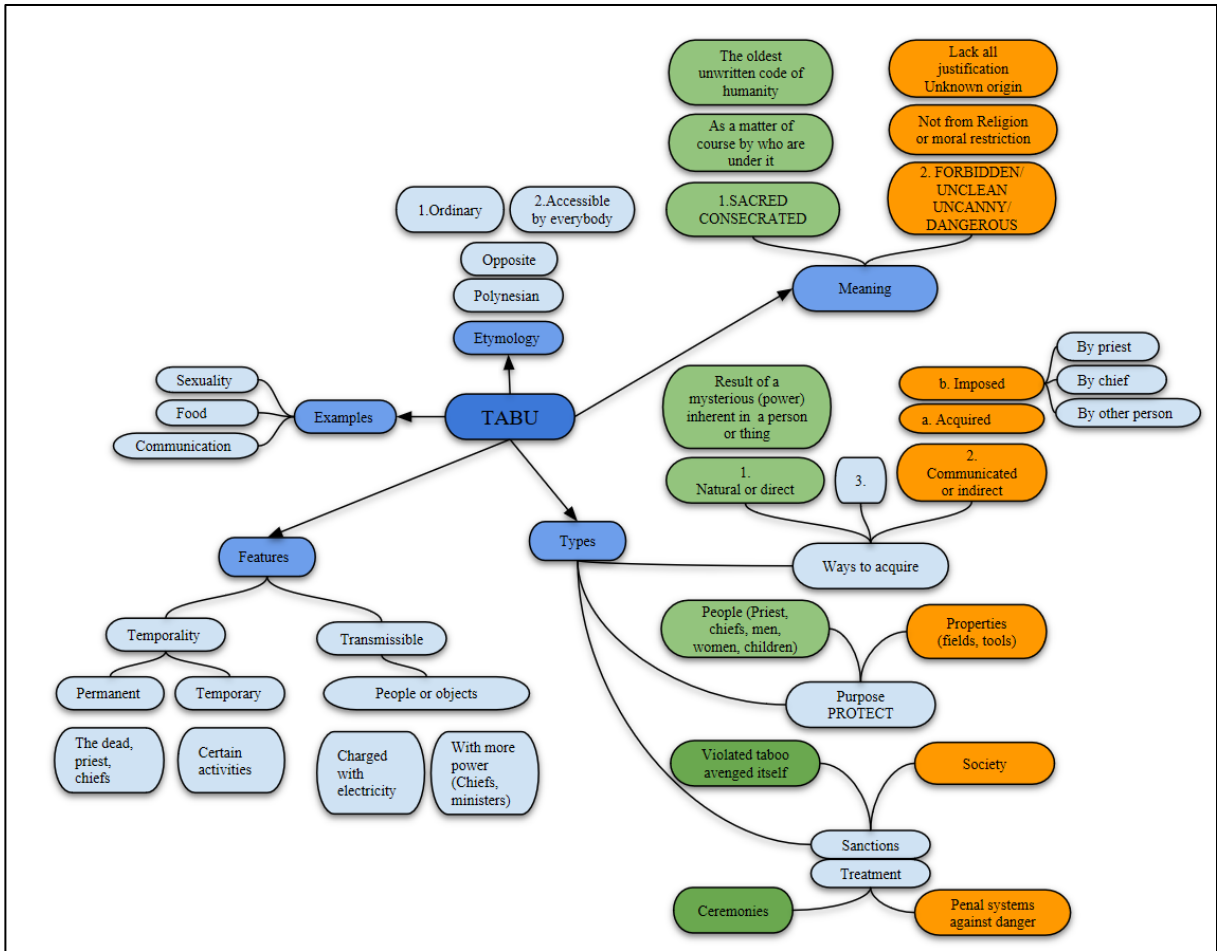


Figure 4.2 Types of taboo.
 Source: Own elaboration, based on Freud 1912-13, 2017.

4.1.1.5 Cultural symbols

The social sciences and humanities study the whole gamut of Indigenous peoples’ cultural symbols, and the research in these areas plays an important role in furthering our understanding about these symbols. However, our perception of culture must include a deeper comprehension. If we keep the cultural theme as separate from nature, the integration of Indigenous knowledge and science is not possible.

To change the perception of the cultural symbols, we have to deal with extreme dichotomies that may seem impossible to bring together: physical-abstract, objective-subjective. In general terms, the major dichotomy is nature-culture. Saarinen and Kamppinen (2009) noted the following:

The dichotomy between nature and culture has been one of the cornerstones in western thought ... While culture has been defined as man-made and therefore an artificial part of the reality, nature has been seen as the original and primordial order of the world, functioning under its own laws independently from human agency ... the main defining humanity has been reason, while nature has been defined exactly through the lack of reason. Nature in its widest sense has become to mean everything that lies outside the human world ... even though [the relation is] highly ambiguous: while humans have been seen as superiors to the rest of the nature, it has been the nature which has been understood to contain the absolute and objective truth ... [that] can be revealed by scientific, rational methods. (311)

The impact of this dichotomy seems to be deep in Western culture that seeks a reconnection with nature. E.O. Wilson (1984, 83), the famous biologist who coined the term biodiversity, also introduced the concept of *biophilia*, which is defined as the urge to affiliate with others form of life. He noted a bridge between biology and culture, and suggests biophilia as a vector to the “cultural evolution” (Wilson 1984, 108).

In Indigenous knowledge, nature and culture are the same thing. To understand Indigenous knowledge, we need to see these concepts, nature and culture, not as a dichotomy but integrated one with the other. For that reason, I propose to work with the concepts of Vernadsky regarding the biosphere. He is a scientist who did his work without the traditional division between culture and nature, and he is the only scientist who worked out a scientific concept that unites culture and nature. He explains that every human action and human thought impacts the Earth and should be studied as a geological force that shapes the biosphere (see 2.3.2). I consider his work the most important basis from which to discuss the integration between science and Indigenous knowledge in academia.

Most cultural symbols of Indigenous peoples are tools to understand nature and to interact with all life on Earth, and with the universe, in a complex way that current science is not able to explain. Among these cultural symbols, there are weavings, animal totems, musical instruments, encoded writings in stones or objects, symbols of energetic forces, representations of space, etcetera. In Quechua tradition and in that of many other Indigenous peoples from South America, the Chakana⁴⁰ (**Image 9**) is the very symbol of their view of nature. These cultural symbols deserve to be studied in areas of natural sciences. For instance, the impact of the interpretation of a song in Quechua language, which has properties of healing in people and the environment, can be studied by neurology and thermodynamics. We should understand that

⁴⁰ It is called the Inca cross.

Indigenous symbols are not imaginary creations or arbitrary designs, they are strongly based on nature's mechanism (see 2.3.2.2) in dynamic form (**Figure 4.3**). These cultural symbols do not mean studying the past; they are not antiques nor obsolete. They are active, only noticeable depending on the individual who is interacting with it.

Also, I want to emphasize the cultural diversity and its benefits. The local knowledge has specific manifestations that enrich the worldwide knowledge of Indigenous peoples in the different ecosystems where they live. A ceremony with very different "techniques" is also a universal way to manage the environment and the energies on it, not imaginary energy but energies manifested in the physical field (**Figure 2.3**).

4.1.1.6 An alternative, an attachment, or integration?

Indigenous knowledge should not be seen as an alternative to current science because they do not contradict each other, at least not with regards to content that they have in common ground, which is nature. From that point, it is possible to integrate them. The evolution of the biosphere and laws of nature are universal, and work for everybody in every place.

Also, it may bring confusion to think that Indigenous knowledge *can* be attached to scientific subjects; for instance, the most publicized example is the understanding of climate change⁴¹ (Berkes 2012, 19; Kassam 2010, chap. 5, 160). To treat Indigenous knowledge as an attachment is not to recognize its very scientific potential. Indigenous knowledge as an attachment can only improve technical efficiency for existing methodologies and current studies. In this case one knowledge is superior and the other one inferior. That approach could promote a "soft colonial period" if it is done paternalistically in a polite way that just credits the "small" amount of knowledge that Indigenous peoples have.

The opposite would be that science is an attachment for Indigenous knowledge. Some people may agree. However, contradictions and controversies may arise making this very difficult. For instance, current science uses standardization. Indigenous knowledge cannot be standard; it is personal. In the framework of integration, science can be personal, each experiment is different, unique—but the idea needs a review in the scientific community. Furthermore, there are differences in the use of tools. For science, tools are used to obtain data.

⁴¹ Despite all of science's work on climate change, this currently has become a topic of value judgements that make it susceptible to be treated as non-scientific.

For Indigenous peoples, the tools are the knowledges, the knowledges are the tools. What is more, the tools are alive: the ceremonies, dreams, stones, mountains, pilgrimages, plants, stories, etcetera. That understanding makes a big difference. It is necessary to say hello to the *Inal mama*, the spirit of the coca (*Erythroxylum coca*), not with words only, but with an attitude of humbleness. The tool, in this case, is not treated just as a way of obtaining information.

Confusion and controversy are part of the integration. This integration process may take decades. The Spaniards who came to the “new” continent were adventurers, militia men, missionaries, people with the purpose of obtaining land, money, or souls. They wrote the history for Indigenous groups, and not many scientists came. After too much devastation occurred, very few scientists started to dig into Indigenous knowledge. One of the earliest recognitions of the science implicit in Indigenous knowledge was the work of Reichel-Dolmatoff (1977, 2015), an anthropologist who studied sacred temples in the Sierra Nevada, analyzing them as a “scientific instrument of astronomical observation.” He also saw the various dimensions that Indigenous people have as the basis of their knowledge (**Image 8**). Recently, not only anthropologists are interested in the “lost” cities like Cuzco and Tiwanaku, or the not-yet-found Dorado city in the Amazon, and not only biologists are interested in Amazon species. Chemists, physicians, mathematicians, cosmologists, filmmakers, and citizens of the world are coming. On the other hand, Indigenous people are going to universities and travelling to different countries to share their knowledge, not in big conferences or international events, just in small groups. They are then sharing their experiences back in their communities.

4.1.1.7 Paradigm and cosmovision

The Indigenous view of nature does not rely on a paradigm; it is not a paradigm in itself, it is a development of conscious interaction with the environment in everyday life. If we try to fit Indigenous knowledge in a paradigm, treat it as a paradigm or convert it into a paradigm, we will create separation instead of integration. The idea that one paradigm replaces or is better than other paradigm is a very Western view. To have a paradigm may be a way to remain stable because the paradigm offers explanations, and our mind likes explanations. One paradigm confronts the other one with theories, logic, and reasonable explanations. Indigenous knowledge does not provide explanations, it involves a constant observation and interaction with nature. Theories, logic, and reasons (explanations) never replace the direct experience and interaction with nature.




The word “cosmovision” is a particular way to see and interpret the reality, it is a world view. However, it can be misleading if we want to understand Indigenous knowledge because the concept becomes incomplete when words like “cosmoaudition” (Lenkersdorf 2008) or “cosmopolitics” (Figueroa 2012) appear. The five senses of our body let us know what we are experiencing, and according to Lenkersdorf, the auditory sense describes the world better than vision in Indigenous contexts. Similarly, “cosmopolitics” describes organization and practice as a way to grasp the world. Therefore, it is important to be aware of the limitations of the word “cosmovision” to name Indigenous life. Cosmovision is part of philosophical studies and not real practice. The only way to enter to the “world,” “vision,” and “view” of Indigenous peoples is to live connected to the Earth as Indigenous peoples do and to have vivid experiences with nature. Figueroa (2012, 396) following Lenkersdorf’s “cosmoexperience” understands this vivid experience as a “bio-eco-cosmoexperience” after analyzing the living of some groups of Indigenous peoples.

4.1.1.8 Conservation, sustainable development

Indigenous peoples did not create the words conservation, nor sustainable development either. These words are not part of their languages or part of their daily life. These terms have created a controversial issue because some Indigenous groups may agree, or not, with conservation. Those words trigger division among Indigenous peoples, pushing people to one side or the other. The reason for different meanings is the result of the experiences people have had with conservation. Maybe it is good when regulations for conservation or sustainable development help Indigenous people to avoid invaders into their lands or when they bring more economic opportunities. Maybe it is bad when Indigenous people are banned from using their resources, accused of being a threat to the environment.

Here the point is not to be against conservation or sustainable development; these approaches are correct for the contexts in which they were developed. However, if institutions keep matching conservation with Indigenous knowledge, the results will never be meaningful. Conservation and sustainable development do not belong to the Indigenous context. To try to fuse them is a simplistic view. If an Indigenous person is taught how to conserve, or how to do sustainable practices, he or she will do it with less effect compared to their own ways to protect nature.

Table 4.2 Conservation vs. other concepts

	Conservation	Preserving	Protecting	Look after
Keyword	To use	Do not touch	Do not touch	Touching
Details	The main idea of conservation is to use and make sure there is something left. Its arguments are fear-based reasons.	Humans are not allowed to touch pristine places. The place should not be modified. It should remain as it is. Its arguments are whatever motive under the logic and reason	Humans act as covering the place, so external threats do not harm. The human participation is only as a defense. Its arguments are whatever motive, under logic, reason, and emotions	Humans do touch and do interact following the mechanism of nature (mathematical order) Feelings of love and respect, no mental reasons. They have certainty based on what is watched, touched, and felt in the right moment of interactions
Conception of nature	Nature is both a resource necessary for development and a problem that needs to be controlled	Nature is a system and a source of knowledge	Nature is identity, a place with common characteristics	Nature is family
Example	Political wishes: “Conservation is the wise use of the Earth and its resources” Theodore Roosevelt			

Source: Own elaboration, 2018.

For example, it is not only the terminology that is not part of Quechua peoples, but the meaning of conservation is also weak, like a green band-aid to the problem of humanity facing the accelerated degradation of the biosphere. What Quechua peoples do is to *look after* (Table 4.2), and in this caring process they “rear” plants and animals because these are part of the family as well (Rolando Paucar, pers.comm.).

Among Tacana communities, this practice to “look after” has changed due to the influences in history, but it remains in the memory: “The Tacana people have a lot of faith and respect for the hills ... since our ancestors told us that they care for our people and our animals and even today they are worthy of great rituals performed by a Janana accompanied by the community so that they take care and accompany” (Quenevo n.d., 21).

4.1.2 The potential of human knowledges (integration)

As discussed before, the division between nature and culture (see 4.1.1.5) is one of the main obstacles to achieving an integration with Indigenous knowledge and science. The work of Vernadsky on the concept of biosphere and its evolution does integrate both (see 2.3.2.2), resulting in the new cultural-biogeochemical energy. In my study, the Indigenous knowledge has no separation of culture and nature, thus it becomes consistent with scientific work as long as the cultural- biogeochemical energy is recognized. **Figure 4.5** will show this consistency, but first an explanation of the geometric representation of space in Quechua textiles is needed, and this is provided in the next section.

The cultural-biogeochemical force that Indigenous peoples have developed may change the future of the human species. Indigenous knowledge is a source of understandings that can prompt science to re-think notions that are still not solved since the time of Vernadsky's analysis of the biosphere. These notions have been part of human cultures for centuries, but their comprehension and elaboration by Indigenous groups have been ignored with respect to the potential and opportunity they represent for a step forward of scientific work. Here I present how Quechua people represent the two fundamental notions that Vernadsky analyzed: The states of space, the right-handedness, and the left-handedness. In addition to the representation of these two concepts, Quechua people act as transformers of their representation through the use of sound, which I exemplify with the work of shamans.

4.1.2.1 Geometric representation of the space in Quechua textiles

Among Indigenous groups it is possible to find a representation of what Vernadsky called a state of space (see 2.3.2.3). In history, some Indigenous representations have been described by outsiders using religious language. For instance, Reichele-Dolmatoff (1977, 210) drew the nine dimensions that Kogi⁴² shamans told him—"each of the staggered worlds has its own divinities and spirits" (**Image 8**). Reichele-Dolmatoff also considers the forces within this representation: "Shamans will mention in their spells and incantations up to seven shades of 'yellow light' that energize the biosphere" (Reichel-Dolmatoff 1976, 315). Indigenous peoples know about the state of space and, additionally, they know the energies implied. For example, Deloria (1986, 2-3) from the Lakota people explains the meaning of *place* and *power*:

⁴² Indigenous group that lives in the Sierra Nevada de Santa Marta in Colombia.

The Indian world can be said to consist of two basic experimental dimensions that, taken together, provided a sufficient means of making sense of the world. These two concepts were place and power, the latter perhaps better defined as spiritual power of life force. Familiarity with the personality of object and entities of the natural world enabled Indians to discern immediately where each living being has its proper place and what kinds of experiences that place allowed, encouraged and suggested. And knowing the places enabled people to relate to the living entities inhabiting it. (Deloria 1986, 2-3)

Similarly, Indigenous people of the Quechua culture have lived according to a comprehension of the state of space and its functioning. After this analysis I can say that the representation that Vernadsky was looking for cannot be achieved in the abstract (drawings); its geometry should be represented in the solid matter itself, and that is what Quechua people did. I will refer to the representation based in the textiles (there are other examples) transmitted from generation to generation since time immemorial. In **Figure 4.3** we can appreciate the representation of the state of space that some Quechua people still preserve, and which presents a complexity of a mechanism close to what Vernadsky explained as the special mechanism of the biosphere (see 2.3.2.2).

In this representation there are three layers: A. The universe blanket, B. The Earth blanket, and C. The human blanket. These are arranged to represent the geometry of space that is as complex as the biosphere is. D. The blankets set up. Quechua people know that the combination of the Universe blanket and the Earth blanket is the flat representation of the fourth dimension (**Figure 4.4**), which I will detail in the next section because it deals with left-handedness and right-handedness.

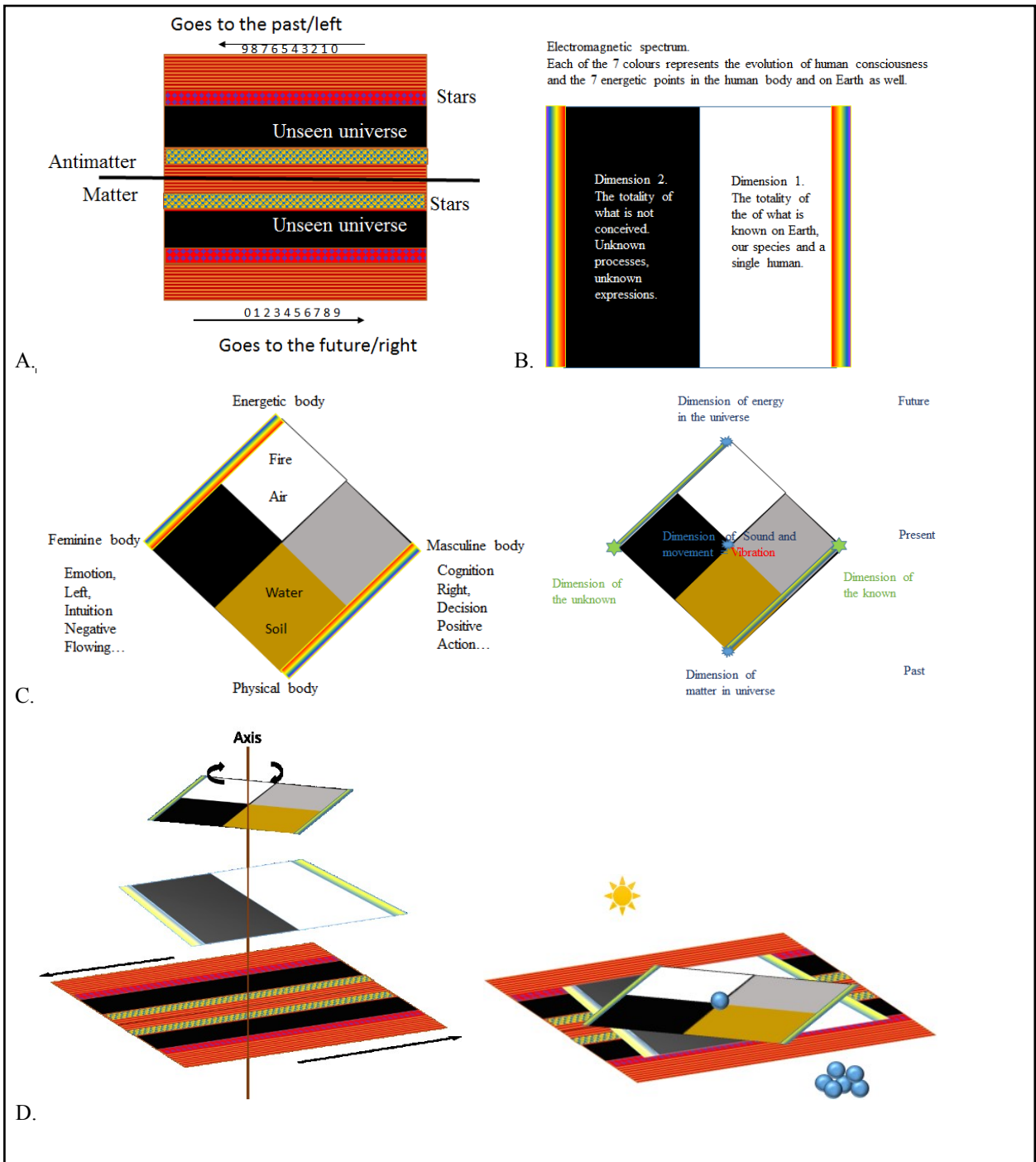


Figure 4.3 Quechua textiles representation of the states of physical space. **A. The universe blanket.** The patterns resemble a mirror image—identical but reversed. Up, is the antimatter, down is the matter. One *goes* right, the other one *goes* left. Dark is the unseen universe. The figures are the stars and life that grows. **B. The Earth blanket.** The opposite of dark and bright represent all dualities. One *is* right, the other *is* left. The textile is one whole. The rainbow colours show the electromagnetic spectrum. **C. The human blanket.** It shows the four dimensions of one whole. The human bodies are: Energetic, masculine, physical, feminine. It also has the electromagnetic spectrum. The blanket also represents the chakana points. **D. The blankets set up.** The three blankets should be placed on a flat surface wherein the energetic body is pointing the sun. Other elements (small gadgets) can be placed after.

Source: Own elaboration (based on Quechua textiles and Paucar 2014), 2018.

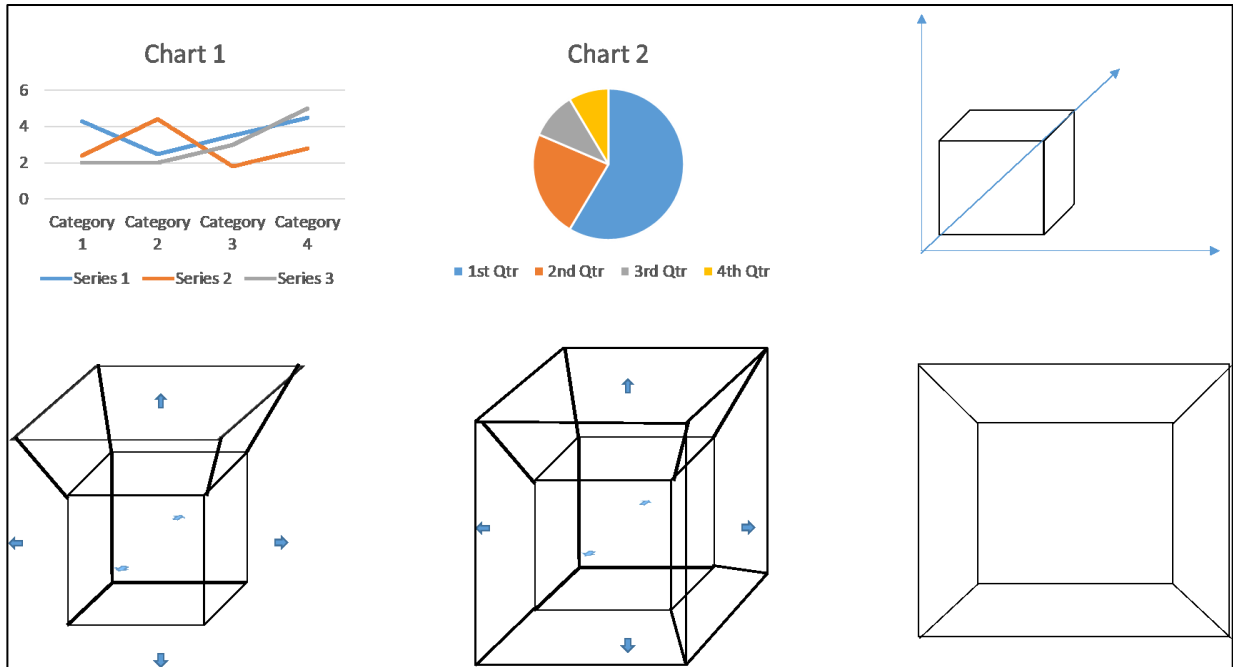


Figure 4.4 Geometrical representation of the fourth dimension.
 Source: Own Elaboration, 2018.

The concept of a fractal is helpful for a modern mind to understand these textiles, but we cannot say textiles are strictly fractals. I refer to this because at some point the young generation of Quechua people have referred to the textiles as fractals (“Manejo del Universo propio. By Nicolas Paucar 1.2” 2016). However, I prefer to keep the concept of *organized state* because fractal is more like a mechanism (the concept that Vernadsky discarded, see 2.3.2.2). Mathematicians can work better with the fractal concept. To my analysis, it is still abstract, and I reiterate that the geometry should be represented in the solid matter itself.

The original textiles are shown in **Image 10**. The textile for the universe has two pieces that are woven the same day. So both are happening at the same time, they will never be identical. Each piece points to the opposite direction, but they are joined together. The patterns show a mirror effect. Numbers from 0 to 9 should be imagined in each piece but in opposite directions; all three blankets, once they are set, will represent the nine dimensions according to the Quechua knowledge, although in a higher level of consciousness the dimensions are said to be “milliodimensional” (Rolando Paucar, pers.comm.). The Earth textile is one whole blanket that illustrates the numerous dualities expressed on Earth, which belong to the same thing, as two sides of a coin, the day and night, good and bad, yes and no, etcetera. The human blanket is also a whole blanket that has four bodies that are part of the same being. The representation of

this unity is important for health and equilibrium. There is a direction in this blanket that connects with the other blankets, and the direction represents the process of evolution.

Following **Figure 4.3**, there is clearly a small-scale representation of space that is in motion. What Reichele-Dolmatoff and Deloria explained becomes consistent with Quechua textiles in the sense that there is a space and flow of energy within the textile. Unfortunately, the language to talk about the meaning of the elements of this space is mixed with religious language.

I created a chart of equivalencies in section 4.1.1.3. (**Table 4.1**), which I use to help understand the representation. It is desirable that future studies free the Indigenous peoples' representation of the space state from this religious language. Meanwhile, the combination of both languages can be used now—because of the long tradition of the one (religious) and the urgency of the other (Indigenous)—for better communication during the process of integration.

This Quechua textile shows that Quechua people are aware of the physical state and physical field (electrical, magnetic, heat, gravitational, electromagnetic forces, visible, and invisible). It is not presented with the sharpness desired, but we cannot dismiss its potential for science. This comprehension of space has allowed Quechua people to live in harmony with nature. Also, this constitutes an opportunity to study the consciousness (see 2.1.2.4), the importance of which in the biosphere was emphasized by Vernadsky (see 2.3.2.2), and which is an urgent next step in science.

Now I can explain **Figure 4.5** which shows the compatibility I referred to at the beginning of 4.2.1 between Indigenous knowledge and scientific work when the cultural-biogeochemical energy is recognized.

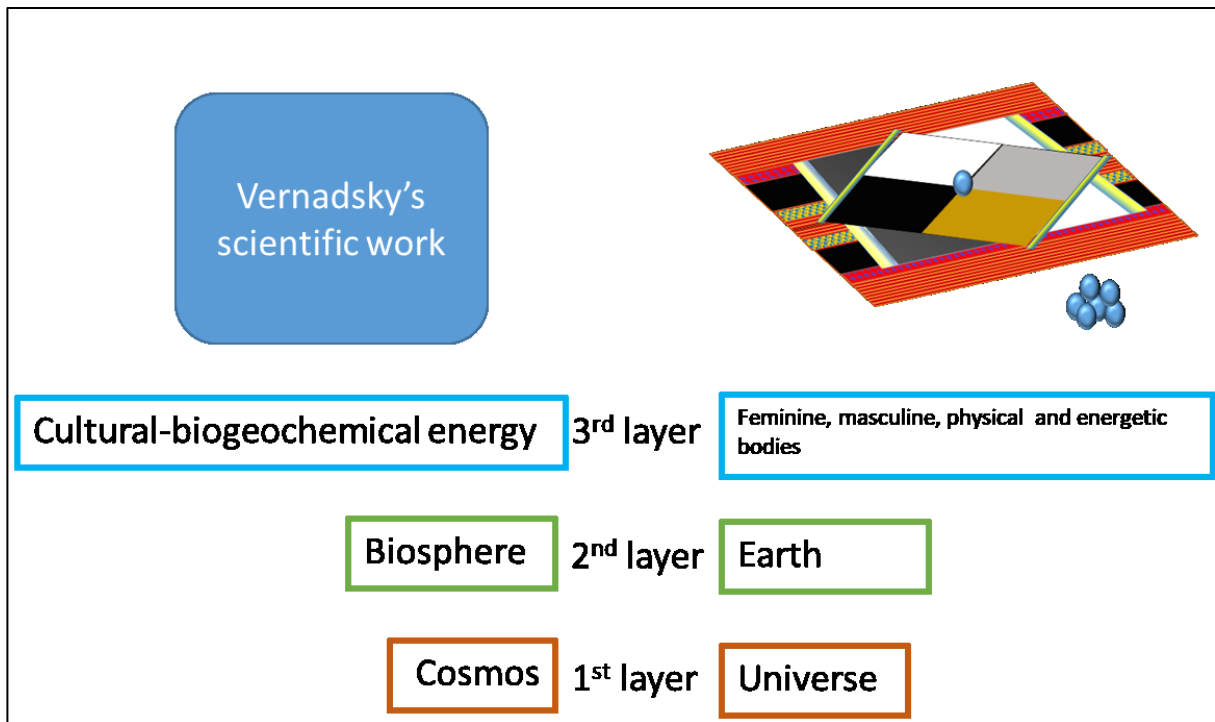


Figure 4.5 Compatibility between Indigenous knowledge (Quechua textiles) and the scientific concept of cultural-biogeochemical energy elaborated by Vernadsky.
Source: Own elaboration, 2018.

Here, there is a correspondence between the scientific concept of cultural-biogeochemical energy and the Indigenous geometric representation of space. For Vernadsky, the former is the next stage of the biosphere, which is more than how nature is defined by ecologists, naturalists, and biologists (see 2.3.2.2) it is in evolution and considers the universe's influence. The latter is not only the organized-state representation at a small scale for the purposes of grasping an understanding, but for interacting effectively with it.

Most of the time the shamans are the ones who use the blankets or other elements to represent the space that guides people and the community to experience the sacred in different activities, places, objects, and so on. I will mention some **sacred activities** below.

Agriculture. As analyzed in **Table 4.2**, the action of cultivation is more than raising crops. I reiterate that in Quechua tradition cultivation means to rear seeds as brothers, kiss them when they are sowed, dance to keep them happy, put them in certain places and not others because they will become part of us. For the complete process, the cycle of the Chakana is followed (the Chakana is observed in the human blanket). The carnival season when I was in

San José de Uchupiamonas was a time for dancing. They renew themselves and the land. Shamans performed “pagos”⁴³ in almost all chacos, which are places for growing crops.

The evangelization and the modern life could not eliminate those ceremonies. A villager told me, “I do not agree at all with these practices, but I am not going to lie, I do offerings to Earth and I call shamans to do that” (Group 1 Villager, pers.comm.). Among Tacana people it is known that the community requests the Ecuai (shaman) to put away the tree spirits to start “chacos” so the spirits do not haunt them (Quenevo n.d., 46). In San José de Uchupiamonas, to keep the Bibosi (*Ficuss spp*) during a burning clearance is a way to keep some energy in the area and the health of the place.

Temples. Reichele-Dolmatoff (1977, 219) explains “The temples are not permanent observatories, but they are positions of control of the sun that allow to verify at any moment, its movements, it is about to mark its progress and, if necessary, to correct it with invocations.” This is valid, for the temples in Cusco, Tiwanaku, and the lost “Loma Santa” in the Amazon area are sacred. Their locations are not a human decision, these places are energetic points. Quechua people have identified many places as a result of the seven colours of the electromagnetic spectrum (observe the blankets), and to walk through these is to walk a sacred path. In San José de Uchupiamonas there are places in the bush that are visited by the shamans and the community only for special ceremonies (Group 3 Personnel, pers.comm.). Tacana people build small altars they call “respeto,” which can be placed in the most special place in the house and always contain a representation for the four bio-inert natural bodies—soil, water, fire, and air. During my fieldwork I became aware of the importance of this place; from time to time people talk to it depending on the day and on what they need. Tuesdays were noticeable because people buy coca leaves, alcohol, and cigarettes to spend time during the night along with this place.

Pilgrimages. The alignment of the body with the geometry of the universe can be achieved by many means, not only using the blankets, but by making the representation at the human scale. Pilgrimages are a common practice for that. As Villoldo says (2016, 155), “a pilgrimage is more than a trek through the countryside; it’s also an inner journey.”

⁴³ Offerings to Pachamama with the arrangements of the space as the shaman arranges.

Walking is more than physical locomotion, and the non-physical body is also moving. Similarly, like in the case of temples, the body presents seven energetic points (observe the blankets). Indigenous pilgrimages are a way to put in order imbalances in the body and/or in the Earth layer.

Dreams. Dreams have always been important among Indigenous peoples, but it is only recently that they are being revalued in public Indigenous academic work. Marlene Bandt-Castellano sees revelations as sources of knowledge: “they comprise various sources, including ‘dreams, visions, cellular memory, and intuition’” (quoted in Kovach 2009, 57). In Western tradition, only S. Freud looked more deeply into the meaning of dreams for humans and allowed him to talk about the concept of the unconscious, which C. Jung, a psychiatrist, expressed at the group level as the collective unconscious and archetypes (myths are manifestations of fundamental organizing principles that exist within the cosmos, affecting lives). In Indigenous contexts, Indigenous peoples feel dreams as an important part in their lives, dreams are told from generation to generation; dreams are part of the unseen world and a manifestation of what people are doing in the visible environment—in other words, a dream is another corner of the state of space they move in. The fact that the dream is unseen does not mean that it is not real. Its potential existence is not in the present, but in the past or future. While living in San José de Uchupiamonas I observed that to ask about what people have dreamt the night before is common during the day, and discussing their dreams might result in guidance for people.

Personal life. Quechua people say that the more conscious one is of the space in which they interact, the more sacred it becomes. The awareness of our impacts on the biosphere increases. Some Indigenous groups have shown this comprehension to many researchers. Richelle-Dolmatoff (1977, 209) says “each individual is assigned with great personal responsibility for the functioning of the universe.” In McHarg’s 1969 book *Design with Nature*, it is explained that “all acts—birth and growth, procreating, eating and evacuating, hunting and gathering, making voyages and journeys—are sacramental” (quoted in Berkes 2012, 123).

If the consciousness is lost on all these activities, the relationship with Earth may become superstitions or mechanical actions. The retrieval of the Quechua knowledge implies considering a constant dialogue with Earth.

4.1.2.2 The duality in the representation of the organized state

As illustrated in the blankets, the right-handedness and left-handedness are well represented—Quechua people have a symmetry of life (**Figure 4.6**). The left-handedness and right-handedness is more visible in the earth and human layers because duality is a feature of the human condition, whereas in the universe layer, the right and left are directions. In the Earth blanket and the human blanket, the left side is the dimension of the unknown processes (e.g., migration of atoms), which Vernadsky called incomprehensible (2.3.2.4). Unknown and incomprehensible are close, but they are not equivalents. The unknown can be incomprehensible or comprehensible depending on certain circumstances. This knowledge of the unknown needs a personal experience to be understood in addition to its representation. In Indigenous peoples' lives, the unknown is not explained as a lesson but practiced in daily life.

The process of the unknown dimension is experienced by Quechua people in many ways, and one of them is the process of cultivation. For a seed to be cultivated it should always move toward the left—similar to proteins, which exhibit a left rotation. The seed starts on the right side, it is physical and it can be seen; then it is sowed in the soil (bottom) and the reason why it grows will happen on the unknown side. Then it will flourish and will be celebrated, and again the cycle will continue.

The details for this cultivation process (e.g., migration of atoms) requires more explanation, but for now the information about the blankets is to show that the geometrical representation of the symmetry of life, that is, right-handedness and left-handedness, has never been out of sight for Quechua people.

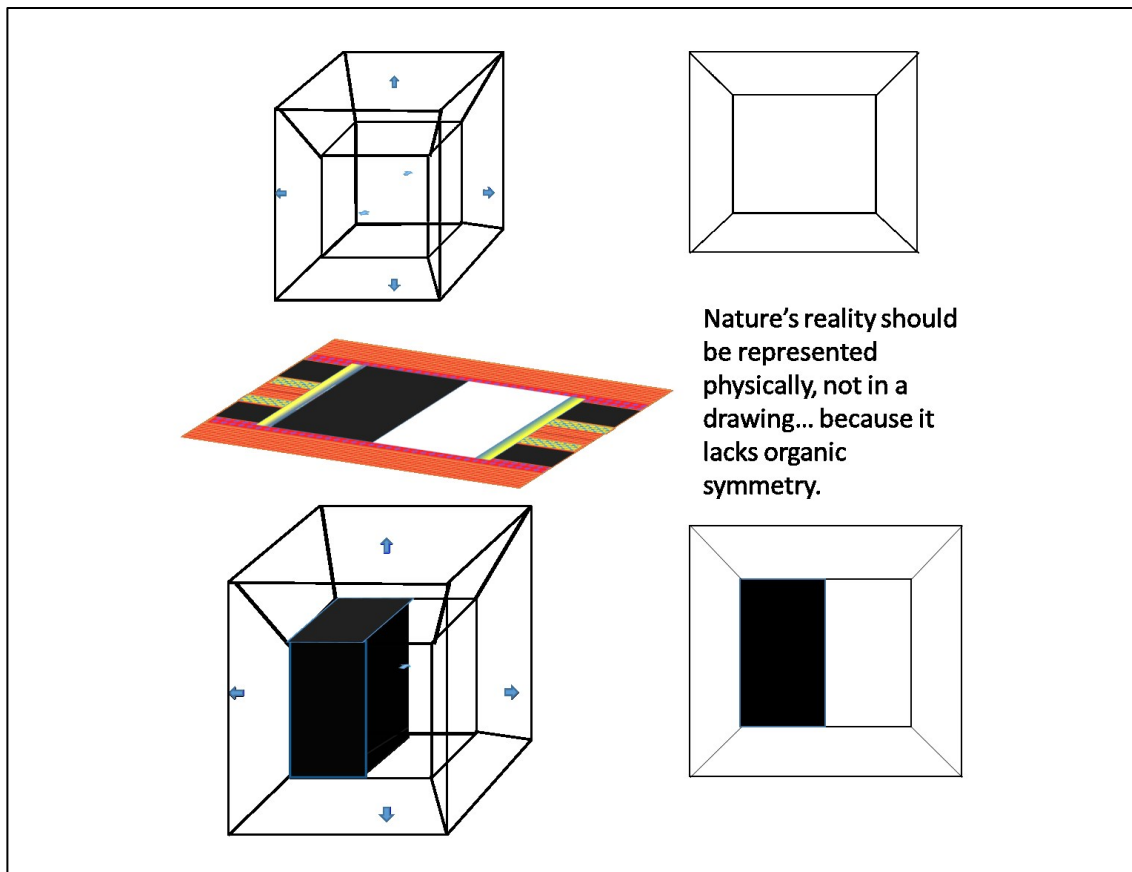


Figure 4.6 Symmetry of life in Quechua textiles.
Source: Own elaboration, 2018

I reviewed an example in another Indigenous nature. Regarding health in Gwich'in people⁴⁴ and their activity of picking berries, Parlee and Berkes (2005) explain that the nutritional and economic values have little to do with the idea of health as a relationship, but rather, people have the idea of relationship with the land as sacred. The berry harvesting implies that “the creator will take care of the community and the land” (134), and is also a connection of their “mental, emotional, physical and spiritual selves” (132). The authors also say that this multifaceted value “is difficult to discuss in academic terms of themes or measures” (134). Also, the four connections that Gwich'in people mention are consistent with the four dimensions represented in the Quechua human blanket: the mental and physical are the

⁴⁴ Athabaskan-speaking First Nations people of Canada and an Alaska Native people. They live in the northwestern part of North America, mostly above the Arctic Circle.

dimension of the known (right side) and the emotional and spiritual are the unknown (left side). If the four dimensions are in harmony, then health is possible.

I reiterate what I said in section 4.1.2.1: the correct geometrical representation of the symmetry of living bodies should be done in the solid; in that way, geometric representation of the material and energetic properties can be achieved. **Figure 4.3** shows my drawings for the three blankets, but this cannot represent the complexity of what is needed for a living organism's interaction and connection with its environment; the figures are just abstract drawings. I also propose that the original Quechua blankets are not the only way to represent the left-handedness and right-handedness of living organisms, but other objects can also serve to represent this if they are solid matter.

This solid arrangement is seen in temples, places of ceremony, textiles, and other places (see 4.1.2.1. sacred activities). In addition to creating the representation of space, Quechua people act as transformers of it. Lenkersdorf (2008) was close to this understanding of connections with nature with his "cosmoaudition" concept. Once the representation is well set (see "D" in Figure 4.3), it is recognized as a living space that the use of sound can modify because sound creates movement that can reach all levels of the organized state. I did observe this process in terms of vibration, but I will explain it from the use of sound, one of its components, because sound is easier to understand.

4.1.2.3 The use of sound.

Quechua people not only describe sound, but they also operate with it. The sound is the certainty of motion (which together forms the vibration). This use of sound is necessary in order to put in motion the elements (represented by small gadgets) in it (see "D" in Figure 4.3) and allow the modification of the state of space. That is why singing, praying, and thanking are actions displayed in the physical space. The sound is real, it is an action, it is not a thought, it is not a belief. Quechua people work with energies in their geometrical representation of space or in the state of space itself. They are not adoring, not worshipping, as has been misunderstood many times even by themselves (for example, young generations in contact with modern world). Quechua people express love in those activities related with sound, but love is not a matter of science. However, the word love can be analyzed differently. If we look at the four bodies in the human blanket (see picture "C" in Figure 4.3), the energetic body corresponds to fire and air, and Indigenous peoples also express fire as both love and as a real force of transformation, so it is

possible to think that the action of love can modify the sound. The analysis of Vernadsky regarding the problem of thought as not a form of energy, but observable in its “empirical results” (Vernadsky 2005b, 20) (see 2.3.2.2.), makes it possible to propose the observation of the “empirical results” of love in the environment. I see that the concept of bio-inert body that is applicable to soil and water (see 4.1.1.2) can also be applied to air and fire, which needs studying with respect to human bodies.

There are limits for the audible sounds, and all sound effects on matter and living matter cannot be seen; however, it is possible for our vision to see its impact on water bodies in the form of waves. Because our body is about 65% water, sounds have a great impact on us. Quechua people are familiar with inaudible sounds in addition to audible sounds. So they hear, and also try to be receptive to, the motion that is the vibration, which is not obvious for our senses; it can come from the external or from the internal of living and non-living bodies. In other words, a conscious human can produce and detect vibration from the outside or from the inner dimension, and even further produce a deliberate resonance. Vibration is life itself and paramount for effective communication with the environment. I will refer to an important example, which is the talking with animals that does not refer strictly to a dialogue using a language with symbols, but a dialogue between vibrations.

Talking with animals and learning from animals is common among Indigenous groups. Sound allows real connections that go further than mere observation of nature. Because of these connections, the participants (speaker and listener) are in tune with the laws of nature, in the Indigenous view of nature we can say that the result of connections is respect. In other words, the respect for animals reflects connections based on sound and the perception of the vibrations. Talking with animals has empirical results in nature. A Quechua shaman explains: “A pack of llamas comes to meet humans when people need them, no violence is necessary if we talk with love to the herd, the herd allows us to sacrifice one of their members” (Rolando Paucar, pers.comm.). Modern science does observe animal behaviour and decides which individual is the leader, when is the time of breeding, births, tendencies of migration, etcetera. These observations result in information used for management, but these results are only descriptive. If we follow the previous criteria of talking with animals, then the communication is missing in most of the methodology of animal behaviour science. To say that there is the need to respect animals is equivalent to say that there should be consciousness of the vibrations and behaviour of the

animals. Depending on the connection, animals would act differently each time. Many people are reproducing studies following a methodology that does not consider that connection, therefore the results seem to have similar patterns. If each scientist changed the how and why they are observing animals, the results would change because the use of the inner sound may cause that. Studies by external researchers have been able to notice this in Indigenous peoples' interactions with animals and plants. I will briefly mention some studies by non-indigenous researchers.

Berkes (2012, 148) describes the availability of fish if they are treated with respect; Colorado (1988, 52) notes that "to see a native speaking with a tree does not carry the message of mental insanity. On the contrary, this is a scientist engaged in research." Villoldo (2016, 24) describes the dialogue with plants or animals: "Indigenous peoples who are carrying on the tradition of respectful dialogue with nature will tell you that they know the qualities of plants not through trial and error [in agreement with the classic scientific method] but because plants speak to them." Among Tlinglit⁴⁵ they say "The Great Spirit put us here with nature. We have to understand the nature. This is why we understand how an animal behaves. This is way we have to talk to them. We don't pray to them" (Colorado 1988, 51). Kassam (2010, 76) says: "In essence, hunter-gather knowledge is dependent on an intimate physical connection with the world and the creatures that live in it." A woman in a documentary says that "when Inuit talk to the environment, we are one" ("Inuit Knowledge and Climate Change" 2015, 20:20). The talking with animals or plants is talking with nature.

In classical management, the monitoring is critical. Indigenous peoples undertake monitoring for reasons related to survival (not conservation), and researchers may find some indicators, which match with the conventional scientific management, interesting and useful. For example, fat content is an indicator of wealth (Berkes 2012, 144) but to recognize it just as a separate indicator is not to understand the whole. Only fat? Peoples' vibration and communication are, again, taken out. Fat and grease have stories in Indigenous peoples' cultures, but it is never only about fat (Flores 2005; Cruikshank 2005). With respect to having "bits" of knowledge that have been under revision before, Bielawski (2003, 323) says that one of the impediments to recognize and utilize Indigenous knowledge is "the problem of extracting empirical bits of Indigenous knowledge and attempting to fit them into western scientific

⁴⁵ Indigenous people from Alaska, British Columbia, and Yukon.

categories.” In saying this, the idea is not to stop the analysis of these useful indicators, but to consider that they are incomplete for environmental management.

Talking to animals has far more implications than observing, monitoring, or applying experiments on animals in enclosed laboratories with limited variables (see 4.1.1.6). This act of “talking” is the science of motion and sound in the environment—it can impact the biosphere at large scales. In the words of Vernadsky, it can act as a geological force to shape the biosphere.

Another example of this understanding of motion and sound is its application to plants. The use of some plants for medicine is well recognized in Indigenous contexts. Here just the consumption has benefits at a chemical level, but without the consciousness of ingesting the plant, the effects may not be the same. In other words, not being conscious of the generation of sound (talking to the plant) will result in an incomplete benefit, insufficient. Or similarly, if one is conscious of the purpose of consumption, this will enhance the benefits. A villager in San José de Uchupiamonas told me once that people eat too much meat; this villager eats little meat, but his nutrition comes from his mind (Group 1 Villager, pers.comm.).

The motion and the sound (vibration) occur in the right moment of the action. The result will not be the same for everyone. This is something that current mainstream science barely considers.

To perceive the sound of the biosphere at a larger scale is not rare among Indigenous peoples who have practiced their entire life. Paucar (2014), a world-renowned shaman “listens” to the electricity and explains that the velocity of Earth has changed and the time feels faster. Similar approaches to what is happening in the biosphere are described in the Canadian Arctic where elders say the Earth is faster now: “perhaps the Earth has tilted on its axis” (“Inuit Knowledge and Climate Change” 2015).

4.1.2.4 The power of the shamans as a geological force

As described in section 2.2.1.3, shamans have diverse roles and people recognize the scope of their work. Berkes (2012, 204) notes that “the shaman is not only a healer of the individual illness but an ecosystem doctor.” The individual’s body will be treated in many dimensions, I find an analogy of the human body with the electron. A human has a physical body, as an electron has a *particle state*, and a human has a luminous energy field (bioelectromagnetic field) as an electron has a *wave state*. Quechua shamans are aware of these two bodies (see picture “C” in Figure 4.3) and can manage the vibration for both and reprogram

them. For instance, energies have different manifestations and one of them is the emotions (Villoldo 2016, 94). The emotions are manifested in the water, according to the Quechua textiles. These emotions can be trapped in the past or in the future, so the shamans provide the space in which the person can arrange and heal the emotions and therefore the illness. It is common among Quechua people to perform ceremonies of healing in the mountains where the three forms of water are found (ice, liquid, vapour). So the adjective of “sacred” mountain is justified by the powerful energetic properties of the place, and this, in addition to other manifestations of the energy (sunlight, pressure, etcetera), allows shamans to fix the inner water of a person.

Tacana people historically had connections with the ancestors of the Quechua peoples, the Incas (Hohenthal 2009). Therefore, Tacana shamans shared the cultural symbols of the Quechua peoples. It is reported that Tacana communities, of around 100 and 300 members, were headed by an *ecuai* and shaman (Ponz, Carpio, and Meo 2005, 31).

During my fieldwork, I observed that ninety-nine percent of the people in San José de Uchupiamonas rely on the shamans for health issues. The three shamans of the Tacana-Quechua peoples performed, or explained to me, what they do. One of them showed me the way he organizes his workplace (**Picture 13**) and the geometrical representation of the states of space, in small-scale, for the process of healing. He does not have the original Quechua blankets, but the arrangements follow the same representation of the four bio-inert natural bodies, the water, the soil, the air, and the fire. He also uses three coca leaves resembling the three points in the human blanket. To produce sound, he pronounces many phrases and makes noises with his mouth in different directions. The other shaman explained to me that he is not the one who has power, he just presents the problem to the unknown energies that he calls “The God that is up.” He showed me the plants he uses in the forest, which can cure venomous snake bites immediately if used properly. The last shaman said that people have forgotten about the ways to act in tune with nature, “if they just can remember that, nothing can be impossible.” But he knows “that is the way it should be, people should re-learn.”

The most important role a Quechua shaman is credited with, is to have a power to control balance in the environment. Villoldo (2016, 9) explains that as an ecosystem doctor “The shaman is the master of the [invisible] world. He lives with one foot in the world of matter and one foot in the world of spirit.” During my fieldwork, I noticed that the shaman is required

to go where the crops are wherein a familiar ceremony is performed for the harvest to be good (see Agriculture 113). In the past, this ceremony was in the interest of the collective (group); a villager told me that one day the people requested the shaman to get rid of the wild pigs that were eating the crops. That time, people did not realize that two types of wild pigs were living in the surroundings. The shaman's ceremony was effective, and people were happy that the wild pig stopped eating crops; but soon after, they noticed that the other wild pig, which they used to hunt, also disappeared. The villager said he wished the shaman was alive to revert that but that he had passed away (Group 1 Villager, pers.comm.) That shaman was the last wise Tacana in San José de Uchupiamonas (Group 3 Personnel, pers.comm.). Many other people told me about that shaman and his seven stones that he used to have in order to care for the environment, but no one else was able to manage those stones (Group 3 Personnel, pers.comm). People also told me that if they had not seen him moving the rain, the harvest, the rivers, the animals, they could not have given credit to one single person for doing that, but he did.

For generations, Indigenous people in the Andes-Amazon area have relied on the power of the shamans to connect with Earth and modify nature's behaviour. The loss of the knowledge, the loss of the shamans, is in process. However, the prophecies (read evolution, instead) are in process too. The shamans have come to know that the time for integration has arrived, the Earth needs more people aware of their own impacts in all dimensions of their existence. So, with that purpose, many shamans are performing ceremonies in many parts of the Earth and teaching their knowledges.

Indigenous peoples know, through the prophecies, that shamans may disappear and others should take the responsibility. Communities have discussed this in the past: "Responsibility for the care of the territory does not fall exclusively to the shaman. Each person in the group must behave according to the prescriptions. To maintain a balance of energy, each family must regulate its diet and social behavior" (Gray, Parellada, and Newing 1998, 112). Shamans do not want to be the mythical magician. They want each person in the world to heal themselves. Paucar (2014, 71-72) says that "Anyone can produce their own neurochemicals to heal, so metaphorically we can say everyone is a shaman."

At the same time, not many years ago European-minded people were not only describing shamans' work but they were also becoming shamans themselves in terms of communication with nature (Alonso del Rio 2016; Villoldo 2015). This may help people who

have no background on the type of work shamans do, to start to approach them in their own languages and contexts.

In the words of Vernadsky (2001, 22-3), every single individual is a geological force:

The human personality changes, accelerates, and causes geological processes of enormous significance ... Man, through his labor and his conscious relationship to life is transforming the envelope of the Earth ... a single individual unit of living matter, out of the totality of humanity – a great personality, whether a scientist, an investor or a statesman – can manifest himself as geological force. (Vernadsky 2001, 22-3).

Can this, humans as geological power, be under the agenda of scientific research?

4.2 Management Principles

4.2.1 Arguments and legislation

At the beginning, when I was drafting ideas for a management plan, I had thought of designing a management model with the necessary technical criteria to make it appropriate for the community where I conducted my fieldwork.

I reviewed the Adaptive Management model because of its emphasis in building a bridge between science and practice. Bridging this gap was the original emphasis of Holling in 1978 (Allen and Ahjond 2015, 3); however, the model went backwards and the gap between science and practice got wider when some researchers, in an attempt to reduce uncertainty in the management of natural resources, focused on mathematical approaches (De Lara and Doyen, 2008) to try and achieve a perfect science. Then another model, adaptive *co*-management, appeared in order to amend the variants of its original approach (Armitage, Berkes, and Doubleday 2007; Bouvier et al. 2009); adaptive *co*-management included a reality that was not considered in the previous approach: people.

Those variants were indicators of a continuum of feedback that would not offer a management model for the Indigenous territory I decided to work with.

Also, I reviewed experiences that aimed to understand the Indigenous view of nature in South America. In 1997 the International Work Group for Indigenous Affairs (IWGIA) held a gathering of Indigenous peoples from Peru, Bolivia, Ecuador, Brazil, Venezuela, Paraguay, Panama, Colombia, Costa Rica, and other countries, who were attending, for the first time, an international debate on the “new” model. I chose this event from among those sponsored by the UN because it was an earlier attempt of NGOs to hear from Indigenous peoples in their local

area in South America. The Indigenous peoples shared their knowledge and showed their willingness to participate. In that gathering, Indigenous peoples concluded that the elders, who are connected with the spirits of the forest, of the river, of the animals and birds, “should approve” the structure of the management system, but the conventional perspective remained in the conclusion of the gathering’s report, which states: “The communities involved must set up a system for the administration of the communal reserve ... [including] traditional systems of consultation and decision-making within the Indigenous communities. Therefore, it should have an executive body (management committee).” On the one hand, this report claims to respect traditional systems; on the other hand, it sets out practices that are not in accordance with the Indigenous view of administration. While for society it is common sense to conceptualize that “an executive body or the management committee” means a group of persons, for Indigenous peoples this does not mean the same—it is not about persons only, it includes the complete environment as participant as well. That is why critiques arise regarding the NGOs’ abilities to understand Indigenous peoples’ own views.

Since I did the fieldwork, and experienced and analyzed the Indigenous knowledge in terms of Vernadsky’s work, i.e., as a cultural-biogeochemical energy, I see clearly there is no possible model if the roots of Indigenous knowledge are not understood and accepted in all levels of decision making. For this to happen, first there should be a change in the conception of nature and in the structure of the administration, which are anchored in an incomplete knowledge and are blind to the scientific progress and blind to the potential evolution of humanity.

It is a special case that in the last decade the Bolivian legislation regarding the environment has changed towards the Indigenous view of nature (**Table 2.2**) (Law 071, Rights of Mother Earth; Law 300, Framework Law of Mother Earth and Integral Development for Living Well; and Law 459, Ancestral Traditional Bolivian Medicine. Material and spiritual resources for the prevention and cure of diseases, respecting the harmonious relationship between people, families, and community with nature cosmos.) However, the previous regulations and ordinances are not in tune with these laws, and as a result there are many types of management plans that differ and contradict each other in application. In San José de Uchupiamonas there are five types of plans (see section 3.3.3). The new laws are an opportunity in history to integrate Indigenous knowledge in all levels of decision making. Specific supports

for this are written explicitly: “The purpose of this law is ... restore and strengthen the local and ancestral knowledge, within the framework of the complementary of rights, obligation and duties; as well as the objectives of the integral development as means to achieve the Living Well, the basis for the planning, governance and investment and the strategic institutional framework for its implementation” (Bolivian Plurinational Legislative Assembly 2012, Law 300, Art.1), wherein Living Well is “a civilizational and cultural alternative to capitalism based on the Indigenous worldview” (Bolivian Plurinational Legislative Assembly 2012, Law 300, Art.5). In addition, the cultural systems are considered part of Mother Earth and are under public policies protection (Bolivian Plurinational Legislative Assembly 2010, Law 071 Art. 8).

Following my analysis and given the current legislation in Bolivia, I designed a framework of management, and created a model for the organization of studying knowledge areas and academic disciplines in which I place principles in accordance with the Indigenous view of nature, all of them in order to provide the basis to fulfill my proposed objective.

4.2.2 Objective

To propose management principles and design its framework based on Indigenous knowledge to reach the point of integration of Indigenous peoples with modern world peoples and vice-versa.

For that to happen, Tacana-Quechua people need to stop being considered inferior, poor. They can offer knowledge with scientific potential for the benefit of all, but they also need tools of the modern world (transportation, university, facilities, telecommunications, safety, and so on) to balance the inequalities that the colonial period brought. At the same time, people in the modern world can learn from Indigenous peoples to integrate themselves consciously with the Earth (reconnecting with the elements, having open and broader perspectives, knowing a holistic medicine, and so on).

For this objective, be aware that integration means integration *between* not integration *into*. Integration is not assimilation of Indigenous knowledge into established schools, politics, governance, rights; it necessarily implies transformation on both sides. The Tacana-Quechua people’s practices, including the use of sound in ceremonies, should be accepted in modern institutions related with the national park (i.e., Ministries, SERNAP, WCS, Municipality, NGOs, banks and others).

4.2.3 The framework of the roots

One of the earliest Indigenous management models was the case of Kuna Yala, which was the first Latin American experience of managing a protected area ruled only by Indigenous peoples. The model caused great expectation, but it failed to be implemented (Gray, Parellada, and Newing 1998; Roeder 1995). Why? It was said that the mechanisms of receiving funds, controlling expenditures, making decisions, and allocating responsibilities were not clear nor effective. Is it that the untrained staff did not fit into the traditional administration? Or that the Indigenous peoples went into a process of “turning white”? The institution created in Kuna Yala began to close its doors, turning its eyes inwards, blinded by the outside world, trying to show a facade of illusory well-being. It was evident that the elders knew more than the technical team, elders did not need classes on the forest or to learn the concepts of words like “biodiversity” and “conservation.” The technical team claimed to combine the best of Western science with the best of traditional knowledge to grow small clearings that were left unattended and were absorbed by the forest, and they tried to make an arboretum that ended with a collection of unmarked trees surrounded by a brush cut, which was soon abandoned. A book was published gathering stories of the elders who reflect the Indigenous sentiment detaching from the project. Here is a phrase from an old woman: “Without money they cannot move, they cannot eat, they cannot drink, they cannot sleep. For this reason, they are destroying the natural world with respect to the future of their children. They take no notice of the damage that they are doing. I maintain, therefore, that money makes people poor, that it creates hunger” (Roeder 1995, 52). Even though Indigenous peoples were participants, the project was in essence molded in the large traditional way of Western administration. There were hard critiques on the incompetence of Indigenous peoples, it was not considered that Indigenous peoples do not learn in a flash of time what took centuries of organization for other cultures.

To my point of view, this Indigenous management model was arranged in the “branches.” Branches refer to the land tenure system, hunting, fishing, social institutions, regulations (sanctions), zoning, tourism, monitoring, animal behaviour, etcetera. These management activities concentrate the most on production and commercial activities. For this reason, I decided to develop a different management framework, based in the “roots”—which does not mean the branches are not important. **Figure 4.7** illustrates my approach.

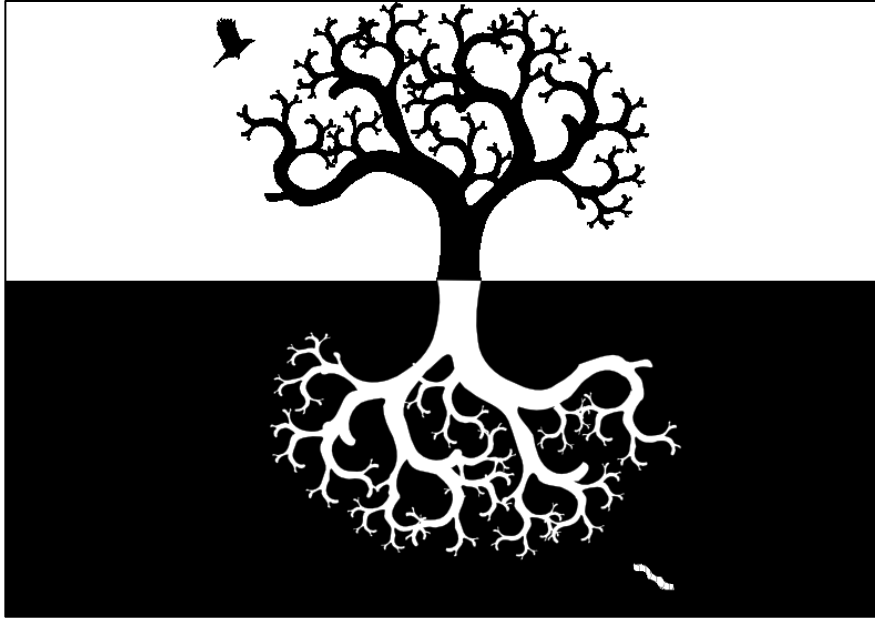


Figure 4.7 Elements of the management framework starting in the “roots.” They reach each branch, leaf, and other parts related to the tree.

Source: Modified picture <https://axispraxis.wordpress.com/2012/09/26/metaphor-the-alchemy-of-thought/>, 2017

Roots refer to ancestral practices, health, wealth, living beings, ceremonies, talking with animals and plants, etcetera. These activities help people and nature for holistic well-being.

The picture is based in the two dimensions of the textiles, which refer to the left-handedness and right-handedness. The organic symmetry should be applied to the planning of the Indigenous territory and the planning of the park.

4.2.4 The terminology

To talk about roots, we should care about the terminology to be used. I observe two thoughts for discussion. The Indigenous terminology proper for the context, and the terminology used in traditional wildland management.

First, Indigenous knowledge does not refer to monopolies, politics, or power; it is not interested in a dominant common language. Scholar Kovach (2009) states that “having a common language, however, has not served to increase cultural understanding. Rather it has put Indigenous culture at risk” (24). In Indigenous encounters, different language is celebrated. For instance, Pachamama, Tonantzin, Wakan Tanka, Mother Earth, and Gaia refer to the same thing. Among Indigenous peoples there is no debate about which is a better term or the best concept or which one should be used. These names have existed for millennia, and enrich

cultures and create bonds between Indigenous peoples. The same happens with other entities such as the sun, which is called Taita Inti, Wirachocha, Thunupa.

Because Indigenous peoples are in relation with nature, they are more likely to use words like ecosystem, food chain, biosphere, dimension, space, neurochemicals, and other terminology in geology, chemistry, physics, and geometry. I call them *biowords or biogeochemical words* because they can explain biosphere functions and act as a bridge between science and Indigenous knowledges. They can be used in the management framework.

Indigenous peoples have historically had the ability to name things because they could perceive their qualities, they could communicate with the environment. Currently that ability is being lost. Kovach (2009,12) states that “colonial history has disrupted the ability of Indigenous peoples to uphold knowledges by cultural methodologies ... the organic transmission was interrupted.” For instance, the native potato name in Quechua language is the result of thousands of years of observation, it carries all of its energy and story (Rolando Paucar, pers.comm.). In my fieldwork, I notice that all people have nicknames in addition to their given name, and these nicknames match with the personalities, attitudes, or behaviour they have. “The act of naming is upheld in many tribal traditions. Naming gives purpose and offers grounding” (Kovach 2009, 176).

However, and secondly, some words in the international context have tried to become the best language, the common language. For instance, hunting and fishing became “wildlife management” and the way of life of Indigenous peoples became “sustainable” so it is no longer spiritual (Zinsser 1994,44). The most important thing in the language of Indigenous peoples is not the concept, but the essence (that is the vibration), the practice of the individual gives shape to the meaning. Based on these language understandings, I propose to avoid some words in the coming management framework.

Wild/Wilderness. Although the meaning is correct in many aspects, such as living in a state of nature, not ordinarily tame or domesticated, and growing or producing without human aid or care (*Merriam Webster Online* 2017), and despite the discussion over modern and urban perceptions of the concept itself (Berkes 2012, 249), this word has such a strong negative connotation in South America, especially in the Amazon area where it is discussed (Fontaine 2007, 202-3; García and Sala 1998, 111; Rivera 2010, 26-7; Espinoza de Rivero 2009; Córdoba and Richard 2015, 94). Only history can change it. However, Quechua peoples have a word for

a similar meaning: Virgin, pure, with different uses as well. Some places should remain pure, due to their energy on Earth, they provide medicine (lakes, mountains, streams, sacred fire). Some places are virgin because they cannot be touched by shoes, only bare feet (food storage locations, places of ceremony).

Ecological. This adjective has been corrupted. Politics, social media, schools, and markets have not been clear about it and it has provoked a misunderstanding. There is literature regarding "other views of ecology," "types of ecology," "cultural ecology," "ecology as a myth," "human ecology," "deep ecology," "ecopsychology" (Boff 1988; Berkes 2012, xvii; Kassam 2010; Hataway 2016, 8). Ecological problems may elicit fear and cause denial, repression, myopia, and paralysis (Hathaway 2016). On the one hand, maybe the word ecology is incomplete because scientific ecology is missing the personal and spiritual elements. On the other hand, disciplines related to personal elements also have critiques; for example, scientists of human ecology may argue that this "discipline [human ecology] seeks to understand and manage wisely the complex problems of the planet of which humans are part (Strauss), the critique is that it is not related with chemistry and physics, geometry, atomics, genetics according to their current scholars" (Kassam 2010, 26). Human ecology studies the culture and social structure impacts for "social change" (Kassam 2010, 48), not the biosphere changes as a whole. The division of culture–nature is again manifested in both remarks.

This word ecologic, which is an adjective, is sometimes taken as if it were ecology, but even the word ecology carries some suggestion of discrimination of Indigenous peoples. For my proposal, instead of ecology I suggest using the term "biospherology," proposed by Vernadsky, because it includes the human personality. The word is grounded in science and sets a terrain for understanding in contrast to the multiple options for interpretation of the category ecology. Additionally, this word offers the opportunity of integration that Vernadsky advanced.

4.2.5 Principles /Methodology

I agree with the Indigenous scholar Kovach (2009) who observes there are methodologies that support Indigenous methodologies. According to her, they might even be in alliance with Indigenous methodologies, but they are still not, in the words of Kathy Absolon, "based in spirit and where spirit comes from" (Kovach 2009, 152). Something that is important in my research is to transform the way people are trying to understand Indigenous knowledge

and offer a view into the Indigenous representation of the state of space in human scale (see 4.1.2.1). A methodology that considers ceremonies as decision-making tools would make no sense if people in the administration do not experience and understand in advance—for example, a healing treatment in a ceremony. So, before the methodology is applied, one should learn one’s own responses, capabilities, and abilities; one should learn other knowledges. Villoldo (2016, 96) says that “the more we rely exclusively on one way of knowing, the more likely we are to operate from biases we are not even aware of.” This is a large process that institutions of education should reframe and review their curricula (see 2.1.2.5); they have historically been oriented toward teaching partial subjects, which tends to close doors for other subjects or topics.

As explained in chapter 2, the way we organize subjects or academic disciplines in all educational institutions is based on the classic scientific-body organization (**Figure 4.8**). This type of knowledge organization has never surpassed its limitations; the highest in complexity is the transdisciplinary approach, which is not yet implemented or conceived in many institutions of education in any area (research, health, law, and others). To me, the transdisciplinary approach makes the effort to overcome the previous hierarchical approaches of single disciplinary approaches, or even such as multidisciplinary and interdisciplinary approaches, which damaged the topics of the minorities in a subtle way. Natural sciences are at the top of the pyramid, in this case natural sciences with math, physics, and so on, and the human and social sciences are at the bottom. The arts, dance, and so on are only considered for entertainment. The approach of transdisciplinarity broke those hierarchies and made math, dance, biology, etcetera, equivalent. That type of organization is of tremendous importance for the development of humans and it is currently being implemented in cutting-edge institutions. However, in doing that, the transdisciplinary approach created illusory equalities between the subjects. The hierarchical order of subject areas and disciplines should still exist. I propose a model in which hierarchies are not written in advance, they will get their place in the context and time for what they are important. The enrichment does not mean accumulation of all other subjects, but the ones that are necessary for a certain period of time. Then I find that transdisciplinary, same as the other models, cannot include the “unknown,” which is a reality of the processes of life (see 2.3.2.4 and 4.1.2.2).

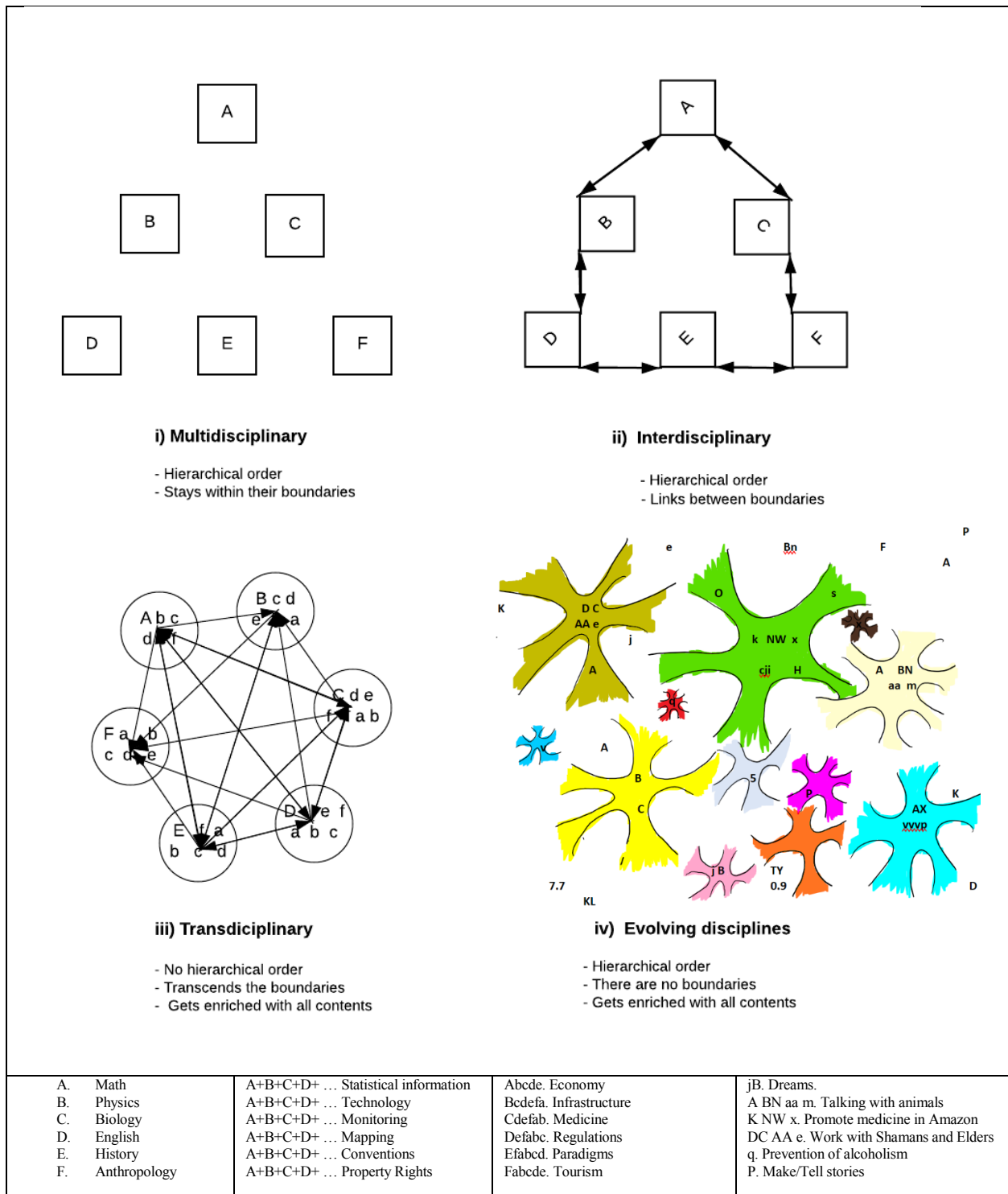


Figure 4.8 Organization of knowledge areas and their potential for integration II (plays a role as the learning methodology of the society).

Source: Own elaboration, 2017.

I designed this organization, which is in accordance with the geometric representation of space of Quechua people and their use of sound.

I use this organization to set out the principles and methodologies that act as subject areas or, better said, as guides. They are never complete, nor exact, and need revision by the people living in the Indigenous town of San José de Uchupiamonas who may want to strengthen one or another that they already practice, or to start the retrieval and revitalization of others.

- *Talk to the Earth*

This is the first talking, the first use of sound. “Here I am” is a talking aloud phrase that will vibrate in the place you live in or the place you go. Otherwise, you do not exist in relation to the Earth; this is a way to make oneself present in it (see 4.1.2.3). The “kiwhirakui” practice in the jungle is common among Indigenous peoples in San José de Uchupiamonas, but it is in risk of being lost. The proper revitalization of it would bring the benefit of identity to young generations.

- *Respect in actions*

Respect gives the opportunity to act according to the forces of the physical space and to be aware of what one is doing and the results of each act.

Respect of the living things are the connections with living and non-living organisms.

Respect does not occur for written rules, which divide good and bad. Here it means to respect the harmony of yourself and the environment; i.e., to respect your body, your energy, your interactions with food, with people, elements, and species in the right moment of the action (**Table 4.2**) (see 4.1.2.3).

- *Know that people conscious of the land can decide over their land*

Not only the biologist, the economist, or the politician should decide just because they have hierarchical positions (see 2.1.2.1). The experts should recognize the limitations of their expertise with respect to the knowledge of Indigenous peoples’ life on the land. For decision makers to consult Indigenous peoples is to usurp the role of the decision maker. Indigenous representatives should never lose awareness of the processes of nature in real life, so they decide what is right (see own life in 4.1.2.1). For example, Indigenous women are more aware of a pig’s need and are constantly confronting men in administrative roles so the pigs have space and happiness. Elders understand better the

forest, the river, animals, and so on. No decision should be taken without them, and the wisdom should be acknowledged in the community and external institutions. This is also local knowledge. Local knowledge is supported by movements such as citizen science and participatory action research that recognize its contributions, as well as the deep ecology movement. All of these can benefit from our overcoming the dichotomy between nature and culture (see 4.1.1.5).

This should not be confused with the elaborated meaning of self-government, which has political controversies (see 2.1.1).

- *Embrace all perspectives in the use of maps in Indigenous territories*

The analysis of the condition of current Indigenous territories is important to rely more on local demarcation. Maps may promote ancestral connections. Keep the names of the land. Today oral descriptions are told in the community and are required to recover the old trails, places that were important for the community (see 2.1.2.5 and 2.1.2.6).

- *Receive guidance from elders and shamans in all levels of representation*

In addition to the political territorial representation, the community should encourage the representation used for their ancestors. It is true that today some people may not agree (see 2.2.1.3), but the Tacana people were guided by the Ecuai and shaman (Hohenthal 2009; Quenevo n.d), and the recovery of this authority is very important for the health of the community (see 4.1.2.4). Currently the representation is from the colonial period mixed with modern institutions (**Table 3.1**).

- *Learn the meaning of local names in accordance with the view of nature of the place*

No terminology should be forced in the future management plans of the community (see 2.1.2.3). The richness of the Indigenous people's own words (see 4.2.4) gives meaning to any purpose and unveiling the meaning behind the medieval religious language may help to better understand their view of nature (see 4.1.1.3).

- *Be aware of the proper use of cultural symbols*

Dreams, ceremonies, fasting, dancing, playing instruments, singing, pilgrimages, and so on (see sacred activities in 4.1.2.1) should be respected in their protocols; the rules are coming from the natural world, not only from humans as reflected in old cultural symbols (see 4.1.1.5). People gathering together again as a part of the park management and Indigenous territory activities will help them to recover the knowledge that is being

forgotten and help them to recognize the improper use of the Earth energies, which is happening due to the many factors (see political work in 2.1.3) that are changing Indigenous socio-economic values.

- *Tell, recover stories*

A way to learn and to remember Indigenous knowledge is to reintroduce the telling of stories in communal meetings. Also, people in the community should teach non-Indigenous visitors about local stories since they need to learn too (see 4.1.1.1). There are stories from elders about animals and plants; stories about the migration of people from Apolo and Tumupasa; stories of adventurers who arrived to the community; stories about the city of gold; stories of the beginnings of their internal organization (town board, etc.); stories of ceremonies in the forest with animals; stories of tragedies and disappearances in the wild; stories of the road life; stories of hunting and fishing; stories of medicine and treatments; stories of traditional connections with Incas; and so on. (I was lucky to listen as much as it was possible, and the stories are an incredible way to open perspectives!) (see 3.2.3.3; Table 3.5, Table 3.6; see the women's council in Table 3.1)

Another way to help in the revival of the stories is to request anthropologists to search for the old tales. Contrast with new versions of stories that were collected in the past. For example, Tacana people have a volume that consists of 395 myths, stories, and tales, carefully annotated and cross-referenced as to variations, written only in German in 1952 by Karin Hissink and Albert Hahn (Hohenthal 2009).

- *Work with the shamans' power*

Modern practices to decide on the land have overpowered mechanisms like voting and cabildos (town councils). The energetic level is barely considered. For example, fortifying consciousness on Birth/Death is extremely important for the community (see health house in **Table 3.4**). Another example is to keep community traditions when somebody passes away. That shamans can work on the energetic level is a decision of the community. The shamans' knowledge and techniques they have are highly appreciated in other places in Bolivia (Group 3 Personnel, pers.comm.). I heard that not many people are following those traditions. These can be combined with practices coming from the city and modern techniques.

- *Invite all people to share the living in the community*
 Invite people involved in the management of the national park to live in the forest. Most of them are into the routine of politics or economics (see 2.1.2.5, 2.1.2.7). Encourage them to live in the community, and invite their families too. They will appreciate experiencing other perspectives, which can free up fixed ideas (see 2.2.2), and they can experience on their own the richness and needs of the forest, similar to my opportunity (see 3.2.2).
- *Maintain dialogue and alliance between all institutions*
 The threats from outside and inside the park put at risk the life of the community. Illegal activities are growing, especially in poaching, and the internal organization (**Table 3.1**) may have no control over that (see studies that deal with political work in section 2.1.3). Coordination and agreements with the SERNAP, WSC, CPILAP, ministries, and NGOs are necessary. Also, these dialogues must include political actions to safeguard the territory. International and national Institutions should learn about the aggressions Indigenous peoples have been resisting for centuries (see political task 2.1.3).
- *Promote the performance of ceremonies in their essence*
 Ceremonies in management are not folkloric events, and they should be differentiated from the classical cultural protocols. The ceremonies of Tacana-Quechua people move energy. They are scientific experiments on land searching to balance the elements and to protect life in the strict following of laws of nature (see 4.1.2.4).
- *Revalue education with Indigenous methodologies along with the modern world*
 The education system should be open to Indigenous methodologies. The current school board most of the time only coordinates the menu of the school meals (see “others” in **Table 3.1**). The community should recover the interest in elementary education in the local community. Incorporate the studies and practices of agriculture, temples, pilgrimages, dreams, and so on (see 4.1.2.1), and the uses of sound (4.1.2.3), talking with animals, dances, and playing music.
 There is interest in bilingual and multicultural education that should be supported. This was controversial in the past, but now Indigenous communities are aware of the importance of their own languages and of the uses of other ones. Spanish was the first,

but English looks promising for their own priorities (**Table 3.2, Table 3.3**). Increase the promotion of scholarships that Indigenous peoples are offered.

- *Research medicine of the Amazon area from a broader perspective, including the dimension of the organized state*

The strategic location of San José de Uchupiamonas in the Amazon can allow the community to organize the offering of Indigenous medicines that are sought by people who may want to use Indigenous medicine. The infrastructure of Chalalán Ecolodge is adequate for that, and the three shamans are experts in the specialties they have. The idea of health and equilibrium is the unity of all dimensions (see 4.1.2.1).

- *Promote activities to forgive colonialism from both sides*

The painful process in colonial history triggers emotional problems in many areas of people's lives. Accusations and division will prevent dialogue. It is important to re-analyze the problem in all Indigenous community organizations as well as in governmental and non-governmental institutions.

- *Welcome incoming suggestions*

CONCLUSION

I draw conclusions, presenting answers to the questions proposed in this thesis:

How to integrate the Indigenous view of nature in the management system of the wildland management in the Madidi National Park and Indigenous Territory of San José de Uchupiamonas, Bolivia?

The integration of the Indigenous view of nature with the management plans of the Madidi National Park and Indigenous Territory of San José de Uchupiamonas will be possible if first there is the recognition that Indigenous knowledge and science can be integrated. For this to happen, two problems should be overcome. The first problem is the theoretical dichotomy between culture and nature. If we keep the cultural theme as separate from nature, the integration of Indigenous knowledge and science is not possible (4.1.1.5). The second is the incomplete geometrical representation of space. The current science does not have a geometry that represents reality (see 2.3.2.3). So, the challenge for this thesis has been to find a solid basis to deal with those problems first, and then conceive a framework for a land management plan in the specific area of interest.

I found common ground between Indigenous knowledge and science despite the long history of irreparable gaps between them and their differences in the purposes of knowledge and their methodologies (see 4.1). This common ground is their subject, the main focus of their study, and that is nature. From this common ground it is possible to integrate them. From the side of science, only V. Vernadsky has elaborated a satisfactory possibility of integration between nature and culture (see 4.1.2) with his scientific concept of cultural-biogeochemical energy (see 2.3.2.2), and he also explained the incompleteness of the geometrical representation of reality. From the side of Indigenous knowledge I found that it is common for Indigenous peoples to consider nature and culture just one reality, and I also found that the way they represent space is complex and broader than science. Specifically, I studied the Quechua textiles, which offer a good geometrical representation of space that can fill the gaps that Vernadsky identified. The three layers—the universe, the earth, and the human blankets—tend to represent dimensions of time and space that are interwoven between them and in which we find the matter; the antimatter; the sense of time in past, present, future; the influence of the sun on Earth and humans through the electromagnetic spectrum; the four bio-inert bodies, soil, water, air, and fire; and the symmetry of life considering the known and unknown in the

processes of life. What is most important is the fact that the geometrical representation of space in small scale or real scale can be modified by the proper and conscious use of sound, opening the possibility of a single individual evolving and the great opportunity for science to address the study of consciousness hand-in-hand with Indigenous knowledge.

So, the Indigenous view of nature in the context of the representation of space for Quechua people is consistent with science that recognizes the existence the cultural-biogeochemical energy. This integration offers the great possibility for science and Indigenous knowledge to work together towards the evolution of the human species.

a) How is Indigenous knowledge perceived in the international context?

International institutions have respectable purposes but do not see or acknowledge Indigenous knowledge as having potential in science. There is some recognition in specific subjects like agriculture, climate change, mapping, property rights, and so on. The core of the Indigenous knowledge, which is the interaction with the land, is a minor issue, but Indigenous peoples have always been defending and presenting their positions about the land in documents that are not considered by the international community. Indigenous peoples want to be part of the modern world, but the way they participate is very limited and controlled by the structure that defines *how* to participate (see 2.1.2.2).

In addition to this problem, Indigenous peoples' living conditions are becoming inferior under increased threats of industrial development, and this is happening over the painful history of hundreds of years of colonialism that still has an impact. Current research is barely approaching a model of integration with people and communities in their daily lives and concerns; most of the research projects look for data, are paternalistic, dependent on funders, are considered suspicious by Indigenous people, and so on. The data-based scientific model is not adequate to grasp the "mystery" of the Indigenous knowledge, and the back-benefits for the communities is minimal. In general, the depiction of Indigenous peoples as inferior peoples still exists, and for many non-Indigenous people, a sense of "strange" still characterizes some of their activities and interactions with nature. However, there are scientists that are contributing with new approaches regarding Indigenous knowledges and nature.

In this thesis I have identified difficulties and reasons that prevent, or do not allow science to recognize Indigenous knowledge, and this is reflected in the international context. I

described some concepts (see 4.1.1) that can act as barriers to grasp Indigenous knowledges, the most difficult one is the medieval language of religion (see 4.1.1.3) that is mixed with Indigenous descriptions of nature. I constructed a chart (**Table 4.1**) that attempts to make associations between the terminologies based on the descriptions of the Quechua culture. I consider that this use of language and all other concepts should be under revision in the international context, otherwise the lack of acknowledgement of the Indigenous view of nature as having scientific potential will most probably persist.

b) Which scientific notions are important in the work of V. Vernadsky?

To discuss the integration of two apparently distinct worlds, I relied on the concept of cultural-biogeochemical energy proposed by V. Vernadsky, a Russian scientist who conducted his work without the traditional division between nature and culture (see 4.1.1.5). He proposed a new state (Vernadsky 2012, 16) in the biosphere that is the *cultural-biogeochemical force*. For him, human cognition is a geological power that includes the spiritual creativity of the human individual. I analyzed Indigenous knowledge of the Tacana-Quechua people in such terms, as a concept and as a force (see 4.0). Moreover, for Vernadsky there are two important notions that are fundamental to understand the reality of the biosphere mechanism. The first one is the state of the physical space in which the geometrical representation of the living matter is critical. The second one is the left-handedness and right-handedness phenomena in living organisms, with laws of symmetry for a geometrical representation that are unknown to the current day. I can say that the representation that Vernadsky was looking for cannot be achieved in the abstract (drawings); its geometry should be represented in the solid matter itself. Quechua people did this representation in the solid matter, using their textiles and other materials in a human-scale representation (see agriculture, temples, pilgrimages in section 4.1.2.1).

These notions are of great importance for science and Indigenous knowledge because the study of the biosphere is critical for our era, and the work of Vernadsky drives attention to the evolution of the biosphere, rather than its degradation (2.3.2). Similarly, Indigenous knowledge offers a complex understanding of these notions showing that the integration of both science and Indigenous knowledge deals with evolution.

c) How is the conception of nature understood among Indigenous people?

The conception of nature among Indigenous peoples carries simplicity, regularity, humbleness, and a relevant understanding of life. Indigenous peoples talk about their knowledge and share it on a daily basis with strong certainty and confidence. The knowledge is not something that has to be studied, it is found in everyday life (see 2.2.3).

During my fieldwork, for which I chose the ethnographic method, I searched for the conception of nature among Tacana-Quechua people and the way they characterize both concepts that Vernadsky studied—space and the symmetry of reality. I found more than expected. People in the community are highly conscious that they are losing the traditions of their ancestors who used to rely on shamans for energetic balances for people and for the environment. The Indigenous town of San José de Uchupiamonas wants to retrieve and revitalize that knowledge for future management plans, they want to base their future in their own knowledge without renouncing the modernity that has both benefits and treats. To find the roots, I looked for the Tacana-Quechua view of nature and spent time with shamans. I found they have a representation of physical space that includes the universe, the Earth, and the human dimensions that were known millennia ago. This organized space is represented in the Quechua textiles, and in those textiles it is also represented as the phenomena of left-handedness and right-handedness, which I assert is the geometrical representation for symmetry in living bodies. These Quechua textiles show that Quechua people are aware of the physical state and physical field (electrical magnetic, heat, gravitational, electromagnetic forces, visible and invisible). And also, the symmetry of life was never out of sight for Quechua people (referring to the physical state and the symmetry). These are not presented with the sharpness desired by conventional scientific methodology, but we cannot disregard the potential for furthering scientific knowledge. This comprehension of space has allowed Quechua people to live in harmony with nature. This also constitutes an opportunity to study the consciousness. The way we represent space and the symmetry of life is fundamental to understand our life and all life because we will act accordingly. Currently we have a representation of the environment (space and symmetry) that is mostly based in Western culture. The understanding of a different representation that includes consciousness of space and symmetry of life (in this case Quechua representation) complements the approach of Vernadsky whose work (cultural-biogeochemical energy) was

dealing with consciousness (see 2.1.2.4), the importance of which in the biosphere was emphasized by him (see 2.3.2.2), and which is an urgent next step in science.

Using various tools and practices, shamans, and Indigenous peoples in general, put in motion this organized state with sounds. Talking with animals is a complex use of sound (see 4.2.2.3) and understanding the meaning of vibration that eventually results in the communication and interaction with nature.

Indigenous peoples who are familiar with prophecies are aware they should integrate themselves with modern life. Every human can act as a geological force that can modify the biosphere, and every human should be responsible for their own self.

d) How to design the structure and organization of a wildland management?

To design a structure of a wildland management plan, I proposed a framework of Indigenous roots to transform the existing branches. I analyzed the three models that attempt to link the classic academic disciplines and fields of study—multidisciplinarity, interdisciplinarity, and transdisciplinarity—and how they play a role as the learning methodology that society assumes is the only efficient one. The three present limitations regarding hierarchies, boundaries, and defined fields. I proposed another way to organize knowledge. I named *evolving disciplines* the attempt at a broader perspective for the organization of academic fields according to the space that I have analyzed in the Quechua textiles. Following that structure, I list principles and methodologies that act only as a guide; they are never complete, nor exact, and need to be experienced and revised for the people living in the Indigenous town of San José de Uchupiamonas.

Finally, the integration of Indigenous knowledge with science is a process that implies transformation on both sides that may take years or decades. There is a need for communication and interaction that, in addition to words and dialogue, also includes the further understanding of the use of a conscious use of sound—this communication and interaction happens between the four human dimensions, the Earth, and the Universe (See 4.1.2.3).

RECOMMENDATIONS

To universities:

Careers in natural sciences like conservation biology should include social content (e.g., anthropology, psychology), and subjects such as biogeochemistry, geometry, and the education system. That will promote a broader curriculum, and also the evolving methodologies I proposed can be tested.

Universities should promote studies that allow for creativity. For instance, the concept of bioinert bodies that is applicable to soil and water (see 4.1.1.2) can also be applied to air and fire. There is not enough research of these bio-inert bodies and their impact on the human species. Soil was the first bio-inert body to be recognized and has thus been subject to greater study. Recently, scientific interest has grown in the properties of water as a bio-inert body. Similar studies are required on air and fire.

Universities should promote that faculties of natural sciences do more research for the benefits of and impacts on communities. The search for data should not be the main objective.

To the ethics board:

Review the current accepted methodologies and include options for researchers to participate more in communities. The methodological approach I used in my fieldwork was Participatory Action Research (PAR), but I was not able to add participant observation at the time I presented my proposal. The ethics board is now including it.

To the community:

The community should ideally retrieve and revitalize the history of the Uchupiamona people, now the Takana-Quechua nation, and find the old Inca connections their ancestors had by asking old men and women during their daily activities, meetings, ceremonies, parties, or any other opportunity.

The current administrative structure is compromised because is not typical nor representative of Takana-Quechua culture. It is forced by external demands, and considered necessary for integration with the modern world. The organization would be strengthened by retrieving and revitalizing the shamans' and elders' participation in decision-making processes.

To the institutions, funders, governments:

Institutions, funders, and governments should have direct contact with communities, not only with leaders and organization managers. Re-think attitudes towards the Indigenous view of

nature and therefore to the policies and projects. Be flexible with the policies. Reassess mistakes, especially reassess the terminology used when referring to Indigenous peoples and Indigenous knowledge. Visit communities and spend time in their daily activities for at least one week. Have a scientific committee in national ministries with the will to integrate science and Indigenous knowledge.

To food industry leaders and consumers:

The current meat and dairy industries are contributing to the destruction of the Amazon forest. Plant-based foods and/or locally produced foods should be promoted in order to protect the forest, which offers unimaginable options for medicine and the opportunity to invest in small communities that still rely on the forest for survival.

To the scientific community:

Recognize the holistic nature of human knowledge, sapient and sentient. Revise the dichotomy of nature and culture with the help of Indigenous knowledge.

To researchers in communities:

Researchers should consider that people need to talk, to ask, to see. Plan extra time to spend more time talking with people. It brings confusion and suspicion and mistrust (*suceptibilidad* in Spanish) among people and their organizations if the researcher only has limited contact with a few main leaders. Permission should be requested from all organizations, institutions, and people.

Be prepared and ready for service that was not planned and that may require extra funds (see Report 2); be open to the new in order to challenge economic limitations. Review the methodology for any paternalistic tendencies.

I conclude my thesis with a list of suggested research topics and approaches for the Indigenous Territory of San José de Uchupiamonas and Madidi National Park.

- Participate in traditional hunting and fishing activities by visiting the places, living with Indigenous peoples.
- Analyze areas of “chaqueo” (the act of burning the forest) and the uses that are intended for agriculture and cattle raising.
- Create a database for documentation and create a history of all the activities performed by Indigenous leaders.

- Be part of one tradition in the community; explore its meaning and implications in the life of the community and transform it into a story.
- Help to prepare a ceremony of healing with a shaman and present results.
- Do service in schools and health houses and identify materials needed.
- Spend time with the old men and old women; first help them and ask permission to record their wishes and stories; report their wishes and stories to the community.
- Participate in the harvesting and preparation of food (e.g., obtaining sugar cane, processing chocolate, preparing maize and rice, obtaining fruits of the forest).
- Observe materials and methodologies for housing infrastructure and roads, and help.
- Visit communal spaces of the community such as the cemetery, church, court, old hostel, and ask about their meaning and history; along with the Indigenous people, construct the story of each place.
- Learn Quechua and Tacana languages.
- Research the organization of women and their activities in the past, such as textiles, ceramics, food preparation, and political life.
- Evaluate the people's perception of animal life and animal connections to people.
- Observe the links between people and specific plants: Coca (*Erythroxylum coca*), Bibosi (*Ficuss spp*), and so on.
- Inquire about the perception of governmental and non-governmental institutions regarding their coordination and collaboration with the people; also inquire about the process of "consultation".
- Contrast decision-making processes in meetings in formal and informal places.

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Appendix A: Recommended items to carry in a trip to the Madidi (does not include personal staff)

ITEM	QUANTITY	AVERAGE PRICE	
		BOL	CAD
Ammunitions	10 units	10	2
Strings for fishing	1 roll	8	1.5
Batteries	1 pack of 4 batteries AA	15	3
Repellent	1 unit	80	15
Sunscreen	1 unit	80	15
Flash light	1 medium	20	3.8
Long Waterproof boots	1 pair	80	15
Raincoat	1 bag	5	1
Hat	1 unit	30	5.6
Bathing suit	1 unit	15	3
Clothes brush	1 unit	10	2
Detergent	5 bags	25	5
Flip flop	1 pair	40	7.5
Machete	1 unit	80	15
FOOD ITEMS			
Rice	4 kilograms	20	3.8
Cooking oil	3 litres	30	5.6
Sugar	4 kilograms	20	3.8
Salt	3 kilograms	5	1
Cheese	1 piece	40	7.5
Smash meat canned	5 small cans	35	6.5
Lime	1 bags (more or less 15 lime)	10	2
Alcohol	1 bottle 250ml.	45	8.4
Onion	1 kilogram	5	1
Tomatoes	3 kilograms	15	3
	Total	Bs.860	CAD.160

Appendix B: Transportation. Departures. Arrivals

Type of transportation	Options	Place	Time	Cost Bs.	Cost CAD.
By air	La Paz-Rurrenabaque	International “El Alto” airport	40 min	1000	200
By bus	La Paz-Rurrenabaque	Terminal de Buses “Minasa” V.Fátima	18 hrs	80	15
By minibus	Sanbuenaventura-Tumupasa	Terminal de Buses		30	6
	Tumupasa-San José de Uchupiamonas	Tumupasa square	4hrs	rainy season	rainy season
By boat	Rurrenabaque-San Buena Ventura	Rurrenabaque croosing	5 min	1.5	0.3
	Rurrenabaque-San José de Uchup.	Rurrenabaque shore	8hrs	3500	650
By tractor	Tumupasa-San José de Uchup.	Cata’s House	4 hrs	none	none
By motorcycle	Tumupasa-San José de Uchup.	Tumupasa square	3 hrs	200	50
By walking	Tumupasa-San José de Uchup.	Cata’s house	8 hrs	none	none

Note: Kevin Sanz-Guerrero Jáuregui from “Madidi Travel” Ecolodge in La Paz helped to complete this lists.

Appendix C: Timeline for fieldwork in Madidi National Park and Indigenous Town of San José de Uchupiamonas (2017)

Date	Activity
January 25th	COMMUNITY FORMAL ENGAGEMENT
January 25th	DEPARTURE TO RURRENABAQUE
January 26th	ACCOMMODATION IN MADIDI RESERVE
January 27th	DEPARTURE TO "SAN JOSÉ"
January 29th	VISIT COMMUNITY (Formalize permission with the community)
January 31st	VISIT COMMUNITY (Explain the purpose of the research)
February 4th	VISIT COMMUNITY (receive feedback from the community about the research)
February 5th	GO BACK TO RURRENABAQUE (1st Inform for supervision)
February 10th	LIVING WITH THE COMMUNITY
February 10th	DEPARTURE TO "SAN JOSÉ"
February 15th	VISIT COMMUNITY (Activity* 1)
February 20th	VISIT COMMUNITY (Activity 2)
February 25th	VISIT COMMUNITY (Activity 3)
February 28th	VISIT COMMUNITY (Activity 4)
March 5th	VISIT COMMUNITY (Activity 5)
March 10th	VISIT COMMUNITY (Activity 6)
March 15th	GO BACK TO RURRENABAQUE AND LA PAZ CITY Coordination with the Ministry for Interviews (2nd Inform for supervision)
March 25th	DEPARTURE TO RURRENABAQUE AND "SAN JOSÉ"
March 27th	VISIT COMMUNITY (Activity 7)
March 31st	VISIT COMMUNITY (Activity 8)
April 1st	PREPARE FUTURE CONTACT
April 2nd	VISIT COMMUNITY (Set up means to present the results of the research)
April 5th	MEETING WITH THE INDIGENOUS REPRESENTATION
April 10th	GO BACK TO LA PAZ CITY (3rd Inform for supervision)
April 15th	FORMAL MEETINGS, INTERVIEWS (Institutions)
April 15th	MEETING WITH THE MINISTRY OF EDUCATION
April 17th	OTHER MEETINGS (Institutions)
April 18th	OTHER MEETINGS (Institutions) (4th Inform for supervision)
April 20th	TRIP TO CANADA

* Activities and dates should be coordinated with the community.

They include relevant activities such as fishing, agricultural labors, sport tournaments, community meetings, traditional ceremonies and so on; in between I will share time in daily activities such prepare and participate in meals, contribute to household chores, visit schools, visit health houses, etc. and interviews will be done.

Appendix D: Letter requesting permission and support of the Town's Board

English version

December 2016, Whitehorse

Mr. Guido Mamani Capiona
President of the Indigenous People of San José de Uchupiamonas

RE: Application Permit and support to MSc degree in Canada on MADIDI

I stand before your authority with the respect I feel for the Earth and for inhabitants of the Indigenous People of San José de Uchupiamonas in MADIDI. I am an educator and engineer in Ecology and Environment, currently a scholarship student of the program "100 scholarships for Scientific and Technological Sovereignty" which is under Supreme Decree 2100 of September 1, 2014, it establishes that at its conclusion I return to Bolivia and work in strategic state enterprises. (See attached)

In that sense my commitment to my profession and the contribution to my country I am doing my masters in Canada at the University of Alberta under the program "Protected Areas and management of virgin lands". My thesis entitled "New management framework based on the concept of Biosphere created by Vernadsky in the National Park MADIDI, Bolivia" (Attachment abstract)

Part of my research requires my presence at MADIDI, so I request your dignified representation, grant me permission to:

1. Visit and share in the community to perform my field work (attached schedule)
2. To stay in a house for a period of approximately 3 months from January 2017.
3. Conduct interviews with his / her authority and other members of the community, with prior consent and strict compliance with their own requirements.
4. Sharing the development and progress of my research in a constant way so that they can observe and make necessary modifications for the benefit of the population. At the end of the work I will present it publicly as many times as necessary to validate it.

During my visit I manifest my willingness to abide by the regulations of the community. Also, to the extent of my possibilities, I fully collaborate in any task that is within my competence and that benefits the population.

Very grateful for your welcome and sure that sharing time will be productive and enriching for all.

I say goodbye with my most distinguished considerations,

Very truly yours,

Ing. Patricia Cristina Quiroga Yañez
C.I. 4373564 L.P.

Attachments:

Letter of approval of the Grant by the Ministry of Education of Bolivia

Thesis Summary.

Travel schedule

Apéndice D: Carta para solicitar apoyo al directorio del Pueblo

Versión Español

Whitehorse, diciembre, 2016

Señor
Sr. Guido Mamani Capiona
Presidente del Pueblo Indígena de San José de Uchupiamonas
Presente.

De mi mayor consideración,

**Ref.: Solicitud Permiso y apoyo a
Maestría en Canadá sobre el MADIDI**

Me presento ante su autoridad con el respeto que siento por la Tierra y por habitantes del Pueblo Indígena de San José de Uchupiamonas en el MADIDI. Soy educadora e Ingeniero en Ecología y Medio ambiente, actualmente estudiante becada del programa "100 becas para la Soberanía Científica y Tecnológica" la cual está bajo Decreto Supremo 2100 de 1ro de septiembre de 2014, el mismo establece que a la conclusión del mismo, los becarios retornen a Bolivia y trabajen en empresas estratégicas del Estado. (Ver adjunto)

En ese sentido mi compromiso con mi profesión y el aporte a mi patria estoy realizando mi maestría en Canadá en la Universidad de Alberta bajo el programa "Áreas protegidas y manejo de Tierras vírgenes". Mi tesis titula "Nuevo marco de gestión basado en el concepto de Biosfera creado por Verdnasky en el Parque Nacional MADIDI, Bolivia" (Adjunto resumen)

Parte de mi investigación requiere mi presencia en el MADIDI, por lo mismo solicito a su digna representación, me concedan el permiso para:

1. Visitar y compartir en la comunidad para realizar mi trabajo de campo (Adjunto cronograma)
2. Alojarme en una vivienda por periodo de aproximadamente 3 meses a partir de enero 2017.
3. Realizar entrevistas a su autoridad y otros miembros de la comunidad previo consentimiento y bajo estricto cumplimiento de sus propios requerimientos.
4. Compartir el desarrollo y avance de mi investigación de manera constante para que lo puedan observar y hacer modificaciones necesarias para beneficio de la población. Al finalizar el trabajo lo presentaré públicamente las veces que se requiera para que lo puedan validar.

Durante mi visita manifiesto mi predisposición de regirme a las normativas de la comunidad. También en la medida de mis posibilidades colaborar plenamente en cualquier tarea que sea de mi competencia y que beneficie a la población.

Muy agradecida por su recibimiento y segura de que el tiempo de compartir será productivo y enriquecedor para todos y todas.

Me despido con mis consideraciones más distinguidas,

Muy Atentamente,



Ing. Patricia Cristina Quiroga Yañez

C.I. 4373564 L.P.


Guido Mamani Capion
PRESIDENTE
TERRITORIO Y PUEBLO INDIGENA
SAN JOSÉ DE UCHUPAMONAS
Recibido
R.B.Q. 19/01/17

Adjunto: Carta de aprobación de la Beca por parte del Ministerio de Educación de Bolivia.
Resumen de Tesis.
Cronograma de viaje

Appendix E: Letter to request formal fieldwork and research authorization

English Version

January 19th, 2017. Rurrenabaque

Mr. Guido Mamani Capiona
President of the Indigenous People of San José de Uchupiamonas

Of my highest consideration,

RE: Application Formal Authorization Research.

A warm greeting to the entire community of San José de Uchupiamonas through your distinguished authority, whom I thank to welcome me as a researcher at the University of Alberta, Canada.

The reason for this is very respectfully requesting a formal approval from the community to do my research following your own ways. For my part my commitment to work, socialization and the delivery of corresponding documentation at the end of the same for mutual benefit.

I will be grateful for your kind attention to my request, without any other particular receive my most cordial greetings.

Very truly yours,

Ing. Patricia Cristina Quiroga Yañez

C.I. 4373564 L.P.

MSc. Student

Protected Areas and Wildland Management

Department of Renewable Resources

Phone number 867-336-0210/ 73524732

University of Alberta

Canada

Apéndice E: Carta para solicitar autorización formal para trabajo de campo e investigación

Versión Español

Rurrenabaque, enero 19, 2017

Señor

Sr. Guido Mamani Capiona

Presidente del Pueblo Indígena de San José de Uchupiamonas

Presente.

De mi mayor consideración,

Ref.: Solicitud Autorización Formal

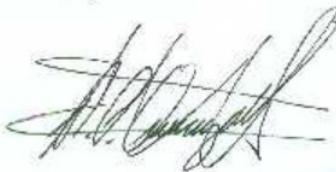
De Investigación.

Un saludo afectuoso a toda la comunidad de San José de Uchupiamonas mediante su distinguida autoridad a quien agradezco la bienvenida a mi persona en calidad de investigadora de la Universidad de Alberta, Canadá.

El motivo de ésta es muy respetuosamente solicitar una aprobación formal de la comunidad que haga procedente mi investigación siguiendo las reglas propias de ustedes. Por mi parte mi compromiso de trabajo, socialización y la entrega de documentación correspondiente al finalizar la misma en beneficio mutuo.

Agradeceré su gentil atención a mi solicitud, sin otro particular reciba mis saludos más cordiales.

Muy Atentamente.



Ing. Patricia Cristina Quiroga Yañez
C.I. 4373564 L.P.
MSc. Student
Protected Areas and Wildland Management
Department of Renewable Resources
Phone number 867-336-0210/ 73524732
University of Alberta
Canada


Guido Mamani Capiona
PRESIDENTE
TERRITORIO Y PUEBLO INDIGENA
SAN JOSÉ DE UCHUPIAMONAS
Recibido
ROR. 19/01/17

Appendix F: Letter to request permission of SERNAP

English Version

Mr
Felix Gonzales Bernal
Executive Director SERNAP

RE.: Madidi Entry permit for Ethnographic Research, Canada

I have the duty to address your authority to very respectfully request your guidance and collaboration towards me as a researcher, allow me to introduce myself.

My name is Patricia, I'm a Bolivian, a fellow in the program "100 scholarships for scientific and technological sovereignty" D.S. 2100 of September 1st, 2014 administered by the Ministry of Education of Bolivia under R.M. 255/2015. (Attached) I find myself pursuing my master's thesis at the University of Alberta Canada on Protected Areas. (Attached Letter of certification as a master's student)

My specific request is a permit to enter Madidi National Park for a period of approximately 3 months in the community of San José de Uchupiamonas beginning this January, 2017. (I have also considered the authorization of the community)

For my part I consulted the requirements, but according to the Regulations and the list of ICAS, my research does not correspond to any of them because I am not a biologist and my work does not deal with biological biodiversity. My work is about the vision of indigenous peoples about nature and has an ethnographic approach. (Attached Summary and Research Profile). I also attach the authorization form, completed. (Attached Application form)

I appreciate your guidance and the alternatives that I have according to my type of research to obtain authorization.

Willing to provide necessary requirements and / or information, I bid you very grateful for your cooperation.

Very truly yours,

Attached:

1. Official scholarship course
2. Request for support and certification as a master's student
3. Summary Thesis (a)
4. Research profile (b)
5. Application filled

Apéndice F: Carta de solicitud de autorización a SERNAP

Spanish Version

La Paz, diciembre 27, 2016

Señor
Felix Gonzales Bernal
Director Ejecutivo SERNAP
Presente.-

Estimado director:

**Ref.: Autorización Ingreso Madidi para
Investigación Etnográfica,Canada**

Tengo a bien dirigirme a su autoridad para muy respetuosamente solicitar su orientación y colaboración hacia mi persona como investigadora, permítame presentarme.

Me llamo Patricia, soy boliviana, becaria del programa "100 becas de estudio para la soberanía científica y tecnológica" D.S. 2100 de 1 de septiembre de 2014 administrado por el Ministerio de Educación de Bolivia bajo R.M. 255/2015. (Adjunto) Me encuentro realizando mi tesis de maestría en la Universidad de Alberta Canadá sobre Áreas Protegidas. (Adjunto Carta de certificación como estudiante de maestría)

Mi solicitud concreta tener autorización para ingresar al Parque Nacional Madidi por un tiempo aproximado de 3 meses en la comunidad de San José de Uchupiamonas empezando este Enero de 2017. (También he considerado la autorización de la comunidad)

Por mi parte he consultado los requisitos, pero según el Reglamento y la lista de ICAS, mi investigación no corresponde a ninguna de ellas pues no soy bióloga y mi trabajo no trata con biodiversidad biológica. Mi trabajo es referente a la visión de los pueblos indígenas sobre la naturaleza y tiene enfoque etnográfico. (Adjunto a. Resumen, b. Perfil de investigación). También adjunto el formulario de autorización, llenado. (Adjunto formulario)

Agradeceré su orientación al respecto y las alternativas que tengo según mi tipo de investigación para obtener la autorización. Dispuesta a proporcionar requisitos y/o información necesarias, me despido muy agradecida de su colaboración.

Muy atentamente,



Ing. Patricia-Cristina Quiroga Yañez

C.I. 4373564 L.P.

MSc. Student

Protected Areas and Wildland Management

Department of Renewable Resources

Phone number 867-336-0210/ 60136065

University of Alberta

Canada



- Adj. 1. Carta oficial de beca
- 2. Carta de solicitud de apoyo y certificación como estudiante de maestría
- 3. Resumen Tesis (a)
- 4. Perfil de Investigación (b)
- 5. Formulario llenado

Appendix G: Request of collaboration to the Mayor of San Buenaventura.

English version

San Buenaventura, January 19, 2017

Mr.

Ing. Javier Delgado Callisaya

Mayor of Sanbuenaventura

RE: Collaboration Master's Thesis San José de Uchupiamonas

I have the duty to address your authority to very respectfully request your collaboration with me as a researcher, allow me to introduce myself.

My name is Patricia, I'm a Bolivian, a fellow in the program "100 scholarships for scientific and technological sovereignty" D.S. 2100 of September 1, 2014 administered by the Ministry of Education of Bolivia under R.M. 255/2015. (Attached) I find myself pursuing my master's thesis at the University of Alberta Canada on Protected Areas. (Attached Letter of certification as a master's student)

The reason for my letter is to inform you that I will carry out my research in the Madidi National Park for approximately 3 months in the community of San José de Uchupiamonas where I will be entering this January 21st. I have made the authorization procedures with the president of the community Mr. Guido Mamani who manifested his full consent. In the same way I have managed the proper permit with the SERNAP who also have made my entry to the area.

My work is about the vision of indigenous peoples about nature and has an ethnographic approach. (Attached a.Summary, b. Research Profile).

I will be very grateful if you can give me an interview during the time you are in the region, possibly in February or March.

Very truly yours,

Ing. Patricia Cristina Quiroga Yañez

C.I. 4373564 L.P.

MSc. Student

Protected Areas and Wildland Management

Department of Renewable Resources

Phone number 867-336-0210 / 73524732

University of Alberta

Canada

Attachments

1. Fourth Ministry of Education (2 sheets)
2. Request for support and certification as a master's student
3. Summary Thesis (a)
4. Research profile (b)

CC. Rosario Barral. San José Suburban Office

Apéndice G: Solicitud de colaboración al alcalde de San Buenaventura

Versión Español

San Buenaventura, enero 19, 2017

Señor
Ing. Javier Delgado Callisaya
Alcalde de Sanbuenaventura
Presente



Estimado director:

Ref.: Colaboración Tesis de Maestría

San José de Uchupiamonas

Tengo a bien dirigirme a su autoridad para muy respetuosamente solicitar su colaboración hacia mi persona como investigadora, permítame presentarme.

Me llamo Patricia, soy boliviana, becaria del programa "100 becas de estudio para la soberanía científica y tecnológica" D.S. 2100 de 1 de septiembre de 2014 administrado por el Ministerio de Educación de Bolivia bajo R.M. 255/2015. (Adjunto) Me encuentro realizando mi tesis de maestría en la Universidad de Alberta Canadá sobre Áreas Protegidas. (Adjunto Carta de certificación como estudiante de maestría)

El motivo de mi carta es poner en conocimiento suyo que realizaré mi investigación en el **Parque Nacional Madidi por un tiempo aproximado de 3 meses en la comunidad de San José de Uchupiamonas en que ingresaré este 21 de enero**. He hecho las gestiones de autorización con el presidente de la comunidad Sr. Guido Mamani quien manifestó su pleno consentimiento. Del mismo modo he gestionado el debido permiso con el SERMAP quienes también han hecho precedente mi ingreso a la zona.

Mi trabajo es referente a la visión de los pueblos indígenas sobre la naturaleza y tiene enfoque etnográfico. (Adjunto a. Resumen, b. Perfil de investigación).

Agradeceré mucho pueda concederme una entrevista durante el tiempo que este por la región posiblemente en febrero o marzo.

Muy Atentamente,

Ing. Patricia Cristina Quiroga Yañez

C.I. 4373564 L.P.

MSc. Student

Protected Areas and Wildland Management

Department of Renewable Resources

Phone number 867-336-0210/ 73524732

University of Alberta

Canada

Adj. 1. Carta ministerio de Educación (2 Hojas)

2. Carta de solicitud de apoyo y certificación como estudiante de maestría

3. Resumen Tesis (a)

4. Perfil de investigación (b)

Cc. Rosario Barral, Subalcaldía de San José

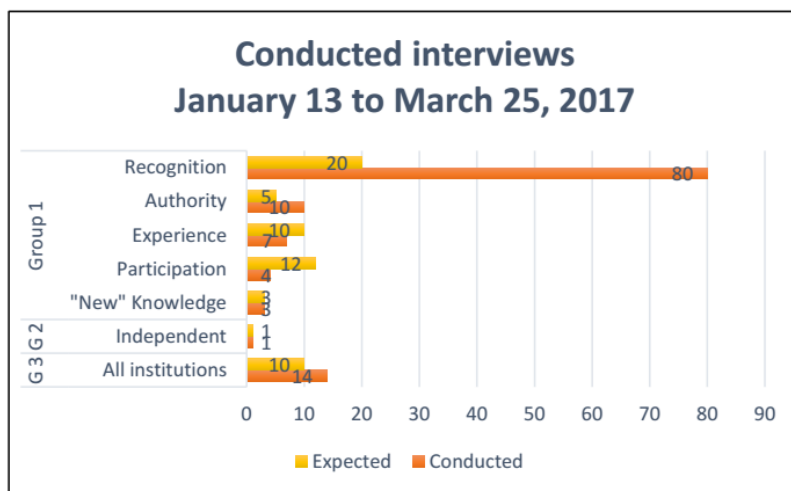
Appendix H: Criteria to identify potential participants (Institutions)

Participants	Work in the Park	Have worked in the park	Intend to work in the park	Total
Institution 1 Ministry of Rural Development	Herlan Surco Lopez (Veterinarian)			1
Institution 2 Health House	Anastacio Cuqui			1
Institution 3 School	Edwin Choque (Teacher)			1
Institution 4 CEPILAP	Lino Illimuri (Secretary of Education)			1
Institution 5 Tour Company Madidi Jungle	Alex Vilca Limaco (Owner)			2
	Rony Quetehuari (Tourist guide)			
Institution 6 Tour Company Chalalán	Rodrigo Mariaca (Manager)			2
	Martin Laura (Trustee)			
Institution 7 Town's Board Ex-member		Elio Valdez Amutari		2
		Guido Mamani		
Institution 8 Regional bureau SERNAP	Jose Luis Howard (Guard Park)			1
Institution 9 Wildlife Conservation Society WCS			Oscar Loayza (Director)	1
Institution 10 National Bureau SERNAP	Jhonny Ayala (Monitoring Technician)		Antonio Pereira (Adviser)	2
Institution 11 SAFCI		Jose Llerena		1
Institution 12 General Direction Biodiversity and Protected Areas	Juan Pablo Torrico (Staff)			1
Independent writer			Carlos Macusaya	1
Total	11	3	2	17

Appendix I: Interview statistics

Summary chart for conducted interviews during the Fieldwork during January 13 to March 25

	Expected interviews*		Conducted Interviews		Remarks
Group 1 (live in the community)	Recognition	(20) 40%	>20<~80	40%	All in fieldwork diary
	Authority	(5) 10%	>5<~10	10%	All in fieldwork diary
	Experience	(10) 20%	7	14%	All in fieldwork diary
	Participation	(12) 24%	4	8%	2 Formal interviews , fieldwork diary
	"New" Knowledge	(3) 6%	3	6%	All in fieldwork diary
	Total	(50)100%	>39<~104	78%	
Group 2 (interact with indigenous groups)	Independent Writer		1	1	Formal Interview
	Total		1	1	
Group 3 (institutions that have legal and administrative authority)	1. National Bureau		1	2	Formal interview
	2. Regional Bureau		1	1	Formal interview
	3. International Organizations		1	1	Formal interview
	4. School		1	1	Formal interview
	5. Health House		1	1	Formal interview
	6. Tour company		1	4	Formal interview
	7. Ministry of Rural Development		1	1	Formal interview
	8. CPILAP		1	1	Formal interview
	9. General Direction of Biodiversity		1	1	Formal interview
	10. Health National system		1	1	Formal interview
	Total		10	14	
	TOTAL		11	17	



* Based on Appendixes:
 C1,C2: Identify potential individuals to interview and/or spend time with
 C3: Criteria to identify potential participants (Institutions)

Appendix J

INFORMATION LETTER ¹

(Group 1)

Study Title: A NEW MANAGEMENT FRAMEWORK BASED ON THE CONCEPT OF BIOSPHERE DEVELOPED BY VERNADSKY FOR THE MADIDI NATIONAL PARK, BOLIVIA (An approach following the indigenous view of nature)	
Research Investigator: PATRICIA QUIROGA YAÑEZ	Professor Supervisor: DR. FIONA SCHMIEGELOW
Address: Department of Renewable Resources University of Alberta 500 College Drive, Whitehorse, Yukon Y1A 5K4, Canada. E-mail: quirogay@ualberta.ca Telephone number: +1 867-336-0210	Address: Department of Renewable Resources, University of Alberta c/o Yukon College, Applied Science Division 500 College Drive, Whitehorse, Yukon Y1A 5K4, Canada. E-mail: fiona.schmiegelow@ualberta.ca Telephone number: +1 867-668-8711

Background

You are being asked to be in this study because your participation and the experience you and your institution have with Madidi National Park will enrich this study. It is important for you to know that the criteria for choosing you and your institution was based on your involvement, either past, current or future, in work in Madidi National Park. The results of this study will be used in support of my thesis at the University of Alberta, Canada, as a sponsored student of the Bolivian Program "100 scholarships for Scientific and Technological Sovereignty" which is under Supreme Decree 2100 of September 1, 2014. It is a requirement of this Program that at the conclusion of my studies I must return to Bolivia and work in strategic state enterprises.

Purpose

The purpose of the research is to guide environmental policies and promote management strategies for Madidi National Park that benefit the entire ecosystem. Because it intends to advance the principles of the concept of "Biosphere" developed by Vernadsky, it will be relevant for broader scientific advancement. The resulting thesis will be presented to obtain the Master of Science degree in the program Protected Areas and Wildland Management in the Department of Renewable at the University of Alberta, Canada.

Study Procedures

The desired location for this interview is your workplace, but if that is not possible for any reason, it will be held in a place we both have safety and feel comfortable.

I would ask you to be honest in your responses as part of your responsibility to your institution. The approximate time for participation in this interview will be between 1 to 2 hours.

A single interview will be complete; however, if you would like to provide more information we can schedule a second or third interview. The type of questions you will be answering are related to the experience you have working in your institution and its relationship with Madidi National Park. The open questions are the following. In your opinion, what are the difficulties that exist in the Park?

What are the possible alternatives to contribute to the well-being of the indigenous community?

What is your opinion about the projects that were carried out or are carried out inside the park?

What impacts do you find due to the influence of technological and economic development on Madidi National Park?

How do you understand and value indigenous thinking? Give an example.

What do you think about the "consultation" defined as the right of indigenous peoples?

How should communication with indigenous peoples be? Mention an example.

How do you evaluate the coordination between the institutions that work inside the park?

¹ It is based on "*Guidelines for Participant Information Letter and Consent Form*" Version 2 of the Human Research Ethics Forms and Template at the Research Ethics Office.

How do you evaluate tourism?

How do you evaluate environmental education?

This interview will be recorded using a simple audio recording cellphone app. However, you are free to write answers to the questions or request a video recording.

Transcripts of your answers (audio or video) will be shared with you, so that you can verify it for the final version.

Benefits

You will not benefit individually from this interview. I hope that the information provided for this research will improve understanding of elements that should be included/not included in a management framework for the Madidi National Park, and thereby improve the long-term management of the Park and the people that depend on it. Lessons from this research may also benefit other areas facing similar management challenges.

Risk

If you feel affected personally by one or more questions because they may recall memories that you prefer not to answer, or for any other reason, I will understand and respect your desire to refrain from answering these questions or to stop the interview.

Voluntary Participation

The participation in this interview is completely voluntary. There is no penalty, nor obligation implied to answer all questions. Once you have verified the transcripts of the interview recording you are free to withdraw at any time during the fieldwork research. If you decide to withdraw, the information you provided will not be used for this research and will be completely removed from all records.

The last date you can withdraw your information is at the end of the fieldwork, which is on April 18 of 2017.

Confidentiality & Anonymity

Your name will appear in the acknowledgement section of the final document only if you authorize it, otherwise just the name of the institution that you represent will appear.

Your address information is confidential and only the researcher (I) have access to it.

Information provided will be kept in a secure place for a minimum of 5 years following completion of research project and electronic data will be password protected on the researcher's computer and all other records stored in a secure place maintained by the supervisor, following secure regulations of the university.

Future use of the data by anyone other than the researcher is not considered. Long term plan for the future use of the raw data considers the scanning of the original diary to become

electronic file format, the complete audio/video recordings of the interviews, will be copied from the researcher's personal computer. These raw data and extra copies of public data will be upload to the satellite office directed by the supervisor giving her the authority to store it according to the University of Alberta regulations.

To validate the information, a meeting following the traditions and procedures of the community will be necessary.

The thesis will be orally and publicly presented in the community before it is presented to the university. A hardcopy of the final thesis will be given to the community authorities.

The data collected for this study may be used for additional research. In that instance, approval will be required from a Research Ethics Board.

Further Information

If you have any further questions regarding this study, please do not hesitate to contact the researcher or supervisor (see contact information above).

The plan for this study has been reviewed for its adherence to ethical guidelines by a Research Ethics Board at the University of Alberta, Canada. For questions regarding participants right and ethical conduct of research, contact the Research Ethics Office at +1 780 492-2615. E-mail: reoffice@ualberta.ca

This office has no direct involvement with this project.

CARTILLA DE INFORMACIÓN ¹
(Grupo 1)

Título : UN NUEVO MARCO DE GESTIÓN PARA EL PARQUE NACIONAL MAIDID DE BOLIVIA BASADO EN EL CONCEPTO DE BIOSFERA DESARROLLADO POR VERNADSKY (Un acercamiento siguiendo la visión indígena de la naturaleza)	
Investigador: PATRICIA QUIROGA YAÑEZ	Supervisora: DR. FIONA SCHMIEGELOW
Dirección: Department of Renewable Resources University of Alberta 500 College Drive, Whitehorse, Yukon Y1A 5K4, Canada. E-mail: quirogay@ualberta.ca Número de teléfono: +1 867-336-0210	Dirección: Department of Renewable Resources, University of Alberta c/o Yukon College, Applied Science Division 500 College Drive, Whitehorse, Yukon Y1A 5K4, Canada. E-mail: fiona.schmiegelow@ualberta.ca Número de teléfono: +1 867-668-8711

Antecedentes

La importancia de usted en este estudio es debido a su participación y experiencia en su institución en relación al Parque Nacional Madidi, áreas protegidas y/o pueblos indígenas lo que permitirá enriquecer este trabajo. Es importante que sepa que los criterios para elegirlo responden a su conocimiento anterior, actual o futuro en el Parque Nacional Madidi, áreas protegidas y/o pueblos indígenas.

Los resultados de este estudio serán presentados en mi tesis de maestría en la Universidad de Alberta, Canadá, como becaria Boliviana del programa "100 becas para la Soberanía Científica y Tecnológica" que se encuentra bajo el Decreto Supremo 2100 del 1 de septiembre de 2014. Es un requisito de este Programa que al final de mis estudios debo regresar a Bolivia y trabajar en empresas estatales estratégicas.

Propósito

El propósito de la investigación es guiar las políticas ambientales y promover estrategias de manejo para el Parque Nacional Madidi que beneficien al ecosistema y los actores. Por otra parte se pretende dar un avance científico de los principios del concepto de "Biosfera" desarrollado por Verdnasky, haciendo un acercamiento a la visión indígena de la naturaleza.

La tesis resultante será presentada para obtener el máster en el programa Áreas Protegidas y Manejo de Tierras del Departamento de Recursos Renovables de la Universidad de Alberta, Canadá.

Procedimientos del estudio

Esta entrevista puede ser desarrollada en su lugar de trabajo, pero si no es posible por otros motivos, se podrá realizar en otro lugar que de seguridad y comodidad.

Le pido que sea honesto en sus respuestas como parte de su responsabilidad ante su institución. El tiempo aproximado para la participación en esta entrevista será entre 1 a 2 horas.

Una sola entrevista es suficiente; sin embargo, si desea proporcionar más información podemos programar una segunda o tercera entrevista. El tipo de preguntas que responderán están relacionadas con la experiencia que usted tiene trabajando en su institución y su relación con el Parque Nacional Madidi, áreas protegidas y/o pueblos indígenas. Las preguntas guías son las siguientes:

En su opinión, ¿Cuáles son las dificultades que existen?

¿Cuál es su opinión sobre los proyectos que se llevaron a cabo o se llevan a cabo dentro del parque?

¿Qué impactos encuentra usted debido a la influencia del desarrollo tecnológico y económico en el Parque Nacional Madidi?

¹ Esta cartilla está basada en “*Guidelines for Participant Information Letter and Consent Form*” *Version 2 (Lineamientos para cartillas de información y formulario de consentimiento, versión 2)* formularios y formatos de Ética de Investigación en Humanidades en la Oficina de ética de la investigación.

- ¿Cuáles son las alternativas posibles para contribuir al bienestar de las comunidades indígenas?
- ¿Cómo entiendes y valoras el pensamiento indígena? Dar un ejemplo.
- ¿Qué piensas de la "consulta" definida como el derecho de los pueblos indígenas?
- ¿Cómo debe ser la comunicación con los pueblos indígenas? Menciona un ejemplo.
- ¿Cómo evalúa la coordinación entre las instituciones que trabajan dentro del parque?
- ¿Cómo evalúa el turismo?
- ¿Cómo evalúa la educación ambiental?

Esta entrevista será grabada usando una sencilla aplicación de grabación de teléfonos celulares. Sin embargo, usted es libre de escribir respuestas a las preguntas o solicitar una grabación de vídeo.

Las transcripciones de sus respuestas (audio o video) serán compartidas con usted, de modo que usted puede verificarlo si se citan para la versión final.

Beneficios

No se beneficiará individualmente de esta entrevista. La información proporcionada para esta investigación mejorará la comprensión de los elementos que deben ser incluidos / no incluidos en un marco de gestión para el Parque Nacional Madidi/áreas protegidas/pueblos indígenas, y así proponer un modelo de gestión a largo plazo para el Parque Nacional y las personas que dependen de ella. Las conclusiones de esta investigación también pueden beneficiar a otras áreas protegidas que enfrentan desafíos de gestión similares.

Riesgo

Si usted se siente afectado personalmente por una o más preguntas entenderé y respetaré su deseo de abstenerse de contestar éstas preguntas o detener la entrevista.

Participación voluntaria

La participación en esta entrevista es totalmente voluntaria. No hay penalidad ni obligación de responder a todas las preguntas. Se podrá hacer cita de su participación si corresponde una vez que haya verificado las transcripciones de la grabación de la entrevista. Si decide la información que proporcionó no se utilizará para esta investigación y se eliminará completamente de todos los registros.

La última fecha en que puede retirar su información es al final del trabajo de campo, que es el 18 de abril de 2017.

Confidencialidad y anonimato

Su nombre aparecerá en la sección de agradecimientos del documento final sólo si lo autoriza, de lo contrario sólo aparecerá el nombre de la institución que usted representa.

La información de su dirección es confidencial y solo la investigadora tiene acceso a ella.

La información proporcionada se mantendrá en un lugar seguro por un mínimo de 5 años después de la terminación del proyecto de investigación, los datos electrónicos serán protegidos con contraseña en el ordenador del investigador y todos los demás registros almacenados en un lugar seguro mantenido por el supervisor, Universidad. No se considera el uso futuro de los datos por otra persona que no sea la investigadora. El uso futuro de los datos a largo plazo considera el escaneo del diario de campo original para convertirse en formato de archivo electrónico, las grabaciones completas de audio / vídeo de las entrevistas se copiará de la computadora personal de la investigadora. Estos datos en bruto y copias adicionales de datos públicos se cargarán a la oficina satélite dirigida por el supervisor, dándole la autoridad para almacenarla de acuerdo con las regulaciones de la Universidad de Alberta. Para validar la información, será necesaria una reunión siguiendo las tradiciones y procedimientos de la comunidad. La tesis será presentada oral y públicamente en la comunidad antes de ser presentada a la universidad. Una copia impresa de la tesis final será entregada a las autoridades de la comunidad. Los datos recopilados para este estudio pueden ser utilizados para investigación adicional. En tal caso, se requerirá la aprobación de una Junta de Ética de Investigación. Información Adicional.

Si tiene alguna pregunta adicional sobre este estudio, no dude en ponerse en contacto con la investigadora o supervisora (ver información de contacto arriba). El plan para este estudio ha sido revisado y bajo directrices éticas por la Junta de Ética en Investigación de la Universidad de Alberta, Canadá. Para preguntas relacionadas con la conducta correcta y la ética de la investigación, comuníquese con la Oficina de Ética de la Investigación al +1 780 492-2615. E-mail: reoffice@ualberta.ca Esta oficina no tiene una participación directa en este proyecto.

Appendix K

INFORMATION LETTER AND CONSENT FORM¹ (Groups 2, 3)

Study Title: A NEW MANAGEMENT FRAMEWORK BASED ON THE CONCEPT OF BIOSPHERE DEVELOPED BY VERNADSKY FOR THE MADIDI NATIONAL PARK, BOLIVIA (An approach following the indigenous view of nature)	
Research Investigator: PATRICIA QUIROGA YAÑEZ	Professor Supervisor: DR. FIONA SCHMIEGELOW
Address: Department of Renewable Resources University of Alberta 500 College Drive, Whitehorse, Yukon Y1A 5K4, Canada. E-mail: quirogay@ualberta.ca Telephone number: +1 867-336-0210	Address: Department of Renewable Resources, University of Alberta c/o Yukon College, Applied Science Division 500 College Drive, Whitehorse, Yukon Y1A 5K4, Canada. E-mail: fiona.schmiegelow@ualberta.ca Telephone number: +1 867-668-8711

Background

You are being asked to be in this study because your participation and the experience you and your institution have with Madidi National Park will enrich this study. It is important for you to know that the criteria for choosing you and your institution was based on your involvement, either past, current or future, in work in Madidi National Park. The results of this study will be used in support of my thesis at the University of Alberta, Canada, as a sponsored student of the Bolivian Program "100 scholarships for Scientific and Technological Sovereignty" which is under Supreme Decree 2100 of September 1, 2014. It is a requirement of this Program that at the conclusion of my studies I must return to Bolivia and work in strategic state enterprises.

Purpose

The purpose of the research is to guide environmental policies and promote management strategies for Madidi National Park that benefit the entire ecosystem. Because it intends to advance the principles of the concept of "Biosphere" developed by Vernadsky, it will be relevant for broader scientific advancement. The resulting thesis will be presented to obtain the Master of Science degree in the program Protected Areas and Wildland Management in the Department of Renewable at the University of Alberta, Canada.

Study Procedures

The desired location for this interview is your workplace, but if that is not possible for any reason, it will be held in a place we both have safety and feel comfortable.

I would ask you to be honest in your responses as part of your responsibility to your institution. The approximate time for participation in this interview will be between 1 to 2 hours.

A single interview will be complete; however, if you would like to provide more information we can schedule a second or third interview. The type of questions you will be answering are related to the experience you have working in your institution and its relationship with Madidi Nacional Park. The open questions are the following.

In your opinion, what are the difficulties that exist in the Park?

What are the possible alternatives to contribute to the well-being of the indigenous community?

What is your opinion about the projects that were carried out or are carried out inside the park?

What impacts do you find due to the influence of technological and economic development on Madidi National Park?

How do you understand and value indigenous thinking? Give an example.

What do you think about the "consultation" defined as the right of indigenous peoples?

How should communication with indigenous peoples be? Mention an example.

How do you evaluate the coordination between the institutions that work inside the park?

¹ It is based on "*Guidelines for Participant Information Letter and Consent Form*" Version 2 of the Human Research Ethics Forms and Template at the Research Ethics Office.

How do you evaluate the tourism?
How do you evaluate environmental education?

This interview will be recorded using a simple audio recording cellphone app. However, you are free to write answers to the questions or request a video recording.
Transcripts of your answers (audio or video) will be shared with you, so that you can verify it for the final version.

Benefits

You will not benefit individually from this interview. I hope that the information provided for this research will improve understanding of elements that should be included/not included in a management framework for the Madidi National Park, and thereby improve the long-term management of the Park and the people that depend on it. Lessons from this research may also benefit other areas facing similar management challenges.

Risk

If you feel affected personally by one or more questions because they may recall memories that you prefer not to answer, or for any other reason, I will understand and respect your desire to refrain from answering these questions or to stop the interview.

Voluntary Participation

The participation in this interview is completely voluntary. There is no penalty, nor obligation implied to answer all questions. Once you have verified the transcripts of the interview recording you are free to withdraw at any time during the fieldwork research. If you decide to withdraw, the information you provided will not be used for this research and will be completely removed from all records.

The last date you can withdraw your information is at the end of the fieldwork, which is on April 18 of 2017.

Confidentiality & Anonymity

Your name will appear in the acknowledgement section of the final document only if you authorize it, otherwise just the name of the institution that you represent will appear.

Your address information is confidential and only the researcher (I) have access to it.

Information provided will be kept in a secure place for a minimum of 5 years following completion of research project and electronic data will be password protected on the researcher's computer and all other records stored in a secure place maintained by the supervisor, following secure regulations of the university.

Future use of the data by anyone other than the researcher is not considered. Long term plan for the future use of the raw data, that is the complete audio/video recordings of the interviews, will be copied from the researcher's personal computer. These raw data and extra copies of public data will be upload to the satellite office directed by the supervisor giving her the authority to store it according to the University of Alberta regulations.

As a participant, you will not have a copy of the thesis; however, a hardcopy of the final thesis will be given to the institution at the conclusion of the research.

The data collected for this study may be used for additional research. In that instance, approval will be required from a Research Ethics Board.

Further Information

If you have any further questions regarding this study, please do not hesitate to contact the researcher or supervisor (see contact information above).

The plan for this study has been reviewed for its adherence to ethical guidelines by a Research Ethics Board at the University of Alberta, Canada. For questions regarding participants right and ethical conduct of research, contact the Research Ethics Office at +1 780 492-2615. E-mail: reoffice@ualberta.ca

This office has no direct involvement with this project.

Consent Statement

I have read this form and the research study has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have additional questions, I have been told whom to contact. I agree to participate in the research study described above and will receive a copy of this consent form after I sign it. I authorize my full name be displayed in the acknowledgement section of the thesis.

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

Do you authorize to record this interview?

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

Do you consent the use of data and analysis for future uses?

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

Participant's Name (printed) and Signature

Date

Name (printed) and Signature of Person Obtaining Consent

Date

CARTILLA DE INFORMACIÓN Y CONSENTIMIENTO¹
(Grupos 2, 3)

Título: UN NUEVO MARCO DE GESTIÓN PARA EL PARQUE NACIONAL MAIDIDI DE BOLIVIA BASADO EN EL CONCEPTO DE BIOSFERA DESARROLLADO POR VERNADSKY (Un acercamiento siguiendo la visión indígena de la naturaleza)	
Investigador: PATRICIA QUIROGA YAÑEZ	Supervisora: DR. FIONA SCHMIEGELOW
Dirección: Department of Renewable Resources University of Alberta 500 College Drive, Whitehorse, Yukon Y1A 5K4, Canada. E-mail: quirogay@ualberta.ca Número de teléfono: +59173524732 (Bolivia) +1 867-336-0210 (Canadá)	Dirección: Department of Renewable Resources, University of Alberta c/o Yukon College, Applied Science Division 500 College Drive, Whitehorse, Yukon Y1A 5K4, Canada. E-mail: fiona.schmiegelow@ualberta.ca Número de teléfono: +1 867-668-8711

Antecedentes

La importancia de usted y su institución/organización en este estudio es debido a su experiencia en el Parque Nacional Madidi/áreas protegidas/pueblos indígenas, lo cual permitirá enriquecer este trabajo. Es importante que sepa que los criterios para elegirlo responden a su trabajo anterior, actual o futuro en el Parque Nacional Madidi /áreas protegidas/pueblos indígenas.

Los resultados de este estudio serán presentados en mi tesis de maestría en la Universidad de Alberta, Canadá, como becaria Boliviana del programa "100 becas para la Soberanía Científica y Tecnológica" que se encuentra bajo el Decreto Supremo 2100 del 1 de septiembre de 2014. Es un requisito de este Programa que al final de mis estudios debo regresar a Bolivia y trabajar en empresas estatales estratégicas.

Propósito

El propósito de la investigación es guiar las políticas ambientales y promover estrategias de manejo para el Parque Nacional Madidi que beneficien a la población y el lugar donde viven. Por otra parte se pretende dar un avance científico de los principios del concepto de "Biosfera" desarrollado por Verdnasky, haciendo un acercamiento a la visión indígena de la naturaleza.

La tesis resultante será presentada para obtener el máster en el programa Áreas Protegidas y Manejo de Tierras del Departamento de Recursos Renovables de la Universidad de Alberta, Canadá.

Procedimientos del estudio

Esta entrevista puede ser desarrollada en su lugar de trabajo, pero si no es posible por otros motivos, se podrá realizar en otro lugar que de seguridad y comodidad.

Le pido que sea honesto en sus respuestas como parte de su responsabilidad ante su institución. El tiempo aproximado para la participación en esta entrevista será entre 1 a 2 horas.

¹ Esta cartilla está basada en “*Guidelines for Participant Information Letter and Consent Form*” *Versión 2 (Lineamientos para cartillas de información y formulario de consentimiento, versión 2)* formularios y formatos de Ética de Investigación en Humanidades en la Oficina de ética de la investigación.

Una sola entrevista es suficiente; sin embargo, si desea proporcionar más información podemos programar una segunda o tercera entrevista. El tipo de preguntas que responderán están relacionadas con la experiencia que usted tiene trabajando en su institución y su relación con el Parque Nacional Madidi. Las preguntas guías son las siguientes:

- En su opinión, ¿cuáles son las dificultades que existen?
- ¿Cuáles son las alternativas posibles para contribuir al bienestar de la comunidad indígena?
- ¿Cuál es su opinión sobre los proyectos que se llevaron a cabo o se llevan a cabo dentro del parque?
- ¿Qué impactos encuentra usted debido a la influencia del desarrollo tecnológico y económico en el Parque Nacional Madidi?
- ¿Cómo entiendes y valoras el pensamiento indígena? Dar un ejemplo.
- ¿Qué piensas de la "consulta" definida como el derecho de los pueblos indígenas?
- ¿Cómo debe ser la comunicación con los pueblos indígenas? Menciona un ejemplo.
- ¿Cómo evalúa la coordinación entre las instituciones que trabajan dentro del parque?
- ¿Cómo evalúa el turismo?
- ¿Cómo evalúa la educación ambiental?

Esta entrevista será grabada usando una sencilla aplicación de grabación de teléfonos celulares. Sin embargo, usted es libre de escribir respuestas a las preguntas o solicitar una grabación de vídeo.

Las transcripciones de sus respuestas (audio o video) serán compartidas con usted, de modo que usted puede verificarlo si se citan para la versión final.

Beneficios

No se beneficiará individualmente de esta entrevista. La información proporcionada para esta investigación mejorará la comprensión de los elementos que deben ser incluidos / no incluidos en un marco de gestión para el Parque Nacional Madid/áreas protegidas/pueblos indígenas, y así proponer un modelo de gestión a largo plazo. Las conclusiones de esta investigación también pueden beneficiar a otras áreas protegidas que enfrentan desafíos de gestión similares.

Riesgo

Si usted se siente afectado personalmente por una o más preguntas entenderé y respetaré su deseo de abstenerse de contestar éstas preguntas o detener la entrevista.

Participación voluntaria

La participación en esta entrevista es totalmente voluntaria. No hay penalidad ni obligación de responder a todas las preguntas. Se podrá hacer cita de su participación si corresponde una vez que haya verificado las transcripciones de la grabación de la entrevista. Si decide retirarse, la información que proporcionó no se utilizará para esta investigación y se eliminará completamente de todos los registros.

La última fecha en que puede retirar su información es al final del trabajo de campo, que es el 18 de abril de 2017.

Confidencialidad y anonimato

Su nombre aparecerá en la sección de agradecimientos del documento final sólo si lo autoriza, de lo contrario sólo aparecerá el nombre de la institución que usted representa.

La información de su dirección es confidencial y solo la investigadora tiene acceso a ella.

La información proporcionada se mantendrá en un lugar seguro por un mínimo de 5 años después de la terminación del proyecto de investigación, los datos electrónicos serán protegidos con contraseña en el ordenador del investigador y todos los demás registros almacenados en un lugar seguro mantenido por el supervisor, Universidad.

No se considera el uso futuro de los datos por otra persona que no sea la investigadora. El uso futuro de los datos a

largo plazo considera el escaneo del diario de campo original para convertirse en formato de archivo electrónico, las grabaciones completas de audio / video de las entrevistas se copiará de la computadora personal de la investigadora. Estos datos en bruto y copias adicionales de datos públicos se cargarán a la oficina satélite dirigida por el supervisor, dándole la autoridad para almacenarla de acuerdo con las regulaciones de la Universidad de Alberta. Para validar la información, será necesaria una reunión siguiendo las tradiciones y procedimientos de la comunidad. La tesis será presentada oral y públicamente en la comunidad antes de ser presentada a la universidad. Una copia impresa de la tesis final será entregada a las autoridades de la comunidad. Los datos recopilados para este estudio pueden ser utilizados para investigación adicional. En tal caso, se requerirá la aprobación de una Junta de Ética de Investigación. Información Adicional.

Si tiene alguna pregunta adicional sobre este estudio, no dude en ponerse en contacto con la investigadora o supervisora (ver información de contacto arriba). El plan para este estudio ha sido revisado y bajo directrices éticas por la Junta de Ética en Investigación de la Universidad de Alberta, Canadá. Para preguntas relacionadas con la conducta correcta y la ética de la investigación, comuníquese con la Oficina de Ética de la Investigación al +1 780 492-2615. E-mail: reoffice@ualberta.ca Esta oficina no tiene una participación directa en este proyecto.

Declaración de consentimiento

He leído este formulario y he recibido una explicación de la investigación. Se me ha dado la oportunidad de hacer preguntas y mis preguntas han sido contestadas. Si tengo más preguntas, tengo información de a quién contactar. Acepto participar en la investigación descrita anteriormente y recibiré una copia de este formulario de consentimiento de _____ después de _____ de _____ firmararlo.

Autorizo que mi nombre completo se muestre en la sección de reconocimiento de la tesis.

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

¿Autoriza usted para grabar esta entrevista?

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

¿Está usted de acuerdo con el uso de datos y análisis para usos futuros?

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

Nombre del participante (impresión) Firma.

Fecha

Nombre (impresión) y Firma de la persona que obtiene consentimiento. Fecha.

Appendix L: Supporting fieldwork letter form the Ministry of Education, Bolivia

English version

La Paz, December 29, 2016

To whom it may concern,

Ref. Support to a scholarship holder of the "100 Scholarships for Scientific Technological Sovereignty" program
Patricia Quiroga Yañez

Miss Patricia Quiroga Yañez with C.I. 4373564 L.P., is a fellow of the program "100 Scholarships for Scientific and Technological Sovereignty" 1st Call, is currently studying for a Masters in "Protected Areas and Wildlife Management" at the University of Alberta in Canada.

As part of the graduate program, she must carry out her fieldwork in Bolivia from January to April 2017 in the Madidi National Park, so all the collaboration that can be offered to the intern to benefit your field work and all your investigation.

Any questions about the intern, do not hesitate to contact the Ministry of Education and the scholarship program

Sincerely,

Alejandro Gomez Lizarro

Director General of Higher Education University

Vice Ministry of Higher Education and Professional Training

Apéndice L: Carta de respaldo del Ministerio de Educación de Bolivia para trabajo de campo

Versión Español

La Paz, 29 diciembre de 2016

A quien corresponda:

**Ref.: Apoyo a becaria del programa
"100 Becas de Estudio para la Soberanía
Científica Tecnológica" Patricia Quiroga Yañez**

La Srta. Patricia Quiroga Yañez con C.I.4373564 LP, es becaria del programa "100 Becas de Estudio para la Soberanía Científica Tecnológica" 1ra Convocatoria, actualmente cursa la maestría en "Áreas Protegidas y Manejo de Tierras Vírgenes" en la Universidad de Alberta en Canadá.

Como parte del programa de postgrado, debe realizar su trabajo de campo en Bolivia de enero a abril 2017 en el Parque Nacional Madidi, por lo que se agradece toda la colaboración que se le pueda brindar a la becaria para beneficiar su trabajo de campo y toda su investigación.

Cualquier consulta sobre la becaria, no dude en contactarse con el Ministerio de Educación y el programa de las becas.

Atentamente,



Alejandro A. Gómez Lizarro
DIRECTOR GENERAL DE EDUCACIÓN
SUPERIOR UNIVERSITARIA
VICEMINISTERIO DE EDUCACIÓN SUPERIOR Y FORMACIÓN PROFESIONAL
MINISTERIO DE EDUCACIÓN

Lic. Alejandro Gomez Lizarro
Director General de Educación Superior Universitaria
Viceministerio de Educación Superior y Formación Profesional

Appendix M: Fieldwork supporting letter from the University of Alberta

English version

December 20, 2016

Whitehorse, Yukon CANADA

Re. Support for Patricia Quiroga Yañez, Master of Science Candidate

To Whom This May Concern:

This is to certify that Patricia Quiroga Yañez is a Master of Science student in the Protected Areas and Wildland Management program, in the Department of Renewable Resources at University of Alberta, in Canada.

Patricia is conducting the fieldwork for her research, entitled:

*A NEW MANAGEMENT FRAMEWORK BASED ON THE CONCEPT OF BIOSPHERE DEVELOPED BY VERNADSKY FOR THE MADIDI NATIONAL PARK, BOLIVIA
(An approach following the indigenous view of nature)*

Any support or information that can be provided to Patricia to benefit and improve the results of her research would be greatly appreciated.

If you have any questions or concerns regarding Patricia's research, please do not hesitate to contact me at the email address provided below.

Sincerely,



Dr. Fiona K.A. Schmiegelow

Professor & Program Director
Northern Environmental and Conservation Sciences
Department of Renewable Resources, University of Alberta
c/o Yukon College, Yukon Research Centre
Email: Fiona.Schmiegelow@ualberta.ca

Apéndice M: Carta de respaldo para trabajo de campo de la Universidad de Alberta.

Versión Español

Whitehorse, 20 de diciembre de 2016
Yukon, Canadá

Ref. Apoyo a postulante de maestría Srta. Patricia Quiroga Yañez

A quién corresponda:

Este es un documento que certifica que la Srta. Patricia Quiroga Yañez es estudiante de maestría del programa áreas protegidas y gestión de tierras en el Departamento de Recursos Renovables de la Universidad de Alberta en Canadá.

Patricia está realizando trabajo de campo para su investigación cuyo título es:

*UN NUEVO MARCO DE GESTIÓN PARA EL PARQUE NACIONAL MADIDI DE BOLIVIA BASADO EN EL
CONCEPTO DE BIOSFERA DESARROLLADO POR VERNADSKY
(Un acercamiento siguiendo la visión indígena de la naturaleza)*

Se agradece mucho cualquier ayuda e información que pueda proporcionar a Patricia para beneficiarla y mejorar los resultados de su investigación.

Cualquier pregunta o inquietud con respecto a la investigación de Patricia, por favor no dude en contactarme.

Atentamente,



Dr. Fiona K.A. Schmiegelow

Professor & Program Director
Northern Environmental and Conservation Sciences
Department of Renewable Resources, University of Alberta
c/o Yukon College, Yukon Research Centre
Email: Fiona.Schmiegelow@ualberta.ca

Appendix N: List of English volunteer students

	Name
1	Yandira Yuchima
2	Jose Alfred Valdez
3	Keity Rubi Pariamo Valdez
4	Dayana Uchina
5	Anjhy Pariamo Valdez
6	Joseph Quetehuari Medina
7	Deivy Rances Navi Apana
8	Jonas Robino Pariamo Valdez
9	Sergio Junior Apana Fuente
10	Axel Aliaga Quetehuari
11	Eunice Siria Cuqui Macuapa
12	Jacky Barradas
13	Mariana Valdez Apana
14	Franco Navi Macuapa
15	Marita Sarley Macuapa

Appendix O: Interview cards

INTERVIEW RECORD CARD	
N° 1	Date: Feb 24 th , 2017
Institution: Chalalán S.A.	Place of interview: Office in Rurrenabaque
Name: Rodrigo Mariaca	Post: General Manager
<p>Brief Description: He is a professional biologist hired by the community in a difficult moment of the Enterprise. He narrates how the areas were never isolated. There was an economical interchange between Andean and Amazonian people in the past. Chalalán started with the help of Yossy Ghinsberg. Chalalán became famous because it was the first ecolodge in the eco communitarian model. He also describes Chalalán's policy to privilege jobs to the community. The first step in his job was to stop the economical loses and rebuild infrastructure. He plans to improve services like the menus according to the public needs including international requisites. The indigenous traditions are attractive to tourists.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 2,3
Notes: Oral consent. No signature due to the difficult conditions.	

INTERVIEW RECORD CARD	
N° 2	Date: Mach 3 rd , 2017
Institution: Madidi Jungle	Place of interview: Town
Name: Rony Quetehuari	Post: Tour Guide
<p>Brief Description: Rony is from San José de Uchupiamonas and he narrates how he learned English in Chalalán program to become a successful tour guide. Currently being a tour guide is his way of living. He works in Madidi Jungle. He expresses his concern about tourism and the problem with new generations that are losing the knowledge and how the opportunities to learn English is less while they need it more. He is the last generation of young people who had formal classes in Chalalán.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 1
Notes: Oral consent. No signature due to the difficult conditions	

INTERVIEW RECORD CARD	
N° 3	Date: March 21 st , 2017
Institution: CPILAP	Place of interview: Casa Grande
Name: Lino Illimuri	Post: Secretary of Education and tourism
<p>Brief Description: He describes his experience as a leader in CPILAP. Indigenous peoples have same problems in many places, and it is important they start to group together. He also talks about his thoughts on the indigenous view of nature. He thinks it is not yet recognized. His point of view of the impact of technology in San José de Uchupiamonas is that they should go in that direction by with enough care keeping traditions safe. He analyzes the word "consult" in the ILO convention 169 OIT in the eyes of the indigenous peoples. The 'consult' is a way to avoid the reality of indigenous demands. Indigenous peoples never requested 'consultation' Provides a message for future generations to preserve knowledge and work for the community being loyal and pursuing the benefit of people.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 2,3
Notes: Oral consent. No signature due to the difficult conditions.	

INTERVIEW RECORD CARD	
N° 4	Date: March 24 th , 2017
Institution: Chalachán S.A.	Place of interview: House in Tumupasa
Name: Martin Laura	Post: Trustee
<p>Brief Description: He describes his analysis of the reasons that lead Chalachán to the bankruptcy. The loss of control on loans were big failings in Chalachán. People borrowed money that could never be paid. Others borrowed the same and rejected to pay to the ecolodge because they wanted 'the previous ones' pay first. Eventually, nobody knew the amount of money that was going out of the company. People needed more money and more for different reasons, health emergencies, school needs and so. The new managers themselves started to rob the ecolodge. The indiscipline on money and the lack of honesty lead to the bankruptcy. He is concerned about nature and the behavior of the community regarding the environment. He met the last powerful shaman of the community, and he wishes people can remember the connection people have with nature as he used to. A wise man that was respected for all. He wants children to learn at early age to take care of the environment and respect their roots. He promotes a voluntary organization to promote environmental education in Tumupasa.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 1
Notes: The record is not clear. Only some excerpts will be transcribed.	

INTERVIEW RECORD CARD	
N° 5	Date: March 23 rd , 2017
Institution: School	Place of interview: Town
Name: Edwin Choque Catacora	Post: Biology teacher
<p>Brief Description: The teacher describes his experience of almost four years working with San José de Uchupiamonas students. He sees the innocence of this population and the way they are changing with the introduction of cellphones, but even though if compared to other schools, the students are well behaved and do not do drugs. He feels the limitations that the school have in remote areas regarding materials, but also the opportunities. Some very good students can easily overpass students in the city. He observes how the community practice ceremonies as a whole in sacred places in special dates to start production or harvesting. They are quite respectful of that. His role as a teacher beyond the school is always shaped by community wishes. Most of the teachers are from the Aymara nation in The Andes and take time to get accepted.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 2,3
Notes: Oral consent. No signature due to the difficult conditions	

INTERVIEW RECORD CARD	
N° 6	Date: April 19 th , 2017
Institution: WCS	Place of interview: Office in La Paz city
Name: Oscar Loayza Cossio	Post: Subdirector of the Program Conservation of the great landscape Madidi
<p>Brief Description: He describes his experience in many years working in the Madidi with other institutions in order to preserve the Madidi. Coordination fails because authorities cannot get an agreement if they change periodically. To start constantly with new people is to forget what has been done before. Planning is important for people, so they know places designated for specific purposes. WCS has expectations on <i>Plan de Vida</i> that will be doing in San José de Uchupiamonas.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 2,3
Notes: Oral consent.	

INTERVIEW RECORD CARD	
N° 7	Date: March 26 th , 2017
Institution: Town's Board	Place of interview: Office in Rurrenabaque
Name: Elio Valdez Amutari	Post: Ex-Member
<p>Brief Description: Elio provides a deep understanding of the indigenous view of nature in his own words. He knows and is confident of the power that nature provides people. The beauty and the magic of this knowledge coming from the ancestors will be back again. The analysis of the difficulties of San José is complemented with the studies he had in the university as a professional in Tourism. He describes many achievements while being in the Town's Board. Progress is important, but in the way they can keep the respect for the way of living they have. His commitment with his people comes from the teachings of their parents and grandparents and his own experience and interactions with nature, with coca leaves, with the dances and parties they practice.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 2,3
Notes: Oral consent. No signature due to the difficult conditions	

INTERVIEW RECORD CARD	
N° 8	Date: March 26 th , 2017
Institution: Madidi Jungle	Place of interview: Office in Rurrenabaque
Name: Alex Villca Limaco	Post: Owner
<p>Brief Description: I interview Alex on two issues. One related with his Enterprise Madidi Jungle, and how did he started, the strategies and how they are doing with ecotourism. Despite the new regulations that ask for a visa to foreign tourists and the diminishment of economical flow to the tourism in general, his company is rising up. As an indigenous entrepreneur, he is most in deep relation to his community and values. He is curious about what happened with the Uchupiamonas and brings back in the practices that old people used to do. The talking with nature and moving the rain is not a tale story, he met the last powerful shaman and trust that respect for nature is the only way to live in harmony truly. The other issue is related with his broad perspective on how San José should face the future preserving the rich knowledge they have. He is convinced that to live in the modern world is possible, but indigenous peoples need to keep their knowledge and at the same time incorporate the tools of the modern world. He protests that Uchupiamonas are not in the constitution. They need to travel around the world and interact with other indigenous groups. They need to talk with other cultures.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 2,3
Notes: Oral consent. No signature due to the difficult conditions.	

INTERVIEW RECORD CARD	
N° 9	Date: December 2016 and April, 2017
Institution: National Board. SERNAP	Place of interview: Office in La Paz
Name: Jhonny Ayala	Post: Monitoring Technician
<p>Brief Description: He has been working many years in SERNAP and unluckily they do not have a database of the books published, not an institutional library. He talks about the lack of indigenous studies in SERNAP, but he is aware of its importance for good management in the National Parks.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 2,3
Notes: This was not a formal meeting, but in few encounters, I had the opportunity to ask about Institution's documentation.	

INTERVIEW RECORD CARD	
N° 10	Date: March 27 th , 2017
Institution: Local bureau SERNAP	Place of interview: Office in Rurrenabaque
Name: Jose Luis Howard Ramirez	Post: Protection Chief of Madidi
<p>Brief Description: The guard park provided general information of the main problems related with conservation and preservation. Leaders of the communities can collaborate in different levels but sometimes some leaders are susceptible, and no dialogue is possible if there is not a good predisposition. The local SERNAP respect hunting for eating and do not deny the right communities have to ask for better services such as electricity and road maintenance. However, the coordination they have with other institutions are difficult to agree, and the budget is not enough as required. The commitment he has to the protection of the park is high and part of his life forever. The experiences in the jungle are delighting. The last one, he remembers is the rescue of a Chilean tourist that affirms monkeys and turtles have helped him to survive providing them shelter, food, and water.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 2,3
Notes: Oral consent. No signature due to the difficult conditions	

INTERVIEW RECORD CARD	
N° 11	Date: April 4 th , 2017
Institution: Independent	Place of interview: La Paz city
Name: Carlos Macusaya	Post: Indigenous Writer
<p>Brief Description: As a writer, Carlos Macusaya describes the indigenous problem in the country. His Aymara perspective and his critiques are valid for all indigenous contexts. He provides many examples of how the current knowledge deny and ignore indigenous peoples. He agrees that the world of indigenous peoples is seen as folklore. Their practices are seen as pagan, but deep in the roots, it is the way they make connections and keep brotherhood. The Indian leaders are lost in a history that wants to hide them. The movement of indigenous peoples coming from many tribes in the Andes and Amazon is just one. They are under threat of disappearance. Society still is talking to educate Indians.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 2,3
Notes: Signature	

INTERVIEW RECORD CARD	
N° 12	Date: April 6 th , 2017
Institution: Town's board	Place of interview: La Paz City
Name: Guido Mamani	Post: Ex-president of the Town's Board
<p>Brief Description: He explains many activities he has done as a president of the community. The treatment he receives as a leader of the indigenous territory, sometimes seen as 'strange,' sometimes very respected. It is not easy for the city to understand that the community shares the land. The future he hopes is the one that can balance the modern world and the traditional knowledge they learned. The man is kind and respectful with his people, even if they decide to break the indigenous territory in single and independent parcels. He hopes young generations study in the universities and give their perspectives to the conventional institutions.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 1
Notes: Oral consent.	

INTERVIEW RECORD CARD	
N° 13	Date: April 19 th , 2017
Institution: Direction of Biodiversity and Protected Areas	Place of interview: Office in La Paz city
Name: Juan Pablo Torrico	Post: Technician in biodiversity knowledge management
<p>Brief Description: The level of this Direccion is distant from indigenous communities, but the interest they have is increasing. He explains the changes of the view they were working with years ago, focusing on flora and fauna. Now the challenge is to integrate new visions of management based on strong community relationship. This is just starting and is very slow due to the difficulties to have sincere encounters with communities. External interests may be a barrier to a real understanding.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 2,3
Notes: Oral consent.	

INTERVIEW RECORD CARD	
N° 14	Date: April 19 th , 2017
Institution: SAFCI (Intercultural Familiar-Communitarian Health)	Place of interview: Office in La Paz. Edificio Loteria 5to Piso.
Name: José Llerena	Post: Ex doctor in San José de Uchupiamonas
<p>Brief Description: He was working with the shamans in the community, trying to put their knowledge to a level that can be understood by occidental medicine. He is delighted with new understandings that are worth to research and give them value. Many times the displayed a demonstration of the powers of the shamans in healing people in the body and the soul. He considers that conventional medicine can benefit gratefully with the knowledge of shamans. He ended up in San José the Uchupiamonas because of his high score in an exam. He could have chosen a place near to the city as many doctors want, but he decided for service. He performed healing with shamans and discovered a power beyond traditional medicine. Conventional medicine can act in some type of illnesses, more physically, but this other medicine embraces energies, the earth, and the cosmos. Everything is connected and has an impact on people He thinks his knowledge has to be free of susceptibility and provide humanity a better living as he himself experienced. He wishes more doctors dare to experience the intercultural Familiar Communitarian Health. When the program started many activities such as the gathering of shamans were challenging for the 'other culture.' Unfortunately, the program became small and needs money from the municipalities that prioritize other activities.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 2,3
Notes: Oral consent.	

INTERVIEW RECORD CARD	
N° 15	Date: April 19 th , 2017
Institution: National Board SERNAP	Place of interview: Office in La Paz City
Name: Antonio Pereira	Post: Director's Advisor
<p>Brief Description: He gives a general perspective based on the questions in the information letter provided to him. He preferred to provide written answers, but in the brief meeting we have, he describes the importance of tourism that Madidi National Park and hopes my work can sum for efforts to preserve natural areas. Some indigenous peoples do not respect SERNAP regulations. The institution collaborates with productive projects. The Amazon is like a house for them, but pollution is very conflictive.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 2,3
Notes: He answered following the questions on the Information Letter.	

INTERVIEW RECORD CARD	
N° 16	Date: Feb, 2017
Institution: Health house	Place of interview: Heath house
Name: Anastacio Cuqui	Post: Medical Assistant
<p>Brief Description: He experienced how external NGO's aid bring good and bad. Also, he explains different types of treatments based on traditional and occidental medicine. If the soul, not the body, is sick the work is for the shamans. His concerns are that people are becoming unhealthy and shamans are old, and the wisest passed away. He hopes people may get conscious and give value to the medicine they have. The rush of the modern life is pulling them to easy an ineffective medicine. Young mothers want an easy remedy and next time the remedy does not work. NGO's leave the medicine and then disappear.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 1
Notes: Notes on the field diary may reconstruct the basic information he provided.	

INTERVIEW RECORD CARD	
N° 17	Date: Feb, 2017
Institution: Ministry of Rural Development	Place of interview: San José de Uchupiamonas
Name: Herlan Surco Lopez	Post: Veterinarian
<p>Brief Description: He helps people to understand the importance of vaccines for the livestock in order to improve cow production. He explains how San José de Uchupiamonas can easily have more incomes if they can transport the livestock. The cows are healthy and may be preferred in the market. Other regions in the tropical areas are having problems with new diseases. For him, it is important that people learn the appropriate ways to raise cows and benefit from it.</p>	
Explicit Consent: Yes	Information Letter Consent Form: Group 2,3
Notes: This was a casual meeting. I had the chance to meet him at night after he finished his work.	

Appendix P: Extended Glossary

Air. See bio-inert natural body. One of the components of the human dimension. It is the mixture of gases that forms the Earth's atmosphere (or other heavenly body). Dry air composition slightly varies depending on the localities and altitude (At sea level the average is: Nitrogen, 78.08%; oxygen, 20.95%; argon, 0.93%; carbon dioxide, 0.03%; neon, 0.0018%; helium, 0.0005%; krypton, 0.0001%; xenon, 0.00001%). Air generally contains, in addition the above liquid aerosols (water vapour from 0% to 4%), and solid aerosols (dust particles, sea salt, hydrocarbons, hydrogen peroxide, sulphur compounds, spores, pollen, bacteria). Electrical discharges make take place causing crackling sounds (atmospherics).

Anisotropic. It manifests right-handedness and left-handedness. All life has this manifestation, (plants, and animals), the geometric laws for this manifestation is unknown. All crystals are anisotropic as well (except perfect cubes. See isotropic), but geometric laws to represent them are known.

Autonomous. That it is independent or self-governing.

Autonomy. It is the capacity to make informed decisions excluding interferences from others and through one's own independence of mind and after personal reflection. See Self-governance.

Awareness. The *mental* experience of consciousness (it is not the only ways to experience consciousness). It involves a sense of knowing and often includes that which is known.

Bioelectromagnetic field. It is the area in which interaction between electromagnetic fields and biological entities occur.

Biosphere. The region of transformers that convert cosmic radiations into active energy in electrical chemical, mechanical, thermal, and other forms. Radiations from all stars enter the biosphere, but we catch and perceive only insignificant part of the total; this comes almost exclusively from the sun. This penetrating cosmic radiation determines the character and mechanism of the biosphere. It is dynamic, and includes mental and spiritual activity.

In Ecology is the highest level of organization (individual, population, community, ecosystem, landscape, biome, biosphere). In the context of biosphere all ecosystems, both on land and in the water, are linked through their interactions (exchanges of materials and energies) with the other components of the Earth system: atmosphere, hydrosphere, and geosphere.

Bioinert material. Biologically inert or bioinert material refers to any material that once placed in the human body has minimal interaction with its surrounding tissue, examples of these are stainless steel, titanium, etcetera. Originally, these materials were used for vascular surgery due to the need for surfaces, which do not cause clotting of the blood. For this reason, bioinert material may sometimes also be called hemocompatible.

Bio-inert natural body. Bio-inert bodies are characteristic of the biosphere. These are lawful structures, consisting of inert and living bodies simultaneously (for example, soils, lakes, air masses, lakes), all of the physicochemical properties of which have to be adjusted—with sometimes very large corrections— if, in studying them, the activity of the living matter located within them is not taken into account.

The concept of a bio-inert natural body is relatively a new concept—defined in exact biogeochemical terms and in distinction from the concepts of inert and living natural bodies. Natural bodies of this sort are clearly expressed in the biosphere and play a big role in how it is organized.

The biogenic migration of chemical elements (atoms) plays a big role in their properties—very often the dominant role.

Category. A group of things that are all of the same type.

Chaco. Slang in San José de Uchupiamonas to refer to a chosen place in the jungle that after it has been burned and trees have been cut, becomes a place to grow crops.

Chakana. It is called the Inca cross. A powerful cultural symbol which mathematical order that can be pointed as perfect. It can be interpreted in various ways for the purposes of ceremonies, agriculture, history and so. It is a key to understand the worlds in which we live.

Classical. Form or system considered of first significance in earlier times and became traditional. See traditional.

Cognition: It is the process of knowing. The process refers to a broad range of mental “behaviors,” including awareness, thinking, reasoning, judgment, memory. J. Piaget, Vygotsky and Bruner, coincide about cognition as a process of acquisition. Piaget's cognitive development was a progressive reorganization of mental processes as a result of biological maturation and environmental experience. Vygotsky's theories stress the fundamental role of social interaction in the development of cognition. Bruner stated that learning is an active process in which learners construct new ideas or concepts based upon their current/past knowledge. The explanation coming from the psychoanalysis (Freud, Jung, Lacan, Chomsky) due to its ‘inner’ feature is commonly related to consciousness (be aware) and unconsciousness (not be aware). See awareness and consciousness.

Collective unconscious: It is a form of the unconscious (that part of the mind containing memories and impulses of which the individual is not aware) common to mankind as a whole and originating in the inherited structure of the brain. It is distinct from the personal unconscious, which arises from the experience of the individual. According to psychiatrist Carl Jung, the collective unconscious contains archetypes, or universal primordial images and ideas.

Cosmic Rays. Highly energetic particles that move through space at close to the speed of light and that continuously bombard the Earth's atmosphere from all directions. They were discovered by V. F. Hess during a balloon flight in 1912.

Cosmology. The study of the large-scale structure and the evolution of the universe, and including, in its modern connotation, that part of cosmogony that deals with the origin of the universe and of the chemical elements.

In anthropology, cosmology entails both the overarching conceptions of the place of human beings in general scheme of existence and the forces engaged in the constitution and generation of such scheme.

Consciousness. The state of being aware of oneself (all dimensions) and one's surroundings. This awareness is not purely of external event or phenomena, but also of one's own feelings and mental events. Such introspective self-awareness as opposed to merely responding to external stimuli, is generally taken to be a prerequisite for consciousness. Consciousness has two dimensions: access to information, and the phenomenal or subjective personal quality of an experience.

The term consciousness often serves as a catch-all for all that is mysterious about mentality and cognition. The problem of consciousness is perhaps the largest outstanding obstacle in our quest to scientifically understand reality. Consciousness is essential to the mind. Any theory of the mind that does not make consciousness a central part of the investigation has missed the point. Traditionally, scientists have been reluctant to study consciousness. This reluctance is based on the belief that consciousness is not "scientific", instead, it has something to do with mysticism or religion.

Creolization. In its most general meaning, is a process of cultural change, the origins of which lie in encounters between Africans and Europeans, initially in a context of slavery and colonialism. This process produces new "creole" cultures and societies. Creolization is characteristic in Latin America where creole refers to people, languages, music, and things that are created in the "New World" but are not of Indigenous ancestry.

Crystal: It is a substance solidified in a definite geometrical form. Most solid substances, when pure, are obtainable in a definite crystalline form. Solids which do not form crystals are said to be amorphous.

Crystallization. The process whereby crystals are formed from a gaseous, liquid molten, or dispersed state.

Energy. Capacity of doing work. Various forms of energy, interconvertible by suitable means, include potential (stored by an object's position in a force field), kinetic (moving object)—others are manifestation of these two main forms: elastic (objects are compressed and stretched), electrical, heat (objects temperature), chemical (released when a fuel burns), nuclear (comes from splitting atoms in a reactor), and radiant (light) energy. Interconversion between these forms of energy can only occur in the presence of matter. Energy can only exist in the absence of matter in the form of radiant energy.

Names are given to many different forms of energy; the only real difference lies in the system under discussion. For example, chemical energy is the kinetic and potential energies of electrons in a chemical compound. The nervous system functions by way of the flow of the electrochemical energy.

Environment: Even for some, this word is exclusive for the "natural" space, environment is a complete space, social and natural.

Ethnography. It is the systematic descriptions of a single contemporary culture, often through ethnographic fieldwork. By contrast, ethnology in contemporary usage is the attempt to develop rigorous and scientifically grounded explanations of cultural phenomena by comparing and contrasting many human cultures.

Euclidian space. In geometry, a two- or three-dimensional space in which the axioms and postulates of Euclidean geometry apply; also, a space in any finite number of dimensions, in which points are designated by coordinates (one for each dimension) and the distance between two points is given by a distance formula.

The Cartesian system is Euclidean space with coordinates. The Cartesian Coordinate System unified geometry and algebra into one system of analytic geometry.

Evolution. Change with no back. This is not a mere morphological evolution (change in gene frequency through time resulting from natural), it implies the evolution of our thoughts as a species. It includes social evolution which refers to social changes that exhibit some sort of directionality. In addition, it is usually thought to involve a transformation in the form or type of society or one of its subunits (qualitative change), and not just changes in the degree or extent (quantitative change).

Field. The concept of a field was introduced to explain the interactions of particles or bodies through space. It is the region in which an electrically charged body (electric field), a magnetized body (magnetic field), or a massive body (gravitational field) exerts its influence. An electric charge, for instance, modifies the space around it such that

another charge in this region experiences a force. A field is thus a model for representing the way in which a force can exist between bodies not in contact.

Fire. See bio-inert natural body. One of the components of the human dimension. It is a phenomenon of combustion manifested in light, flame, and heat. Apparently had two roots for fire: *paewr- and *egni- (source of Latin ignis). The former was “inanimate,” referring to fire as a substance, and the latter was “animate,” referring to it as a living force (verb) c. 1200, furen, “arouse, inflame, excite” (a figurative use); literal sense of “set fire to” is attested from late 14c., from fire (n.)

Fire is major agent of disturbance, altering both biological and physical environment. In many regions, fire is a major determinant of landscape patterns.

Folk ecotope. It is a culturally-recognized landscape unit based in a variety of criteria including geomorphological features and landscape uses, perceived ecological, socioeconomic, and spiritual importance.

Fourth dimension. Ordinary space has three dimension, i.e. length, breadth, and thickness, each one at right angles to both the others. In dealing with a material particle, it is necessary to state not only where it is, but when it is there. Thus time is somewhat analogous to a dimension of space. In Newtonian (pre-relativity) physics space and time are separate and absolute quantities; that is they are the same for all observers in any frame of reference. An event seen in one frame is also seen in the same place and at the same time by another observer in a different frame. Relativity has shown in particular in what manner time may be regarded as fourth dimension, so that all real events take place in a four dimensional space-time continuum.

Fractal. In mathematics, fractals are infinitely complicated abstract objects used to describe and simulate naturally occurring objects. Fractals commonly exhibit similar patterns at increasingly small scales, also known as expanding symmetry or evolving symmetry. If this replication is exactly the same at every scale, it is called a self-similar pattern.

Functioning. Being in effective operation.

Geochemistry. It is concerned with (1) the determination of the relative and absolute abundance of elements in the earth, and (2) the study of the distributions and migration of the individual elements in the various parts of the earth with the object of discovering principles governing this distributions and migration.

Geological force. Geologic forces are forces that can change the geography of the land. Human species or even a single individual—including his thoughts and spirituality, can be considered as a new geological force.

Geologic forces that shape the Earth are weathering and erosion (from wind, ice, water, and gravity) and the results of plate tectonics (volcanism, earthquakes, mountain building, subduction, crust creation). They can also be called aeolian processes, glacial processes, fluvial processes, biological processes, hillslope processes, igneous processes, and tectonic processes.

Heliobiology. Study of the sun’s effect on biology.

Interaction. A mutual effect between two or more systems or bodies, so that the overall result is not simply the sum of the separate effects. The idea of a two-way effect is essential in the concept of interaction, as opposed to a one-way causal effect. There are different types: (A) Interactions distinguished in physics. 1. *Gravitational*, the weakest of the four, about 10^{40} times weaker than the electromagnetic interaction. It is an interaction between bodies or particles on account of their mass, and operates over long distances. 2. *Electromagnetic*, the interaction between charged bodies or particles (stationary or moving). It falls off with the square of distance and operates over all distances. 3. *Strong*, an interaction between hadrons (subatomic particle), about 100 times greater than electromagnetic interaction. It operates at very short range (up to around 10^{-15} m) and is the force responsible for holding nucleons together in the atomic nucleus. 4. *Weak*, an interaction about 10^{10} times weaker than the electromagnetic interaction. It occurs between leptons, and is the interaction in beta decay (a type of radioactive decay in which a nucleus emits, for instance, an electron). So far it has not proved possible to formulate a unified field theory for all four types of interaction, although there has been some success in unifying the electromagnetic and weak interaction. (B) Chemical interactions. Interactions between atoms and molecules. (C) Biological interactions. 1. *Gen-environment*, when two different genotypes respond to environmental variation in different ways. 2. *Cell-cell*, direct interactions between cell surfaces that play a crucial role in the development and function of multicellular organisms and 3. *Species*, the predation, parasitism, competition, and mutualism are all involved in acquiring the energy and nutrients required for assimilation the necessary resources for metabolism, growth and reproduction (the food chain and food webs is the abstract representation of the feeding relationship). (D) Interpersonal, Social, and Cultural interactions.

International community: It is a phrase used in geopolitics and international relations to refer to a broad group of people and governments of the world. It does not refer literally to all nations or states in the world. The term is typically used to imply the existence of a common point of view towards such matters as specific issues of human rights. The phrase has critiques in the political arena and cultural arena.

Isotropic. It lacks any manifestation of right-handedness and left-handedness. Only cubic crystals are isotropic, its perfect symmetry makes it without left-handedness or right-handedness (phenomena manifested in all life. See Anisotropic). Currently, geometrical space is isotropic (life is represented as a perfect cube).

Kichirakui: A Quechua word. It refers to the act of asking permission to Pachamama to start working the land including the petitions of wellbeing for the labours that will be initiated.

Living well. A civilizational and cultural alternative to capitalism based on the indigenous worldview. A definition in the context of Bolivian Plurinational State, Law 300 Art.5.

Mental activity. It is related to cognition. See cognition.

Mind. A set of faculties, processes and activities of the human beings that enables our awareness. It is of interest of disciplines such as the neurosciences, philosophy, psychology, linguistics, history, even in the past mind has been equated with the soul or the spirit. At other times, the mind has been denied altogether, and behaviour considered the only reality. The mind is part of the understanding of humans in areas such as language, thinking, pain and healing, depression and mood, addiction, development, ageing, violence and others.

Management. An activity undertaken by humans for the purpose of harvesting, transporting, protecting, changing, replenishing, or using resources. Management activity is driven (or should be) by management plans.

Matter. A specialized form of energy which has the attributes of mass and extension in space and time. There are states of matter (solids, liquids, gases, plasma, and others like glass or liquid crystal; or the ones under extreme conditions Bose-Einstein condensate, neutron-degenerate matter, quark-gluon plasma)

Matter is the substance composing bodies perceptible to the senses. The distinguishing properties of matter are gravitation and inertia. Any entity exhibiting these properties when at rest is matter. Although electromagnetic radiation also possesses these properties to some extent, this radiation always moves with the speed of light.

Matter should not be confused with mass (there was an historical time when there was no reason to distinguish mass from simply a quantity of matter). Matter is a general term describing any “physical substance”. By contrast, mass is not a substance but rather a quantitative *property* of matter and other substances or systems. Another difference is that matter has an “opposite” called antimatter, but mass has no opposite—there is no such thing as “anti-mass” or negative mass, so far as is known, although scientists do discuss the concept. Antimatter has the same (i.e. positive) mass property as its normal matter counterpart.

As such, there is no single universally agreed scientific meaning of the word “matter”. Scientifically, the term “mass” is well-defined, but “matter” can be defined in several ways. Sometimes in the field of physics “matter” is simply equated with particles that exhibit rest mass (i.e., that cannot travel at the speed of light), such as quarks and leptons. However, in both physics and chemistry, matter exhibits both wave-like and particle-like properties, the so-called wave-particle duality.

Mechanism. A system of parts working together. A mechanism has a state strictly identical in the past and in the future. All of the components have a strict and precise return into the system.

Mirror image. Reflected duplication of an object.

Morphology. The study of the form of organism. The term may be used synonymously with anatomy although generally the study of external forms is termed morphology while the study of internal structure is termed anatomy.

Neurology. A branch of medicine concerned especially with the structure, function, and diseases of the nervous system including the brain, the spinal cord and the nerves. The neurologist is the expert on the brain; the psychiatrist holds forth on matters pertaining to the mind. This gap is narrowing at last; neurologist recognize that emotional and behavioural disorders cannot be accounted for wholly by brain and nervous systems dysfunction, and psychiatrists are now becoming proficient in the neurosciences. The cutting-edge study in neurology is related with the *Neural stem cell*, a largely undifferentiated cell originating in the central nervous system. Neural stem cells (NSCs) have the potential to give rise to offspring cells that grow and differentiate into neurons and glial cells (non-neuronal cells that insulate neurons and enhance the speed at which neurons send signals). For years it was thought that the brain was a closed, fixed system.

Neurochemical. Or neurotransmitter, is a chemical that is released from neurone endings to cause either excitation or inhibition of an adjacent neurone or muscle cell. It is stored in minute vesicles near the synapse and released when a nerve impulse arrives. E.g. acetylcholine is related to areas of movement, learning, memory, and sleep quality.

New Physics: This term refers to a range of fundamental developments and paradigm shifts that occurred in the physical sciences during the last half of the twentieth century. These include the *theory of quarks*, which is essential to the standard model of fundamental particle physics; the study and application of macroscopic manifestations of quantum phenomena such as superconductivity, super-fluidity, lasing, and other types of spontaneous quantum self-organization; the realization of electroweak unification and the quests for grand and total *unification of the four fundamental interactions*; the burgeoning successes in gravitational physics, including *gravitational wave and black*

hole physics; and inflationary, fundamental-particle, and *quantum cosmology*, which ultimately rely on total unification and quantum gravity schemes. Another component of the new physics is the *study of chaos and complexity*, which involves modelling complex physical processes using nonlinear, often dissipative, deterministic mathematical systems in which there is extreme sensitivity to initial conditions, leading to loss of predictability, the importance of top-down causality together with a lack of reducibility to more fundamental systems and processes, and the emergence of higher-level self-organization out of lower-level erratic behaviour. Some of the key features of the new physics are the fundamental *indeterminism* at the basis of all quantum phenomena due to the Uncertainty Principle, and the appearance of one of more levels of global chaotic or self-organizing behavior accompanied by radical unpredictability and irreducibility in complex systems, such as fluid turbulence, weather systems, and the dynamics of insect populations.

Notion. Scientific notion. Concept.

Organized state. According to Vernadsky, it is a peculiar mechanism, a continuously changing equilibrium—a dynamic equilibrium—never reaching a state strictly identical in the past and in the future. At every moment of the past and of the future time the equilibrium is different but closely resembling. It contains so many components, so many parameters, so many independent variables, that no strict and precise return of some state in its previous form is possible. An idea of it may be given by comparing it to the dynamic equilibrium of the living organism itself. Geometrical representation of the space in Quechua textiles can be considered an organized state.

Physics. The study of the properties of matter and energy.

Physiology. The way in which organisms or parts of organisms function. See morphology.

Property rights. They are theoretical socially-enforced constructs in economics for determining how a resource or economic good is used, owned and sold. A property right is the exclusive authority to determine how and by whom a particular resource is used. Resources can be owned by (and hence be the property of) individuals, associations or governments. Property rights can be viewed as an attribute of an economic good. This attribute has four broad components and is often referred to as a bundle of rights: the right to use the good, the right to earn income from the good, the right to transfer the good to others, the right to enforce property rights.

Radiation. Energy radiated from the sun in the form of electromagnetic waves, including gamma rays, X-rays, ultraviolet light, visible light, infrared radiation, microwaves, radio waves, long-waves. Solar radiation creates heat and cause thermal patterns that, coupled with earth's rotation and movement, generate the prevailing winds and oceans currents, produces the greenhouse effect, which is crucial to maintaining the planet's surface warmth, also plants use it as a source of energy in the process of photosynthesis.

Resonance. A vibration of large amplitude in a mechanical or electrical system caused by a relatively small periodic stimulus (small periodic driving forces have the ability to produce large amplitude oscillations). Resonance is a phenomenon in which a vibrating system or external force drives another system to oscillate with greater amplitude at specific frequencies.

The mutual influence of interacting systems on each other, it allows two or more entities to become a part of one fundamental whole.

Respiration: Aerobic respiration is the process by which living organism, or their components, take oxygen from the atmosphere and give off carbon dioxide. Anaerobic respiration is the process by which organism, or their components, obtain energy from chemically combined oxygen when they do not have access to free oxygen. According to Vernadsky, an organism cannot exist without exchange of gases—respiration—and the intensity of life can be judged by the rate of gaseous exchange. On a global scale, we must look at the general result of respiration, rather than at the breathing of a single organism.

Sacred. Space with power. In this case power is a great amount of energy. In anthropology denotes a class of objects, entities and beings that a culture define as different from those of ordinary reality.

Self-determination. In modern international law, it is a principle that does not state how decision is made, nor what the outcome should be, whether it be independent. Self-determination has come to mean the free choice of one's own acts without external compulsion

Self-government. Generally, when self-governance of nation-states is discussed, it is called national sovereignty, which is an important concept in international law. It can be used to describe a person or persons or a group being able to exercise all of the necessary functions of power without intervention from any authority that they cannot themselves alter. Self-government, then, is a political concept based on the typically federalist principles of subsidiarity, solidarity, cooperation and coordination in peace and in respect for the law, through the exercising of the sovereign democratic power of the citizen at various levels of organized political power. See Autonomy.

Shaman. General term to designate people that produce medicine, have access to the Earth energies and is an advisor among indigenous nations. It is derived from the Siberian Tungus word “saman”, which means “to know in an ecstatic manner.” He is a “technician of the sacred” (to use Murcea Eliade's famous phrase)

Sound. It is part of the dimension of vibration (along with motion) it is in between the dimension of energy and the dimension of matter. It is produced by vibrating bodies. In current science, sound is a manifestation of the energy (See energy). There are two types of sound that are categorized on the basis of their frequency ranges. **Inaudible.** Human ear cannot detect sound frequencies less than 20 vibrations per second i.e. 20 Hz. In the high-frequency range, the human ear cannot detect frequencies above 20000 vibrations per second (20 KHz) and the amplitude of the wave would be depending on the loudness of the sound. The low-frequency sound which human ear cannot detect is also known as infrasonic sound. Whereas the higher range inaudible frequency is also known as ultrasonic sound. **Audible.** Human ear can easily detect frequencies between 20 Hz and 20 KHz. Some animals like dogs have the ability to hear sounds having frequencies higher than 20 KHz. The ultrasound equipment used for tracking and studying many medical problems works at frequencies above 20 KHz.

Soil. See bio-inert natural body. One of the components of the human dimension.

Symmetry. In mathematics (geometry) an object is symmetric if it can be divided into two or more identical pieces, this object is invariant to any of various transformations. In physics, the principle of space-reflection symmetry, or conservation of parity, states that no fundamental distinction can be made between left and right. This law holds for all the phenomena described by classical physics, but in 1957 it was shown to be violated by certain interaction between elementary particles (three types: strong nuclear interactions electromagnetic interaction and weak nuclear interactions). For all strong nuclear interactions and electromagnetic interactions parity is conserved, that is to say, if a left-polarized particle exists (i.e. one which spins in an opposite sense to its direction of motion) there will be an approximately corresponding number of right polarized particles. It has been found, however, that for weak nuclear interactions parity is not conserved. Thus, in a typical weak interaction, such as the decay of a neutron, the emitted electron is always left-polarized. As a result of non-conservation of parity in weak interactions, it is now possible to make a fundamental distinction between left and right.

Symmetry of life. Is the distinction between right and left corresponding to life, these are the inequalities or right-handedness and left-handedness. It was L. Pasteur's discovery and he named it dissymmetry (confounded with asymmetry used in chemistry and physics generating misperception), P. Curie used the term distinct states of space. L. Pasteur supposed that, in cosmic space, right- and left-handed spaces are separate. As we see, for three-dimensional Euclidean space, and for Euclidean space in general, this cannot be the case with respect to matter. Symmetry here is expressed in the external form of that eternally mobile, dispersed element of living matter—a large or a negligibly small living organism—which is created and maintained by the biogenic migration of atoms, and is revealed as a body that is sharply distinct from the nature surrounding it. Symmetry is expressed also in its internal structure, its organization, and its macroscopic and microscopic cross-sections. Vernadsky says in regards to right- and left-handedness, expressed as right- or left-handed spiral structure of atoms, are chemically identical in inner bodies and distinct in living ones. This one of the most profound geometrical properties of natural bodies, has been given insufficient attention, in philosophy, mathematics, and natural science. But we are all very familiar with it in daily life.

Space. A fundamental notion to understand nature's reality. The way it is represented and defined is the result of the human thought that varies from culture to culture.

Spirit. The energetic body of any entity composed of fire and air. In anthropology it is often used in contrast to "soul" though is as an immaterial component of living humans, usually persisting after death. Ancestors are frequently described as spirits. Also, it is an odd-job word in comparative religion. Even leaving aside such expression as the "spirit of capitalism" or "the spirit of resistance," it has no precise or general definition. Instead, it is best used to refer to some indigenous category of supernatural agencies, differing from case to case.

State. The particular condition that something is in at a specific time.

State of space. The condition of the physical space that includes the states of matter (solid, liquid, etcetera. See matter), and the physical field (that has curvature and, a great number of phenomena, physical fields in which lines of force are distributed—electrical, magnetic, heat, gravitational and electromagnetic field. In indigenous knowledge, this space also includes the state of vibration produced deliberately to modify it.

Structure. It is a fundamental concept in science. It means the arrangement of parts. Examples are the organs in a body, or crystals in a substance like granite, buildings, machines, rock or a mineral, atoms or sentences. It always reflects the hierarchy of its parts.

"Susceptibilidad". This Spanish word is very specific in Bolivia to express the feelings of the people when researchers around are mistrusted or under suspicion.

Traditional. Things related to past practices or established conventions. See classical.

Universe. All of space and its contents, the study of which is called cosmology. The universe is dynamic and is evolving.

Water. See Bio-inert body. One of the components of the human dimension. In indigenous knowledge is a body of seven levels of energy and purity. In natural sciences it is the liquid that descends from the clouds as rain, forms streams, lakes, and seas, and is a major constituent of all living matter and that when pure is an odourless, tasteless, very slightly compressible liquid oxide of hydrogen H₂O which appears bluish in thick layers, freezes at 0° C and boils at 100° C, has a maximum density at 4° C and a high specific heat, is feebly ionized to hydrogen and hydroxyl ions, and is a poor conductor of electricity and a good solvent.

Wave motion. The propagation of a periodic disturbance carrying energy. At any point along the path of a wave motion, a periodic displacement or vibration about a mean position takes place. This may take the form of a displacement of air molecules (e.g. sound waves in air), or water molecules (waves on water), a displacement of elements of a string or wire, displacement of electric and magnetic vectors (electromagnetic waves), etc.

Western Society. It is a term referring to different nations depending on the context, most often including at least part of Europe and what they all have in common.

Western culture. Also known as Western civilization, Occidental culture, the Western world, Western society, and European civilization, is a term used very broadly to refer to a heritage of social norms, ethical values, traditional customs, belief systems, political systems and specific artifacts and technologies that have some origin or association with Europe. The term also applies beyond Europe to countries and cultures whose histories are strongly connected to Europe by immigration, colonization, or influence. The development of western culture has been strongly influenced by Ancient Greece and Ancient Rome, the former due to its impact on philosophy, democracy, science and art, building designs and proportions, architecture; the latter due to its influence on law, warfare, governance, republicanism, engineering, and religion (Christianity and various Protestant churches). In the modern era, Western culture has been heavily influenced by the Renaissance, the Ages of Discovery and Enlightenment, and the Industrial Revolution. Through extensive imperialism and Christianization by Western powers in the 15th to 20th centuries, much of the rest of the world has been influenced by Western culture.

Thought. In a scientific sense, it is related to mental activity, cognition. See cognition. In an indigenous sense, it includes thinking by the body.

Spirituality. It is related to consciousness. See consciousness.

FIRST NATIONS & INUIT

TRADITIONAL NAMES & LOCATIONS



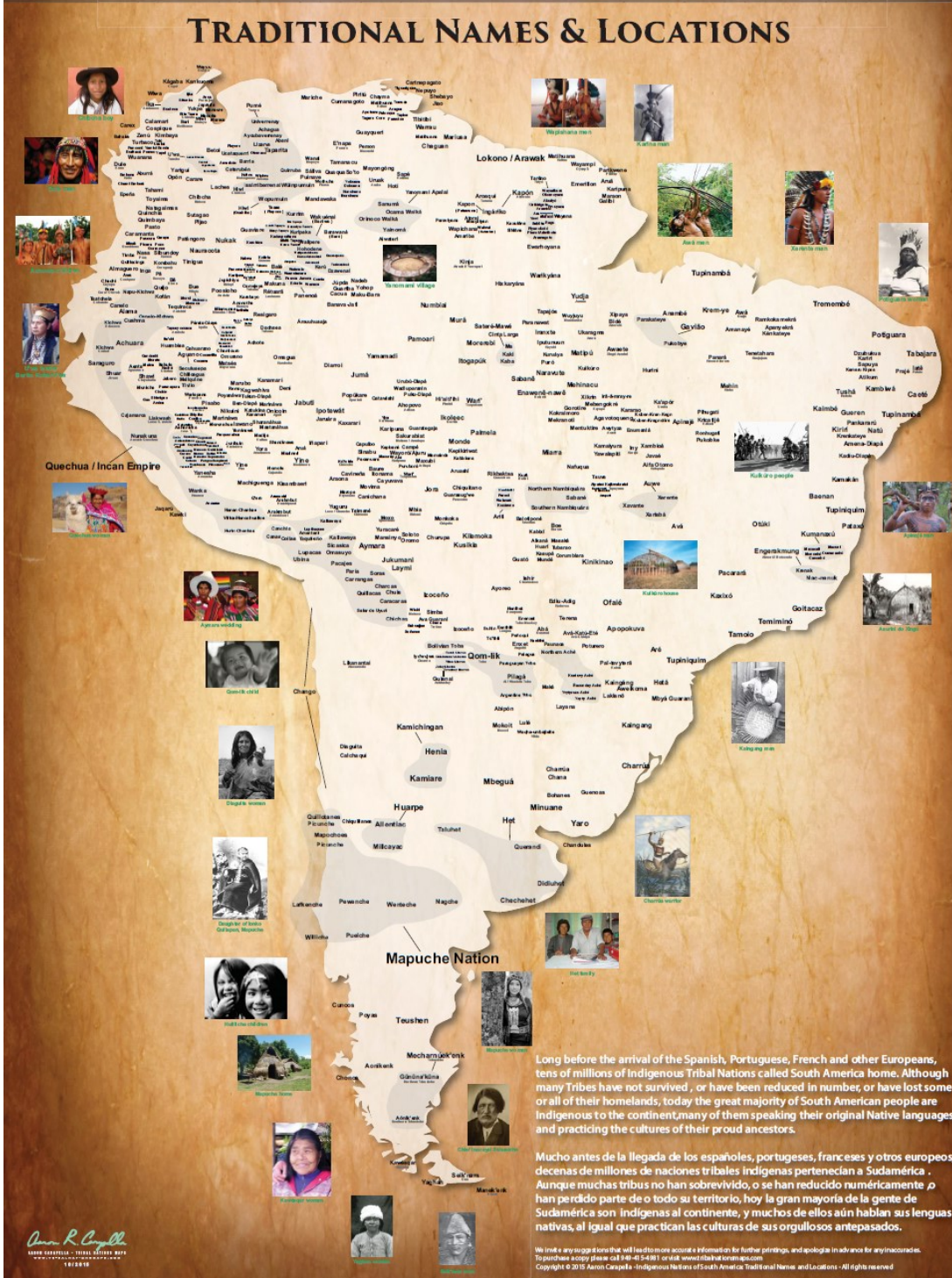
This map is the most comprehensive ever created of the First Nations of Canada. It utilizes the original and true tribal names for each Nation, and shows the original homeland of each Nation. It includes the names of the Nations who survived this incursion, as well as those that did not, honoring the memory of those who have fought tenaciously to hold on to their homelands. It is a visual reminder of those who were called this land home since time immemorial, creating a sense of pride for First Nations people, and a better understanding for the non-Indigenous public. To Aboriginal First Nations peoples, this land will always be our ancestral homeland.

This map was researched and compiled by Aaron Carapella. Further photos, and photos in various sizes for use in print. Copyright © 2016 Aaron Carapella. All rights reserved.

Image 1. First Nations in Canada.
Source: Tribal Nations Maps. March, 2016. Copyright ©2016 Aaron Carapella.

INDIGENOUS NATIONS OF SOUTH AMERICA

TRADITIONAL NAMES & LOCATIONS



Long before the arrival of the Spanish, Portuguese, French and other Europeans, tens of millions of Indigenous Tribal Nations called South America home. Although many Tribes have not survived, or have been reduced in number, or have lost some or all of their homelands, today the great majority of South American people are Indigenous to the continent, many of them speaking their original Native languages and practicing the cultures of their proud ancestors.

Mucho antes de la llegada de los españoles, portugueses, franceses y otros europeos, decenas de millones de naciones tribales indígenas pertenecían a Sudamérica. Aunque muchas tribus no han sobrevivido, o se han reducido numéricamente, o han perdido parte de o todo su territorio, hoy la gran mayoría de la gente de Sudamérica son indígenas al continente, y muchos de ellos aún hablan sus lenguas nativas, al igual que practican las culturas de sus orgullosos antepasados.

We invite any reader interested in further information for further printings, and epigraphic inscriptions for any incursions. To purchase copies please call 948-615-4981 or visit www.tribalnationsmaps.com. Copyright © 2015 Aaron Carapella - Indigenous Nations of South America Traditional Names and Locations - All rights reserved.

Image 2. Indigenous Nations in South America.
 Source: Tribal Nations Maps. March, 2016. Copyright ©2016 Aaron Carapella.



Image 3. Panorama sketch of a map.
 Source: Tobias 2009, 23.

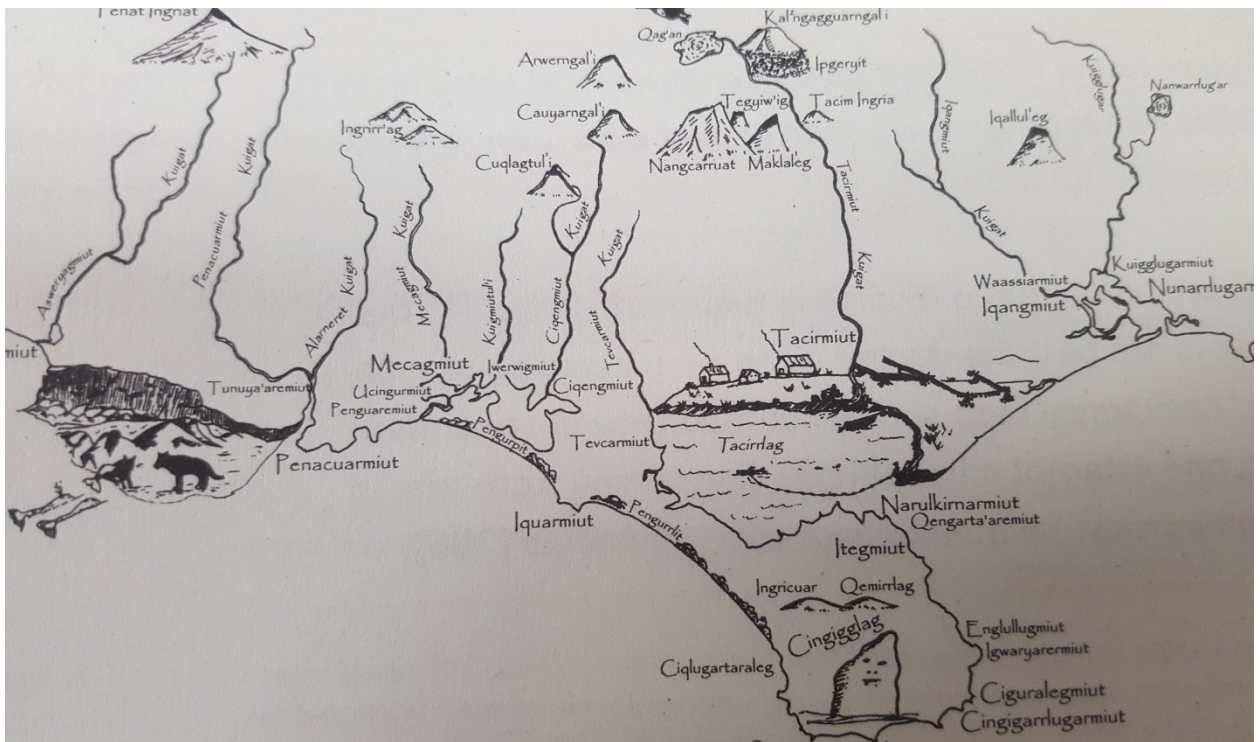


Image 4. Place name representation map.
 Source: Tobias 2009, 331.

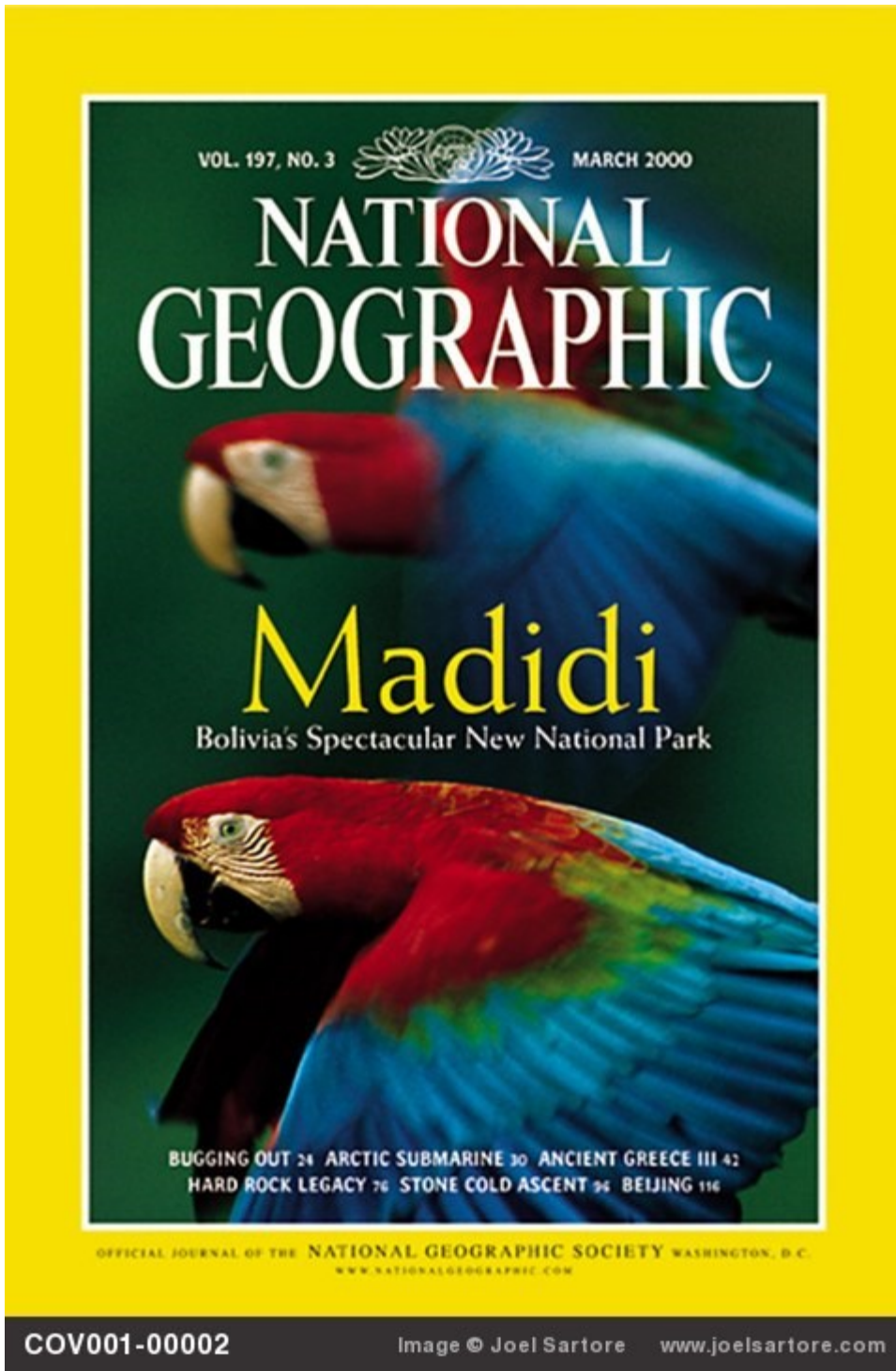


Image 5: National Geographic Magazine.
Source: Sartore (2011).

Madidi

Diary

Photographer
Joel Sartore
Finds Trouble
in Paradise

Enter

Photographs
by Joel Sartore

RELATED LINKS

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Photography
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Photography

CREDITS

NATIONAL GEOGRAPHIC Magazine | March 2000 Highlights

Madidi
Diary

Rosa María Ruiz was my guide through Madidi. Her nonprofit group, **Eco Bolivia**, has been vital both in helping to establish the park's boundaries and in protecting the small section of rain forest in which I did the bulk of my work.

To me, Rosa is a one-woman army. She's trying to educate as many people as possible about this treasure—before it's ruined.

Back To Main

Photograph by Joel Sartore

◀ 1 2 3 4 5 6 7 8 9 ▶

Image 6: Madidi Diary of Joel Sartore.
Source: "Madidi" (2004).

MINISTERIO DE MEDIO AMBIENTE Y AGUA
SERVICIO NACIONAL DE AREAS PROTEGIDAS

FORMULARIO DE AUTORIZACIÓN DE INGRESO

Solicitante: Patricia Cristina Quiroga Yañez En Fecha: 27 de diciembre, 2016

Motivo del Ingreso: Trabajo de campo. Tesis Duración: 3 meses

Fecha de Ingreso:

Localización de la Expedición: San José de Uchup N° de Personas 1

Responsable de la expedición: Patricia Cristina Quiroga Yañez

Nombre de la Expedición o Proyecto:

Equipo a Emplear: Guías de Entrevista, diario de campo

Objetivo: Conocer el punto de vista de la comunidad, su relación con la vida

y la naturaleza para comprender la visión de su mundo

Descripción Resumida de los Trabajos a Realizarse: Convivencia con la comunidad en todas

las actividades. Para este estudio se dividen en actividades cotidianas y

actividades de relevancia para la comunidad.

El SERNAP autoriza la realización de los trabajos de campo arriba descritos, debiendo el solicitante coordinar con el Director del Área Protegida el acceso a la zona, asimismo se compromete a entregar copia de los resultados del trabajo realizado al SERNAP y a la Dirección del Área Protegida. La Dirección del Área Protegida a través del encargado de campamento asignará un guardaparque, para el seguimiento correspondiente, cualquier contravención a las disposiciones legales en actual vigencia serán motivo de las sanciones que el caso amerite.

Nombre y Firma del Solicitante
N° de C.I. 4373564 L.P.

Firma Autorizada
Director de Área Protegida

Firma Autorizado por
Director del SERNAP

Image 7: Permission Sheet of SERNAP.

Source: http://sernap.gob.bo/wp-content/uploads/2016/11/form_-ingreso-.pdf.

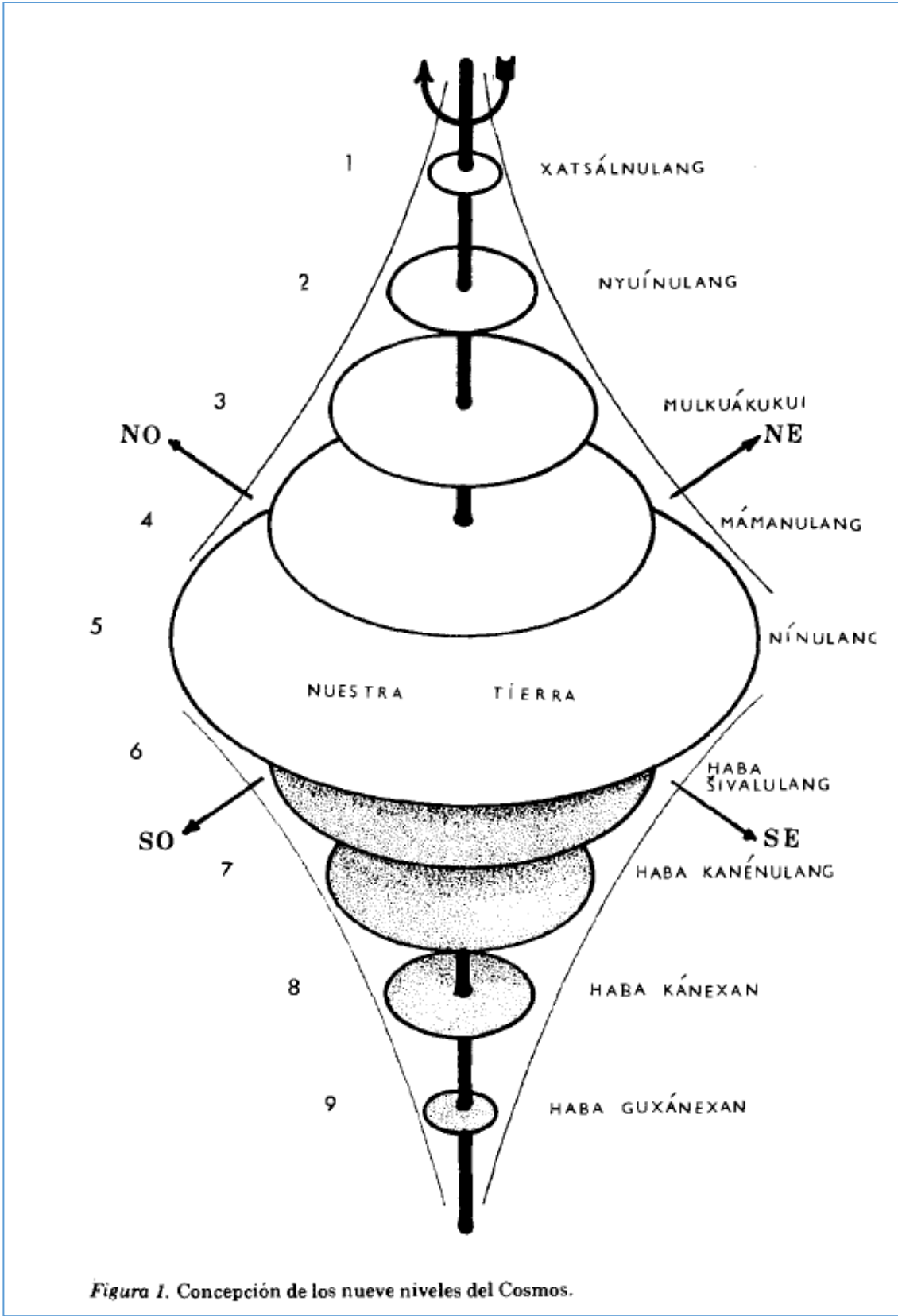


Image 8. Conception of the nine levels of the cosmos.
 Source: Reichel-Dolmatoff (1977, 235)

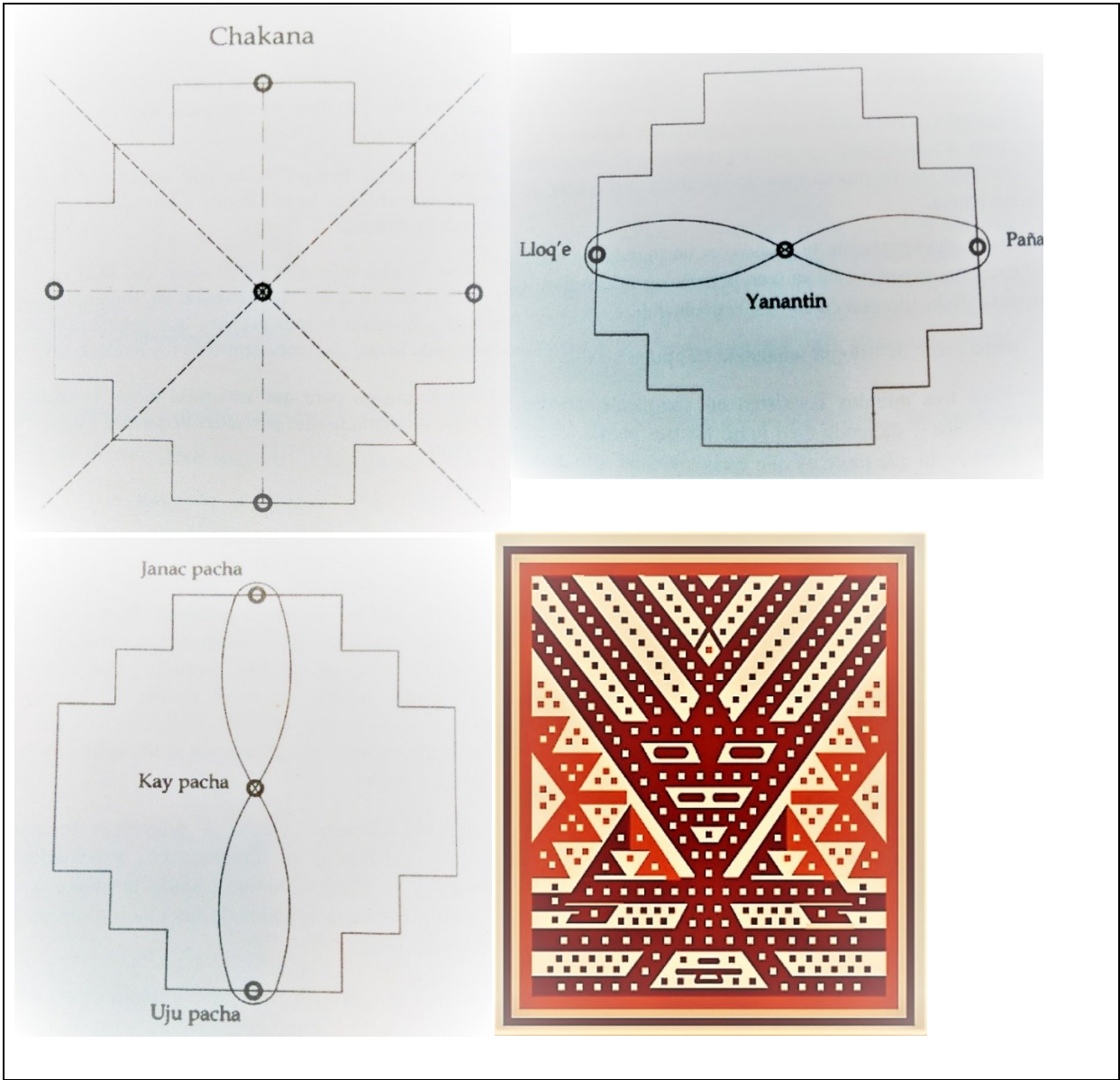


Image 9. Cultural Symbols in Quechua Nation. Chakana and Wiracocha.

Source: Paucar, 2014.

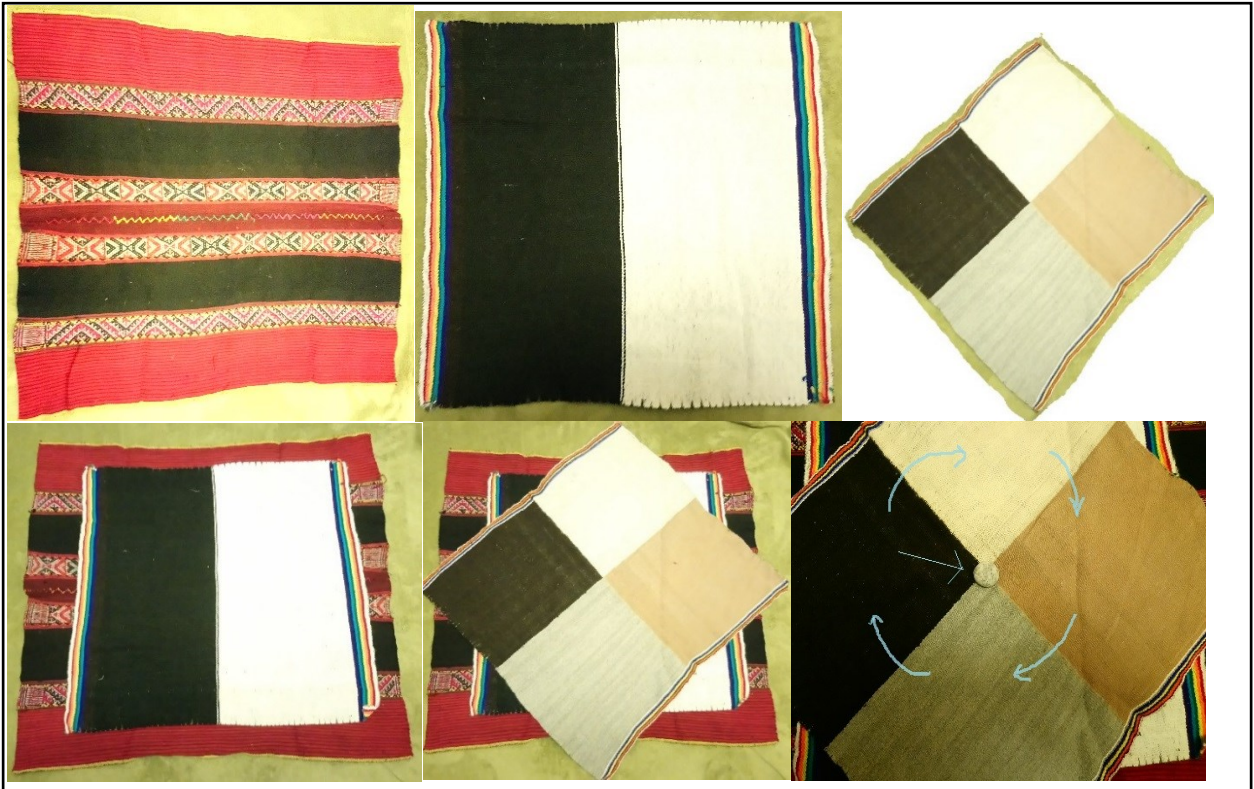
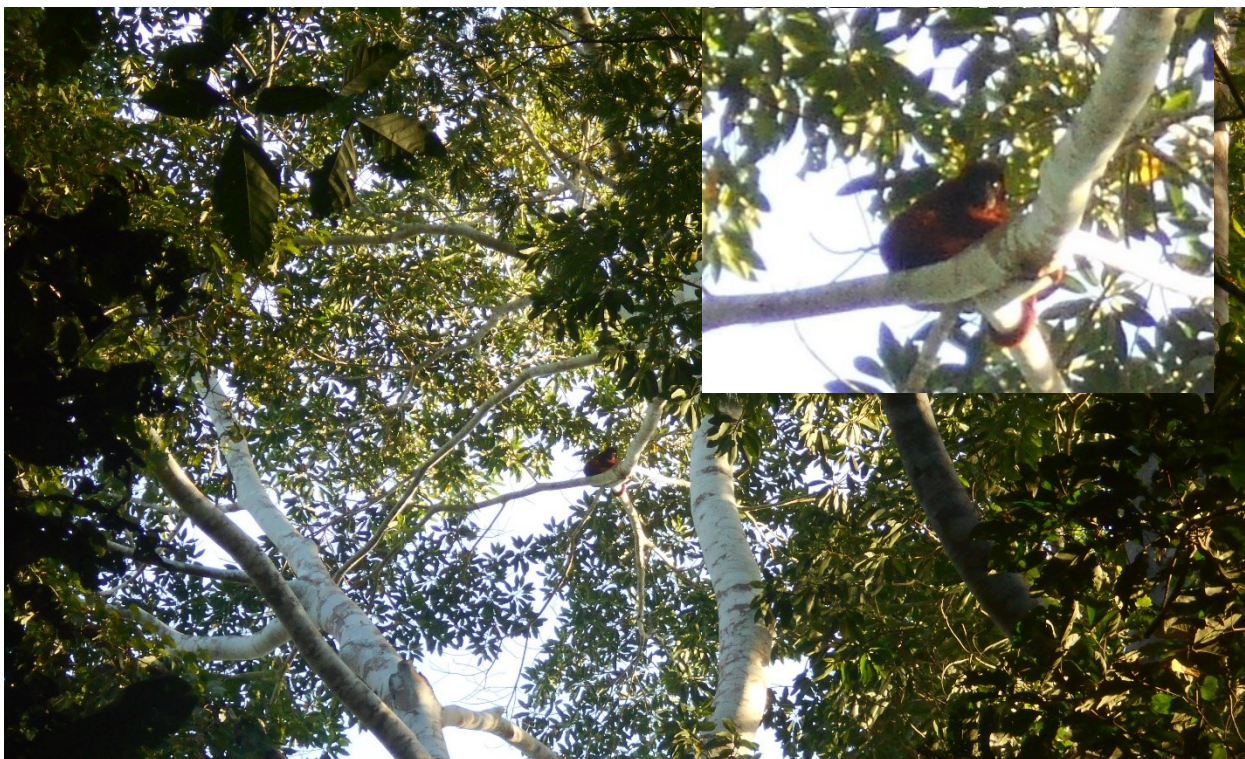


Image 10. Indigenous design for the states of the physical space
Source: Original Quechua textiles.



Picture 1. In the jungle.



Picture 2. Casa grande.



Picture 3: Meeting of Sunday 22. New Town's Board.



Picture 4: Magistrate office.



Picture 5: Travelling on the tractor.



Picture 6: Beatriz Amutari's house.



Picture 7: Meetings in “Casa Grande”.



Picture 8: Fishing activities.



Picture 9: “Chaqueo” for agriculture and cattle.



Picture 10: Data base of the town documents.



Picture 11: "Rutucha" (Hair cut).



Picture 12: Carnival Party.



Picture 13. Ceremony of healing.



Picture 14. Madidi travel interview.



Picture 15: Vocational guidance seminar in the high school.



Picture 16: English student.



Picture 17: Woman with a baby.



Picture 18: Obtaining sugar cane.



Picture 19: Houses: Jatata roof. Adobe technology. Motacú leaves.



Picture 20: Churh.



Picture 21: Book about Tacana Language perspective.



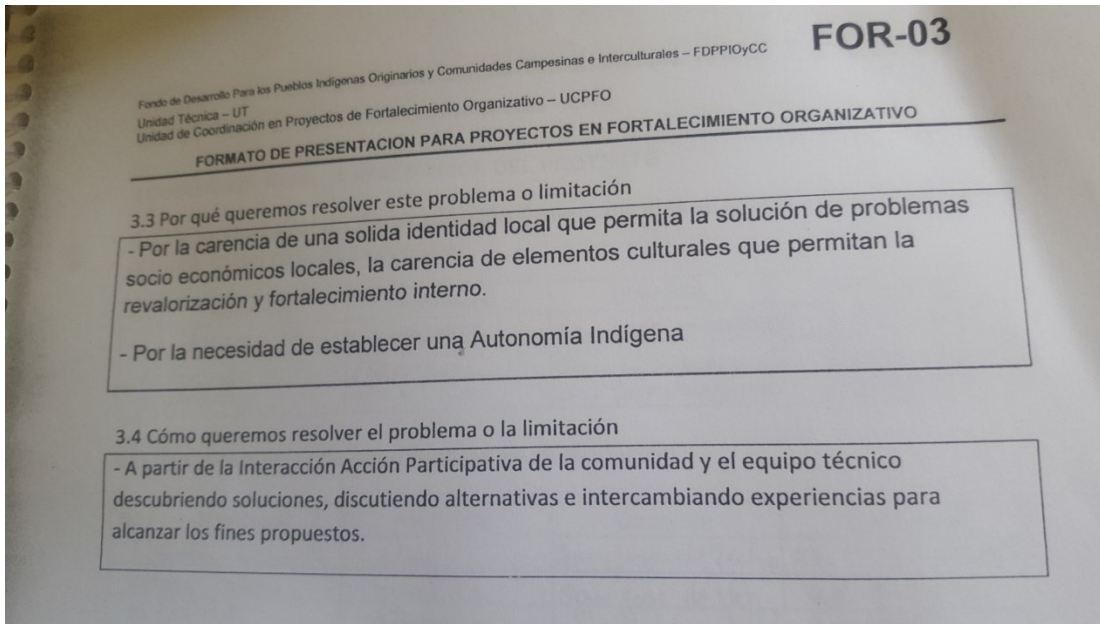
Picture 22: Food preparation.



Picture 23: Animal message: Bad luck.



Picture 24: Bibosi (Type of healing tree).



Picture 25: Governmental collaboration. Strengthening organizations project form.



Picture 26: The San José de Uchupiamonas School.



Picture 27: Diary fieldwork.



Picture 28: Leaders receiving the booklet: Yo soy investigadora (I am a researcher, a personal travel through scientific research). It is based in "Who's at the gap between Research and Implementation? The places and Spaces of Encounter between Scientist and Local People in Madidi, Bolivia" (Tomey 2015)



Picture 29: Transport supplies.