



THE SCHOOL
FOR FIELD STUDIES

Amazonian Plant Biodiversity and Traditional Medicine

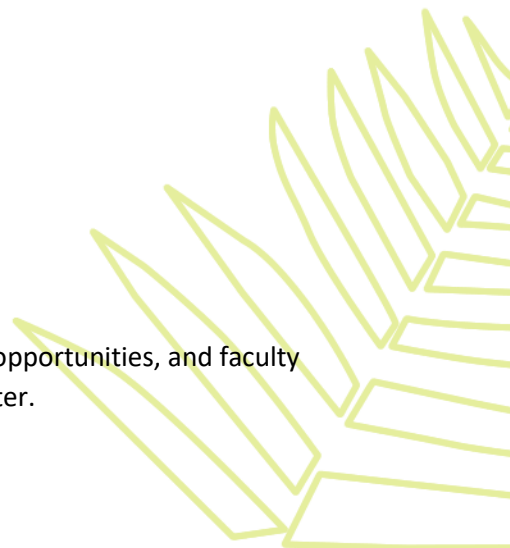
SFS 3832

The School for Field Studies (SFS)
Center for Amazon Studies
Tarapoto, Peru

This syllabus may develop or change over time based on local conditions, learning opportunities, and faculty expertise. Course content may vary from semester to semester.

www.fieldstudies.org

© 2023 The School for Field Studies



COURSE CONTENT SUBJECT TO CHANGE

Please note that this is a copy of a recent syllabus. A final syllabus will be provided to students on the first day of academic programming.

SFS programs are different from other travel or study abroad programs. Each iteration of a program is unique and often cannot be implemented exactly as planned for a variety of reasons. There are factors which, although monitored closely, are beyond our control. For example:

- Changes in access to or expiration or change in terms of permits to the highly regulated and sensitive environments in which we work;
- Changes in social/political conditions or tenuous weather situations/natural disasters may require changes to sites or plans, often with little notice;
- Some aspects of programs depend on the current faculty team as well as the goodwill and generosity of individuals, communities, and institutions which lend support.

Please be advised that these or other variables may require changes before or during the program. Part of the SFS experience is adapting to changing conditions and overcoming the obstacles that may present. In other words, this is a field program, and the field can change.

Course Overview

This summer course invites students to explore the rich and complex world of the Traditional Medicine (TM) as practiced by indigenous people in the Peruvian Amazon. Deeply rooted in ancestral knowledge, TM is not just a package of healing practices, but an expression of a holistic understanding of health that sees humans, non-human living forms, forests, and the spiritual realm as intimately interconnected. The exploration of traditional Amazonian medicine (TAM), in its concepts, practices, and worldview, will guide students to expand perspective on the meaning and mechanisms of health, illness, and healing.

Drawing on field visits and conversations with practitioners and other experts in the field, students will learn how this medicine inextricably relates to the forest biodiversity providing the basis for remedies and healing concepts used to treat illnesses.

At the same time, the course critically examines indigenous medicinal knowledge within the mainstream health and biomedical scientific frameworks.

Key topics:

- Amazonian medicinal plants: how do plant ecology and physiology relate to human health?
- Indigenous health concepts and practices. The course explores Traditional Amazonian Medicine as a complex and rigorous body of knowledge, orally passed on from generation to generation in continuous evolution that will challenge common sense and scientific understanding of human physiology.
- Amazonian biocultural diversity and human health. Current, past and future contributions of Amazonian biodiversity to biomedical sciences.
- Intercultural health. Bridging medical systems and health paradigms. The course drives students through cultural constraints to unveil a broader and cross-cultural understanding of human health, disease and healing.
- Medicinal plants and cultural identity. The course uncovers the intimate relation between the ancestral knowledge about medicinal plants and Indigenous identity and how it connects to forest conservation.

Learning Objectives

During this course, students will be able to:

1. Identify the major medicinal plants most frequently used by mestizo and indigenous healers and describe their ecological characteristics and applications for health.
2. Compare TAM health concepts and practices with those of Modern Medicine, recognizing their epistemological foundations and areas of dialogue or tension.
3. Explain the connections between plant ecology and human health, understanding how ecological interactions shape the biochemical and healing properties of Amazonian flora.
4. Analyze the role of medicinal plants and the associated knowledge in sustaining indigenous identity and forest conservation.
5. Analyze how power, knowledge, and legitimacy are negotiated between indigenous and Western medical systems, exploring the role of global frameworks, state policies, and local practices.

Assessment

The evaluation breakdown for the course is as follows:

Assessment Item	Value (%)
Participation	15
Science Communication	15
Field Exercise 1	20
Field Exercise 2	20
Final Product	30
TOTAL	100

Participation (15%)

Active participation in all class activities is expected in this course, including promptness and preparedness for field activities. Students are encouraged to engage in class discussion (active listening, constructive contribution by raising or answering questions). Engagement in discussion, contribution to group work during FEXs, timeliness, and preparedness for activities throughout the program are expected for full participation marks. Contribution, listening, and attitude during classes will be considered for this item.

Science Communication (15%)

Context: Science needs to be translated for a non-scientific public to inform people's choices and actions and promote a better understanding and respectful coexistence with our natural surroundings. Usually, scientists use statistics and complex models to understand ecological/cultural processes. However, some of those scientists have never seen the ecosystems, communities or species they model or speculate about. The socio-environmental current crisis challenges ecologists to work and interact with nature and people contributing to reconnecting with each other. Integrating indigenous knowledge, natural history and the scientific perspective has the potential to facilitate such reconnection. Dayton & Sala (2001) called "the natural history" as the sense of wonder, creativity and progress in ecology and explained that research and review articles are a valuable tool for communication among scientists. Accordingly, we need to explore new strategies to enhance people's bio-literacy and create meeting points between diverse and complementary systems of learning and knowledge.

Students will: a) read a scientific paper, b) summarize and share the main takeaways, and c) organize a creative activity to promote discussion and reflection on the paper's theme, results, and implications.

Field Exercise 1: Traditional Amazonian Medicinal Plants Journal (20%)

Context: The journals of early naturalists are more than relics of exploration; they are foundations of modern science and living archives of human curiosity and ecological understanding. Their detailed records of species, landscapes, and observations helped establish the principles of biology, ecology, and environmental science. These documents reveal how early scientists learned to see nature systematically by recording data carefully, comparing regions, and connecting observations into larger theories about life and the planet. Today, these same practices remain essential for preserving traditional ecological and medicinal knowledge, especially in biodiverse regions such as the Amazon where this knowledge has been passed down orally for generations.

Students will: a) explore, observe and describe the different natural and cultural ecosystems we visit during our fieldtrips when looking for medicinal plants, b) Compile and summarize all information related to medicinal plants, including common names, scientific classification, diagnostic characteristics

for species identification (drawings and written descriptions), ecological data, medicinal uses, and the requirements for planting, harvesting, preparation, and administration; and c) Enhance their written descriptions and illustrations of medicinal plants with properly prepared botanical samples, and develop a dichotomous identification key for the species collected.

Field Exercise 2: Documenting TAM through Participatory Learning and Action (20%)

Context: In the modern world, traditional knowledge of Indigenous peoples has often been undervalued and overlooked, frequently dismissed as unscientific or outdated in favor of Western knowledge based on progress and technology. However, Indigenous medicinal knowledge continues to support health care of a significant proportion of human population, has been source for the discovery of many drugs used in modern pharmacotherapy and is still being actively investigated in the quest for new molecules. In this context, recognizing Indigenous knowledge as legitimate and useful is an act of justice and a crucial step toward addressing today's global challenges for human health and wellbeing.

One approach that embodies this recognition is Participatory Learning and Action (PLA), community-based research and planning methods that actively involve local people in the collection, analysis, and interpretation of information about their environment, resources, and livelihoods. Through its emphasis on respect, reciprocity, and co-creation of knowledge, PLA ensures that community voices remain central to research and that traditional knowledge is valued as a vital source of insight and innovation.

Students will: a) split in groups to design semi structured interviews; b) engage collaboratively through an intercultural dialogue with key indigenous and mestizo healers of different traditional medicine specialties to gather qualitative data about their practices, key learnings during training, how they identify, harvest and prepare the medicinal plants they use, the administration, precautions and behavioral and dietary restrictions associated with medicinal plants intake; c) inquire about the cultural and spiritual dimensions of medicinal plants and healing practices; d) prepare a document that summarizes, systematizes, and reflects on the information shared by the healers interviewed.

Final Product (30%)

Context: The debate surrounding traditional medicines and knowledge reflects an ongoing tension between scientific and other ways of understanding health, disease, and healing. On one side, traditional medicinal systems, rooted in Indigenous and local knowledge, interpret illness as an imbalance and healing as a process that requires a holistic perspective integrating human, communal and environmental health including non-human living forms and the spiritual dimension. On the other hand, modern biomedical science is centered on the individual, understood from a reductionist approach, that seeks to fix dysfunctional organs with chemical compounds or surgical interventions. Our objective is to create a reflective environment where we can understand the complementarity between these two apparently disparate health systems and propose strategies or meeting points that serve as bridges connecting them.

Students will: a) creatively explore and demonstrate understanding of the complex tensions and connections between traditional medicinal knowledge and modern scientific perspectives, b) go beyond academic analysis by expressing learning through creative and interdisciplinary form, which may include:

- A short reflective essay and oral presentation combining scientific and traditional perspectives
- A visual or multimedia project (e.g., illustrated story, short film, or photo essay) that represents how healing practices reflect cultural relationships with nature
- A role play, fictional dialogue or narrative between a traditional healer and a biomedical practitioner exploring different understandings of illness and cure
- An educational infographic for communities or other audience

Grading Scheme

A	95.00 - 100.00%	B+	86.00 - 89.99%	C+	76.00 - 79.99%	D	60.00 - 69.99%
A-	90.00 - 94.99%	B	83.00 - 85.99%	C	73.00 - 75.99%	F	0.00 - 59.99%
		B-	80.00 - 82.99%	C-	70.00 - 72.99%		

General Reminders

Honor Code/Plagiarism – SFS places high expectations on their students and we hold students accountable for their behaviors. SFS students are held to the honor code below. SFS has a zero-tolerance policy towards student cheating, plagiarism, data falsification, and any other form of dishonest academic and/or research practice or behavior. Using the ideas or material of others without giving due credit is cheating and will not be tolerated. Any SFS student found to have engaged in or facilitated academic and/or research dishonesty will receive no credit (0%) for that activity.

“SFS does not tolerate cheating or plagiarism in any form. While participating in an SFS program, students are expected to refrain from cheating, plagiarism and any other behavior which would result in a student receiving credit for work which they did not accomplish on their own. Students are expected to report any instance of cheating or plagiarism by others.”

AI Usage in Assignments – SFS acknowledges the growing role of artificial intelligence (AI) tools in education and professional settings. While AI can be a valuable resource for learning and productivity, its use must align with the learning goals and integrity of each assignment. For this reason, students are encouraged to discuss the acceptable uses of AI for each assignment with the instructor. If you wish to use AI for any part of an assignment, consult with the instructor beforehand to ensure that its use adheres to the academic expectations of the course. Let’s work together to navigate this evolving landscape responsibly!

Deadlines – Deadlines for written and oral assignments are instated to promote equity among students and to allow faculty ample time to review and return assignments before others are due. As such, deadlines are firm; extensions will only be considered under extreme circumstances. Late assignments will incur a penalty of 10% of your grade for each day you are late. After two days past the deadline, assignments will no longer be accepted. Assignments will be handed back to students after a one-week grading period. Grade corrections for any assessment item should be requested in writing at least 24 hours after assignments are returned. No corrections will be considered afterwards.

Content Statement – Every student comes to SFS with unique life experiences, which contribute to the way various information is processed. Some of the content in this course may be intellectually or emotionally challenging but has been intentionally selected to achieve certain learning goals and/or showcase the complexity of many modern issues. If you anticipate a challenge engaging with a certain topic or find that you are struggling with certain discussions, we encourage you to talk about it with faculty, friends, family, the HWM, or access available mental health resources.

Participation – Since we offer a program that is likely more intensive than you might be used to at your home institution, missing even one lecture can have a proportionally greater effect on your final grade simply because there is little room to make up for lost time. Participation in all components of the course is mandatory, it is important that you are prompt for all activities, bring the necessary equipment for field exercises and class activities, and simply get involved.

Course Content

Type: D: Discussion, **FL:** Field Lecture, **GL:** Guest Lecture, **L:** Lecture, **FEX:** Field Exercise, **LAB:** Lab Exercise

*Readings in **Bold** are required.

No	Title and outline	Type	Time (hrs)	Required Readings
1	Introduction to the course What can students expect from the course? What is the background knowledge of students related to the course topic? Outline of the course, the field trips and the learning process that students will experience.	L	1.0	
2	Plant origin, evolution and diversity Explore how plants first appeared on Earth, trace their evolutionary journey through time, and uncover the incredible variety of forms and functions exhibited today.	L	1.0	Benton et al. (2022). Boyce et al. (2010).
3	Plant ID: The science of identification Observe and describe key features, use/create identification tools, and appreciate the diversity of plant forms across ecosystems.	L; LAB; FEX	2.0	
4	Amazonian medicinal botany: Key plant families Explore key morphological traits, learn how to recognize common families like Asteraceae, Lamiaceae, and Fabaceae, and gain insight into their traditional and therapeutic uses.	L; LAB, FEX	3.0	Bussmann & Sharon (2006).
5	Ethnobotany, ethnopharmacology, and ethnomedicine Explore these intertwined and overlapped scientific approaches to the relationship between humans and non-human living forms (most frequently plants) and health.	GL	2.0	
6	History of medicine: Health paradigms across time/cultures Placing the course in a broad context, we will explore the history of medicine to learn about the scientific, political, and sociocultural events that shaped its evolution and its apparent divorce from traditional medicines. Students will explore how the meaning of health and disease vary between cultures and throughout history as an example of the evolutive nature of human understanding.	L; GL	2.0	Conti (2018).
7	Pharmaceutical industry strategies for drug discovery based on plant biodiversity Explore the intricate and inseparable relationship between the modern pharmaceutical industry, plant biodiversity and indigenous knowledge, and learn about the strategies for developing drugs and medicines.	L	2.0	Buenz, Verpoorte, & Bauer (2018). Tym (2020).
8	Amazonian healers' techniques, practices and concepts: Part I Students will directly learn, hands-on, how indigenous and mestizo healers harvest, prepare and dose plant-based remedies, with a special emphasis on the body of knowledge to achieve efficacy and safety: precautions, restrictions, contraindication and potential adverse effects.	FEX	3.0	

No	Title and outline	Type	Time (hrs)	Required Readings
9	Amazonian healers' techniques, practices, and concepts: Part II Investigate the main healing practices like <i>dietas</i> , <i>purgas</i> , and techniques for inducing altered states of consciousness as a therapeutic strategy. We'll explore the "cleansing" concept through tobacco smoke blowing and other techniques. Students will also experience how singing is used as a healing tool.	FEX; GL	4.0	Sanz-Biset & Cañigueral (2013). O'Shaughnessy & Berlowitz (2021).
10	Public policies and approaches to traditional medicines Traditional medicine is acknowledged around the world as a valid and useful resource for preventing and treating physical and mental illnesses. In this lecture, we'll uncover WHO and other international organizations policies on traditional medicines. We'll explore the policies in countries with the largest traditional medical systems like China and India and those of US through the NCCAM. We'll also learn from initiatives aimed at implementing Intercultural health systems.	L	2.0	
11	Amazonian healers' techniques, practices, and concepts:Part III We'll dive into the cultural understanding of the relationships between humans and plants and how healers take care of these relationships through rituals to achieve safety and efficacy.	FEX	3.0	
12	Crossing the Bridge Part I: Dialog between biomedical science and traditional medicinal knowledge There exist multiple connections between these two sources of medical knowledge. Through data collected in the field and cutting-edge research papers, we will reflect on how health and disease is a multifaceted and complex process that can be understood from a transdisciplinary approach.	L; D	2.0	
13	Medicinal knowledge, medicinal plants, indigenous identity Medicinal knowledge and practices are fundamental components of indigenous identity. The course will enable formal and informal exchanges between students and indigenous people and healers to facilitate the understanding of the role of medicinal practices in defining their identity, including from the perspective of gender identity and roles.	FEX	3.0	
14	Gender and healing practice This session explores how women's knowledge of medicinal plants contributes to reproductive autonomy, community health, and ecological care. We will reflect on gendered access to forest resources and decision-making in community health.	L	2.0	
15	Indigenous understanding of the connection between people's and environment's health Amazonian people believe that the health of the environment is intimately interconnected with human health. This understanding shapes the way they behave and relate to non-human life. The course will reflect on the implications of sharing or not these beliefs with the current environmental crisis.	L	2.0	Salmón (2000). Århem (2004). Viveiros de Castro (2005).

No	Title and outline	Type	Time (hrs)	Required Readings
16	<p>Medicinal plants in the local and global markets</p> <p>The increasing interest in medicinal plants as safe and effective tools to treat certain health conditions creates an opportunity for new income sources for the people who have the knowledge to identify, grow, harvest and use them, but also for overexploitation and deforestation. We'll visit Takiwasi botanical garden, laboratory, and boutique for a guided tour of over 80 Amazonian medicinal plants used to create phyto-pharmaceutical and cosmetic products.</p>	FL	2.0	<p>Román Córdova & Cahuana Cabanillas (2022).</p> <p>Cieza Irrazabal (2021).</p>
17	<p>Traditional Amazonian Medicine and indigenous women</p> <p>Students will meet indigenous women organizations leading initiatives to adding value to medicinal plants and to the associated knowledge while conserving the ecosystems.</p>	FL	4.0	Lazarou (2022).
18	<p>International agreements about traditional knowledge associated with biodiversity</p> <p>The Convention for Biological Diversity and the Nagoya Protocol are international policies that regulate access to biodiversity, called "genetic resources", and to associated indigenous knowledge (creating the concept of biopiracy). Explore these agreements through an environmental and social justice lens.</p>	L	2.0	<p>Mackey & Liang (2012).</p> <p>Teran (2016).</p>
19	<p>Plant ecology and their medicinal properties</p> <p>Plants physiology and ecology are intimately related to human health through a bewildering diversity of molecules derived from the plant metabolism that have pharmacological actions on human and non-human animals. Explore how millions of years of evolution of herbivore-plant and environment-plant interactions configure a multispecies engagement setting.</p>	L	2.0	<p>Huffman (2003).</p> <p>Huffman (2022).</p>
20	<p>Social aspects of medicinal knowledge</p> <p>Who is a legitimate knowledge holder? The legitimacy of medicinal knowledge holders is not fixed. It's negotiated among communities, states, scientific institutions, and global frameworks, and deeply influenced by power, recognition, and social relations.</p>	L	1.0	<p>Schenberg & Gerber (2022).</p> <p>Cloatre (2019).</p>
21	<p>Medicine from the Amazon exported around the world or the "Internationalization of Ayahuasca"</p> <p>During the last few decades, a singular phenomenon has been taking place in which the use of ayahuasca left its sociocultural context to conquer almost every corner of the planet. As this same process has happened in the past with other plants like coca and tobacco, the course will reflect on the question of how a sacred medicine can become a harmful drug.</p>	GL; L	3.0	
22	<p>Expanding our understanding of health and disease</p> <p>We will explore the challenges, limitations and opportunities in the integration of different health knowledge systems.</p>	GL	2.0	

No	Title and outline	Type	Time (hrs)	Required Readings
23	Crossing the Bridge Part II: Indigenous medicines for modifying human consciousness The course will take advantage of the interaction with specialized Amazonian healers to analyze how the use of plant-based psychoactive substances like ayahuasca and tobacco have healing properties. This controversial topic will also be addressed from neuroscience perspective in the context of the psychedelic medicine rebirth.	FL	4.0	
24	One Health and “medicinal ecosystems” Understand the interconnection between human health, animal health, and the environment. Discuss the dilution effect, its relation to biodiversity and emergent zoonotic diseases. In this closing lecture we will analyze experiences from the program about indigenous understanding of humans’ and environment’s health under the scope of new scientific paradigms.	L	1.0	Adisasmito et al. (2022). Zinnstag et al. (2011).
		Total	55	
		UMN Instructional Hours*	66	

*[UMN defines](#) an instructional hour as a 50-minute block. SFS syllabi are written in full 60-minute hours for programming purposes. Therefore 50 full hours = 60 UMN instructional hours (for four credit courses) and 25 full hours = 30 UMN instructional hours (for two credit courses).

Reading List

*Readings in **Bold** are required

- Adisasmito, W. B., Almuhairi, S., Behraves, C. B., Bilivogui, P., Bukachi, S. A., Casas, N., ... & Zhou, L. (2022). One Health: A new definition for a sustainable and healthy future. *PLoS pathogens*, 18(6), e1010537.
- Århem, K. (2004). The Cosmic Food Web: human-nature relatedness in the Northwest Amazon. In Ph. Descola & G. Pálsson (eds.), *Nature and Society: anthropological perspectives*, pp. 185-204. London and New York.
- Benton, M. J., Wilf, P., & Sauquet, H. (2022). The Angiosperm Terrestrial Revolution and the origins of modern biodiversity. *New Phytologist*, 233(5), 2017-2035.
- Boyce, C. K., Lee, J. E., Feild, T. S., Brodribb, T. J., & Zwieniecki, M. A. (2010). Angiosperms helped put the rain in the rainforests: the impact of plant physiological evolution on tropical biodiversity. *Annals of the Missouri Botanical Garden*, 97(4), 527-540.
- Buenz, E. J., Verpoorte, R., & Bauer, B. A. (2018). The ethnopharmacologic contribution to bioprospecting natural products. *Annual review of pharmacology and toxicology*, 58, 509-530.**
- Bussmann, R. W., & Sharon, D. (2006). Traditional medicinal plant use in Northern Peru: tracking two thousand years of healing culture. *Journal of ethnobiology and ethnomedicine*, 2(1), 47.
- Cieza Irrazabal, M. C. (2021). El valor agregado en plantas medicinales aromáticas y generación de ingresos económicos a las Nuwas de la comunidad Shampuyacu.
- Cloatre, E. (2019). Law and biomedicine and the making of ‘genuine’ traditional medicines in global health. *Critical Public Health*, 29(4), 424-434.

9. **Conti, A. A. (2018). Historical evolution of the concept of health in Western medicine. *Acta Biomed.* Oct 8;89(3):352-354. doi: 10.23750/abm.v89i3.6739. PMID: 30333455; PMCID: PMC6502124.**
10. Huffman, M. A. (2003). Animal self-medication and ethno-medicine: exploration and exploitation of the medicinal properties of plants. *Proceedings of the Nutrition Society*, 62(2), 371-381.
11. Huffman, M. A. (2022). Folklore, animal self-medication, and phytotherapy—something old, something new, something borrowed, some things true. *Planta medica*, 88(03/04), 187-199.
12. **Lazarou, R. (2022). *Nuwas Forest—Biodiversity and Indigenous Knowledge Conservation*. <https://www.takiwasi.com/en/nuwas-forest-conservation-amazon.php>**
13. **Mackey, T. K., & Liang, B. A. (2012). Integrating biodiversity management and indigenous biopiracy protection to promote environmental justice and global health. *American journal of public health*, 102(6), 1091-1095.**
14. O’Shaughnessy, D. M., & Berlowitz, I. (2021). Amazonian medicine and the psychedelic revival: considering the “Dieta”. *Frontiers in Pharmacology*, 12, 639124.
15. **Román Córdova, C., & Cahuana Cabanillas, M. J. (2022). *Servicio ecosistémico y la conservación de plantas etnomedicinales del bosque de Las Nuwas, distrito de Awajún, 2021* [Universidad Católica Sedes Sapientiae]. <https://repositorio.ucss.edu.pe/handle/20.500.14095/1700>**
16. **Salmon, E. (2000). Kincentric Ecology: Indigenous Perceptions of the Human-Nature Relationship. *Ecological Application*, 10(5), 1327–1332.**
17. Sanz-Biset, J., & Cañigueral, S. (2013). Plants as medicinal stressors, the case of depurative practices in Chazuta valley (Peruvian Amazonia). *Journal of ethnopharmacology*, 145(1), 67-76.
18. **Schenberg, E. E., & Gerber, K. (2022). Overcoming epistemic injustices in the biomedical study of ayahuasca: Towards ethical and sustainable regulation. *Transcultural psychiatry*, 59(5), 610-624.**
19. **Teran, M. Y. (2016). The Nagoya protocol and indigenous peoples. *International Indigenous Policy Journal*, 7(2), 1-32.**
20. Tym, C. (2020). Medicine as microcosm: Pharmaceutical bioprospecting and the political epistemology of nature in industrial–capitalist and indigenous Amazonian societies. *Environment and Planning E: Nature and Space*, 3(4), 1180-1195. <https://doi.org/10.1177/2514848619897876> (Original work published 2020)
21. Viveiros de Castro, E. (2005). Perspectivism and Multinaturalism in Indigenous America. In Surrallés, A., & Garcia Hierro, P. (Eds.). *The land within: Indigenous territory and the perception of environment*, pp 36-74. International Work Group for Indigenous Affairs. Copenhagen.
22. Zinsstag, J., Schelling, E., Waltner-Toews, D., & Tanner, M. (2011). From “one medicine” to “one health” and systemic approaches to health and well-being. *Preventive veterinary medicine*, 101(3-4), 148-156.