

WHERE THE PAMPA MEETS THE MOON: A SEARCH FOR
ETHNOBOTANICAL KNOWLEDGE IN QUILLABAMBA

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by

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by

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ABSTRACT

WHERE THE PAMPA MEETS THE MOON: A SEARCH FOR ETHNOBOTANICAL KNOWLEDGE IN QUILLABAMBA

by Andrea Presler

This interdisciplinary research project incorporates history, botany, geography and applied anthropology in an attempt to retrace the 1936 travel routes and botanical collection sites of Ynés Mexía near Quillabamba, Peru. It documents perspectives of environmental change as well as the transfer of ethnobotanical and environmental knowledge inter-generationally. Divided into four distinct but interrelated phases, data collection for this project was completed both at San Jose State University and in Peru.

This project provides insight regarding the relationship between the environment and the people of the Quillabamba region of Peru. The cosmological perspectives of the Peruvian people provide a holistic and nurturing approach to the environment and subsistence levels of living. However, current issues associated with climate change, the economy, and regional development, have challenged their ability to live subsistently. This project presents cultural, ethnobotanical, and environmental data that may be used in intercultural education and for developing sustainable policies for cultural and environmental resources. This project triangulates ethnographic information, visual representations, and regional cultural interpretations of the surrounding environment with ethnobotanical data. The interdisciplinary nature of this pilot research project may serve as a model to guide similar projects that attempt to delve into the temporal and spatial interface between humans and the environment.

ACKNOWLEDGEMENTS

All things are related, this I know. This pilot project would not have been initiated without the serendipitous convergence of my life with that of my advisor Dr. Guadalupe Salazar, my advisory committee Dr. Kathryn Davis and Dr. Roberto Gonzalez; and Dr. George Vasquez who directed the study abroad program in Peru. Dr. Kathryn Davis introduced me to the remarkable life of Ynés Mexía (1870-1938), which provided me, with the idea for this project. Mexía's journey to Peru in search of botanical specimens intrigued me, and in a way, seduced me into going to Peru. Although she died in 1938, and is not here physically to accept my appreciation, it is her shoulders that I stand on as she provided the impetus and the courage for this exploratory project.

Our connection to and dependence on the environment is something that I have always respected and have sought to understand. Our place in this world and our relationship with it is shaped by the forces of our own history and upbringing. My parents, Jack and Virginia Presler were instrumental in teaching me about the natural world, how to work the land and how to balance subsistence level living with a wage economy. It was my mother who first planted the seed and introduced me to the world of wild edible and medicinal plants, which grew to become my passion. I also want to thank my nine siblings: Karla, Sharla, Mark, Maetha, Alisa, John, Joella, Tanya and Amelia, for always being supportive of my numerous endeavors and journey through life.

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I am sincerely appreciative for the help that I received from Mayra Cerda for watching my videos and translating several hours' worth of interviews from Spanish to English. Mayra was able to clarify some of the translations that were difficult to discern and kindly offered her time and effort while also working on her master's degree. Without the help of my translators and friends: Melania Garcia Vizcarra, Karla Salazar in Cusco and Edison Cárdenas in Quillabamba I would not have been able to proceed with this project. I am forever grateful for their patience and generosity in helping me not only with interpretations, but with all of the logistical considerations that allowed me to conduct research in Peru. In addition I want to thank Edison's family, for kindly inviting me for *cuy* dinner.

I am sincerely appreciative and respectful of all of the participants in this project who shared their knowledge and a piece of their lives with me. Without their generosity and trust this project would not have been accomplished. Their insight regarding the environment, culture, and cosmology has provided me with a greater understanding of the world in which they live. The voices of the people and the sights, smells, and sounds of Peru will always remain with me. I am especially grateful for those people who took me by the hand and led me into to the pampa.

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PROLOGUE

RETRACING THE FOOTSTEPS OF YNÉS MEXÍA

From Cuzco I took the train which “switched-back” up out of the valley over the pass, then dropped down by the growing stream of the Vilcanota or upper Urubamba into the deep gorge of the river. From the cold, arid puna almost bare of vegetation, there was a tremendous change to the hot valley bottom. As we neared the station of Machu-Picchu, the perpendicular cliffs were covered with wild Fuchsias and Begonias not to mention a multitude of orange Compositae and bright yellow Calceolarias, the plants as high as one’s head.

I did not stop at Machu-Picchu, but took the “bus” for Quillabamba, several hours ride down the narrow valley. A beautiful ride it was along the railroad bed where the unlaid rails await further finances. (Excerpt from letter written by Ynés Mexía, 1936) [Davis, personal collection]

Ynés Mexía Botanical Collection and Historical Documents

The botanical collections, cultural notes and legacy of explorer and botanist Ynés Mexía (1870-1938) provide an historical account that offers clues to environmental and cultural change as well as ethnobotanical knowledge that warrants further investigation. At the age of 51, after working as a social worker for several years, Mexía began taking botany classes at the University of California, Berkeley. She became passionate about the study and identification of plants and began making excursions to Mexico, South America and Alaska to gather botanical specimens (Davis, personal communication April 2008). In the span of sixteen years (1922-1938), Mexía collected approximately 145 thousand botanical specimens and discovered two new genera (Ynés Mexía Papers, BANC MSS 68/130 m, The Bancroft Library, University of California, Berkeley; Online Archive of California (OAC) 2006). Mexía’s meticulous notes and numerous correspondences with colleagues and friends provided information about her itineraries,

the environment, and cultures that she encountered during her collecting expeditions (Davis, personal communication April 2008). Her botanical collections and documents are housed in several herbaria, botanical gardens and museums in the United States and Europe (Online Archive of California (OAC) 2006).

Mexía's scientific contributions to the world of botany are impressive; however, only sparse information is available regarding the exact routes of her travels and the geographic locations of the original collection sites. While she took notes regarding the general vicinity and other physical features of the environment where the plant specimens were collected, she did not provide detailed geographic information or associated cultural information of the plants. The documentation of environmental and ethnobotanical knowledge, whether in an indigenous group or non-indigenous community is an important endeavor. As expressed by Bussman and Sharon (2006:7), "It is often the case that in local communities traditional knowledge and resources are undocumented and in danger of disappearing, as their members continue to adapt to modernization and globalization." This project attempted to mitigate such loss by building on Mexía's research to document ethnobotanical knowledge as well as environmental and cultural change associated with it. Proposed here is an interdisciplinary model that incorporated historical, botanical, ethnographic and ethnobotanical data to retrace the 1936 travel routes and botanical collection sites of Mexía near Quillabamba, Peru (Figure 1).



Figure 1. Road through the Valley of Rio Vilcanota looking north toward Quillabamba, July 4, 2008.

This project was divided into four distinct but interrelated phases. I conducted data collection and field work during the months of May, June and July 2008 both at San Jose State University and in Peru. The translations, analysis and write up of the data took place from August 2008 to July 2009. The town of Quillabamba, Peru was my main field site however additional data collection was conducted in Cusco, Qishuarani, Chinche, Echarati, Ollantaytambo and surrounding communities. Here, I provide an overview of the research design, followed by a synopsis of the Mexía portion of the project.

Research Design and Methodological Approaches

Phase I: Historical Literature and Map Review

In this phase, I documented and analyzed the historical literature, bio-geographic information, botanical collections and ethnographic information pertaining to the Quillabamba region. It was divided into sections A. Geography, B. Botanical Collections, and C. Applied Anthropology: Ethnographic and Ethnobotanical Information. Using the historical clues referring to geography, botany, environment, culture, date, mode of travel, weather and other useful information found in Mexía's letters, I planned a travel route and established a regional base.

A. Geography: Preliminary Investigation of the Travel Routes Used By Ynés Mexía in the Quillabamba region of Peru (1936)

I used geographic information such as cities, roads, topography and geologic features associated with the botanical collections, notes, letters and other documents from the Quillabamba region to delimit the research area. The historical documents exemplify the type of geographic information that is associated with the botanical collections. For example, the documents indicate that Mexía was in Lima in June 1936; she traveled by steamer from Lima to Mollendo and then took a train to Cuzco.

B. Botanical Collections

Historical information derived from the botanical collections was crucial to mapping of the travel routes and collection sites. Figure 2 is an example of Mexía's inventory that was synthesized with the other data to provide geographic references that were tied to specific plants. A closer look at the list reveals that a variety of specimens

were collected from several different plant families. As noted by Young et al. (1997), a great diversity of plants from both the jungle and the mountains can be found within a short distance of Quillabamba especially when traveling vertically through the different altitudinal zones.

8019	no specimens lost:		
8020	Escallonia litoralis Phil. d. Johnston		Sax.
8021	Calceolaria punctata (R. & P.) Vahl. d. Pennell		Scroph.
8022	Pseudopanax valdiviensis (Gay) Seeman d. Johnston		Aral.
8023	8023 Myrceugenia planipes (H. & A.) Berg. d. Johnston		Myrt.
Peru 1936			
Departamento Cuzco; Provincia La Convencion; Valley of Rio Vilcanota May 9			
8024	Leucaena trichodes (Jacq.) Benth. det. Killip		Leg.
8024a	no specimen lost?		
8025	Piper elongatum Vahl. d. Trelease add near Quillabamba		Piper
8025a	Amaryllis seed only, sent to Morrison		
8026	Prosopis juliflora (Sw.) DC. d. Killip		Leg.
8027	Banisteriopsis argentea (HBK.) Rob. d. Morton		Malpig.
8028	Brickellia diffusa (Vahl.) Gray d. Blake		Comp.
8029	Banisteriopsis argentea (HBK.) Rob. d. Morton		Malpig.
8030	Phaseolus adenanthus G.F.W. Mey. d. Killip		Leg.
8031	Piper quillabambanum Trelease sp. nov. Type collection		Piper
8032	same as 8030		Leg.
8033	Adiantum boliviense Christ & Ros. d. Copeland/Valley of Vilcanota May 10		Fern
8034	Piper antirheumaticum Trelease sp. nov. Type collection		Piper
8035	Pogonopus tubulosus (DC.) Schum. d. Standley /add Hacda. Potrero		Rub.
8036	Pothomorphe Dombeyana Miquel d. Trelease/ Hacda. La Selva, Valley of Sambray		Piper
8037	Mucuna rostrata Benth. d. Killip		Leg.
8039	Pityrogramma austroamericana Domin d. Maxon not Hacda.		Fern
8040	Erythrodontium squarrosus (L. C.M.) Par. d. Bartram		Moss
8040a	Trichostomum andinum Sull. d. Bartram		"
8040b	Entodon Beyrichi (Schwaegr.) P.C. m. d/ Bartram		"
8041	Quamoclit coccinea (L.) Moench. d. Standley/ change to Mouth of Rio Sambray		Convolv
8042	Mikania cordifolia (L.f.) Willd. d. Blake		Comp.
8043	Iresine Celosia L. d. Standley		Amarant
8044	Clematis dioica L. d. Killip		Ran.
8045	Pityrogramma austroamericana Domin, d. Maxon near Quillabamba		Fern
8046	Oxypetalum Dombeyanum Dcne. d. Standley/Valley of Rio Vilcanota Mission of Quillabamba May 11		Asclep
8047	Peperomia vilcanotana Trelease sp. nov. Type collection/ Valley of R. V. Rio Sambray		Piper
8048	Merremia aegyptia (L.) Urban d. Standley/S. of Quillabamba not Rio Sambray		Convolv
8049	Sida paniculata L. d. Killip May 12		
8050	Panicum maximum Jacq. d. Chase		Gram
8051	Trichilia Mexiae Standley sp. nov. Type col./ Valley of Rio V. Playa de Balsa		Melia
8051a	Cnidocolus tubulosus (Muell. Arg. IM. Johnston d. Croizat		Euph.
8052	Blechnum unilaterale Sw. d. Copeland		Fern
8053	Anemia flexuosa (Sav.) Sw. mixed with A. ferruginea HBK. d. Mickel		"

Figure 2. Scanned botanical document from Mexía collection. Note the references to Quillabamba, Rio Vilcanota, Rio Sambray and the Mission of Quillabamba.

This project attempted to document associated cultural uses of five plant species included in the Mexía collection (*Oxypetalum dombeyanum*, *Merremia aegyptia*, *Ruellia brevifolia*, *Piper elongatum*, *Tibouchina longifolia*). Limiting the number of plant species under study allowed me to employ this model and determine whether or not it

could be feasibly applied to other plants in the Mexía collection and by extension to other botanical collections lacking geographic and ethnobotanical data. I integrated the material present in the inventory in Figure 2 with historical literature as well as botanical and geographic information to develop a table that facilitated the search for correlations between the date, place and plants collected. This, in turn, allowed me to focus my investigation in specific locations. Table 1 depicts a synthesis of geographic and botanical clues found in the historical documents.

Table 1. Geographic data associated with Mexía botanical collections.

Date 1936	5/9	5/11	5/12	5/16 or 5/17	5/18
Location	Near Quillabamba	Valley of Rio Vilcanota	Valley of R.V.	Valley of Vilcanota	Valley of Rio Vilcanota
Feature		Mission near Quillabamba	S. of Quillabamba	Road Macchu-Picchu to Quillabamba near km 153	Mission near Quillabamba
Species	<i>Piper elongatum</i>	<i>Oxypetalum Dombeyanum</i>	<i>Merremia aegyptia</i>	<i>Ruellia brevifolia</i>	<i>Tibouchinia longifolia</i>
Family	Piperaceae	Asclepiadaceae	Convolvulaceae	Acanthaceae	Melastraceae

C. Applied Anthropology: Ethnographic and Ethnobotanical Information

I utilized ethnographic information associated with the historical documents to verify Mexía's encounters with locals. While collecting plants outside of Quillabamba, she met a priest who mentions the "Machigueño," (also spelled, Machiguenga, Matshiguenga, Matsigenka), "For several days I collected in the vicinity, conversed with a dear old Dominican Priest who has spent thirty years among the Machigueño Indians in the heavy forests of the Madre de Dios region, while between times I packed and pressed my plants" (Davis, personal collection). Using applied anthropology methodologies, I

collected historical and contemporary ethnobotanical and ethnographic data related to the five plant species and other plants that are not associated with the collection.

Ethnographic interviews allowed me to gain insight to different cultural perspectives of environmental change.

Phase II: Triangulation of Historical, Botanical and Ethnographic Data to Develop an Interdisciplinary Model to Map Travel Routes and Botanical Collection Sites

In this phase I focused on the development of a provisional map. I triangulated the data derived from the synthesis of the three disciplines to delimit the parameters and frame the research around three key geographic features near Quillabamba: 1. the road marker km 153 on the road from Cusco to Quillabamba; 2. the Rio Sambaray; and 3. the “mission” near Quillabamba. I chose the features as focal points because they were the primary geographic references associated with the collections. Figure 3 is a digital image of the original map and route used by Mexía between the port of Mollendo and Quillabamba. Quillabamba is located in the upper left corner of the map.

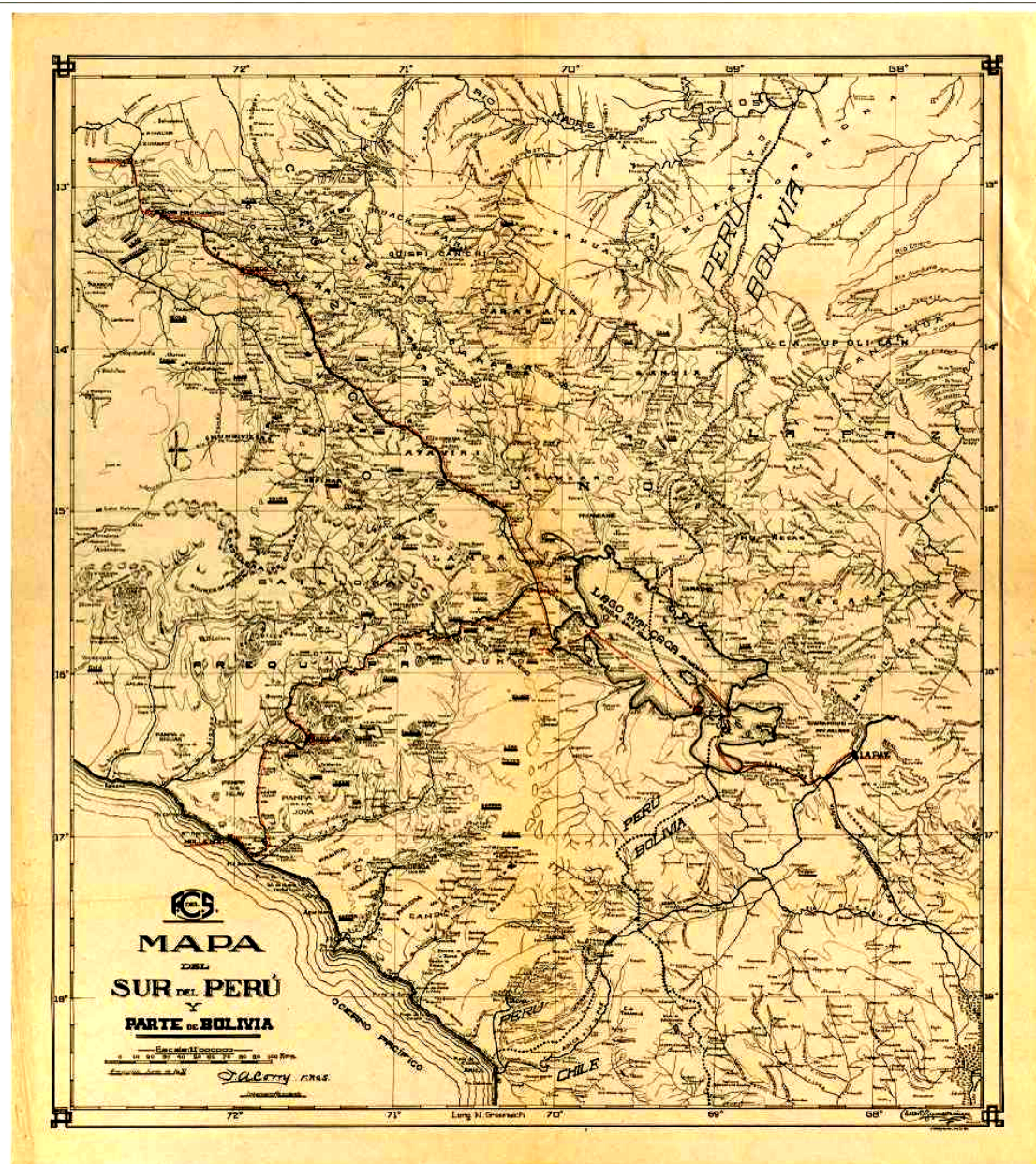


Figure 3. Original map used by Ynés Mexía in 1936 depicting her hand-tracing of the travel routes in faint red. (Received from Bancroft Library, Berkeley, CA)

Phase III. Visual Representations

The initial proposal for this project included a plan to develop cultural maps to convey important environmental and geographic information pertaining to native flora and fauna. I could not complete this aspect of the proposal due to the extensive

cultivation in the region. Few areas of intact native flora and fauna exist in the area surrounding Quillabamba. In addition, few of the participants utilized the wild species for subsistence due to their reliance upon domesticated plants and animals. Those who were familiar with the native flora and fauna requested that I not reveal the locations where they harvested. Out of respect for my participants, rather than create cultural maps, this project incorporated various visual representations of culture, subsistence, the geography and the environment without necessarily disclosing the physical location of important or clandestine sites.

This phase focused on documentation and interpretation of images captured in photographs and on film. They include but are not limited to: produce, food, and natural forest products found at markets, displays of textiles and hand-made crafts at fairs, and exhibits of sculpture and children's drawings. Due to the large volume of photographic data collected, only representative samples of the images are included in this report. Visual representations provide insight to perspectives and those things that are considered important to the local culture. The children's drawings presented in this report are particularly intriguing as they depict various activities concerning subsistence modes of living, economic development, and environmental change. I included a large sample of the children's drawings because they provide a greater depth of cultural information and perspectives than the other data. Although I also encountered similar pieces drawn and painted by adults, the drawings produced by children capture perspectives that are still evolving and may provide an interesting reference for future research. A clear example of visual representation is found in Figure 4 which depicts a portion of a much larger

rendering created by a child. The complete image includes handwritten toponymic information such as the name of Chinche, a local mountain, and a cooperative. Similar to a cultural map, the drawings are a symbolic representation of the surrounding environmental and cultural features. While viewing the display, I asked a small group of children and adults about the different mountains, buildings and plants in the drawing. They pointed to the different shapes and provided the names of the mountains, the buildings, the river and the plants. The shape of each plant represents different species or cultivars that are difficult to discern as an outsider. The people I queried recognized what the artist drew because they are familiar with the plants and other features that are found in the region.



Figure 4. Child's depiction of the cultivated region surrounding Chinche. Note the fire, the locust tree and the bell at Chinche (lower right).

Phase IV. Applied Anthropology: Intercultural Education and Interpretive Voice

This phase synthesized the data gathered during the first three phases and used applied anthropology methods and intercultural education¹ to provide people of the Quillabamba region an opportunity to tell their story from their perspective, in other words, their voice. For this project, intercultural education consisted of the exchange of knowledge and information about plants, the environment and culture in the United States with the participants, while they provided equivalent information about Peru. The sharing of information immediately allowed all parties to establish common ground and increase their understanding of one another.

When possible, the documents and media developed during this research will be made available for inclusion as part of the intercultural process to develop intercultural education programs. Intercultural education programs take on different meaning in different cultures. For purposes of this study, I use the definition explored by Aikman (1997) developed in the Cusco Seminar in 1995 that states:

Interculturality is a process of social negotiation which aims to construct dialogical and more just relations between social actors belonging to different cultural universes on the basis of recognition of diversity...It is a notion which encompasses the global society and helps to overcome dichotomies, particularly that of indigenous/non-indigenous...There cannot be interculturality without democracy. [Cusco Seminar 1995]

Aikman (1997) examines Latin American perspectives and the history and relationship between intercultural education and indigenous self determination. She claims that there are “contradictory concepts of interculturality embedded in different

¹ Intercultural education is a method that allows the researcher and participants to share knowledge about their respective cultures to facilitate understanding and appropriate action (Aikman 1997).

models of democracy (representative versus direct)” (Aikman 1997:476). The challenges that face indigenous and rural societies need to be understood within the existing heterogeneous and intercultural framework and addressed within an equitable and democratic process in which their rights are embraced. Knowledge gained and media generated from this research might prove useful to students and faculty in Quillabamba² as well as in the United States as part of intercultural curricula. The project report and associated provide an opportunity for the people of Quillabamba to express their views and provides images that represent their concerns about the economy and the environment from their unique worldview or cosmovision (Ishizawa 2004).

THE MEXÍA COLLECTIONS

Geographic Information and Challenges of Proximity

In this section I present the Mexía portion of the investigation. Vignettes from my journey are used to depict the travel routes and reveal the contemporary geographic and botanical issues encountered during the search. Although references to the Mexía historical documents are found throughout the project, a synopsis of the data associated with her collections and recommendations for ongoing research are examined here. The related themes of ethnobotany and perceptions of environmental change, which became the primary focus of my investigation, are presented in the subsequent chapters.

² One of the professors in Quillabamba expressed interest in my project and utilizing my findings.

Km 153: The Search for *Ruellia*

The route to Quillabamba winds through the steep rugged terrain of the mountains. Despite the road being asphalt and well traveled, every turn presented a challenge and potential for catastrophe. Rocks and large boulders strewn about the road served as constant reminders of the *derrumbes* (landslides), which are common occurrences. Landslides scar the mountain and wreak havoc on the highway as new slides often block half the roadway. This created a very dangerous situation, forcing vehicles to maneuver around the rubble on blind curves often with oncoming traffic (Figure 5).



Figure 5. Landslides along the road to Quillabamba.

While traveling through the valley of Rio Vilcanota, Mexía collected a specimen of *Ruellia brevifolia* near km 153. As I searched for the road marker, it became evident that the original highway was taken out by landslides and floods years ago. A closer look at the map used by Mexía in 1931 (Figure 6) shows that the main highway connecting Ollantaytambo and Quillabamba in 2008 did not exist then, therefore, I was able to travel only a portion of her original route. Although I did find a specimen of *Ruellia* in another location, I soon realized that the *Ruellia* collected near km 153 was on part of the original route that is no longer accessible. Only one road leads into Quillabamba from Cusco along this route. Judging from the extent of the landslides, this area of the mountain had been impacted for several years. The train rails that Mexía mentioned during the bus ride through the valley were finally laid in 1978 (Moore 1991), only to be taken out by major floods and landslides during the El Niño events of 1997 (personal communication with Alfredo Encinas Martín July 10, 2008). The rails await financing once again, but may never be rebuilt due to the potential impacts from a constantly shifting landscape.

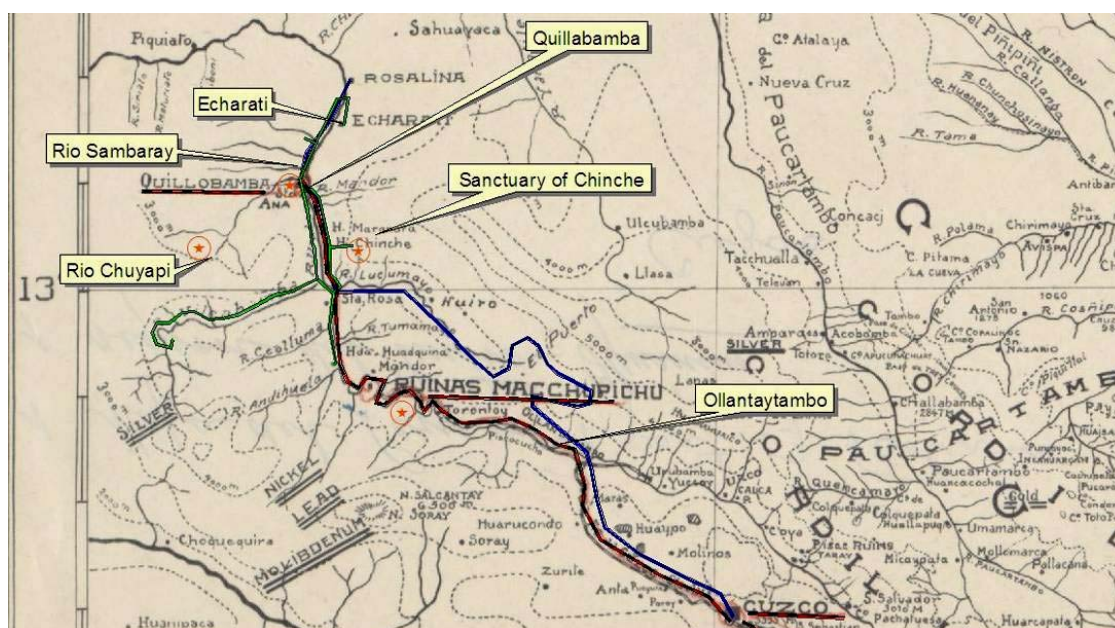


Figure 6. Travel routes of Mexía in red with orange stars marking possible collection sites. The blue and green lines represent the approximate routes I traveled in 2008. Note that sections of the road Mexía used between Ollantaytambo and Santa Rosa in 1936 are no longer accessible.

The Rios

I continued to make my way down the mountain as the landscape changed dramatically from high, rocky, *puna* (grassland), to scrubby, vine-covered vegetation, and then dense banana plantations and tropical forest. The air became warm and heavy, laden with tropical moisture while the road turned abruptly from asphalt to gravel as I ventured deeper into the valley of the Rio Vilcanota. In a letter written in 1936, there is a reference to a river where Mexía collected but the name is not provided. She mentioned meeting Mr. Bues, an “Americanized-Peruvianized German” who helped her while she was in the Quillabamba region:

We went out collecting but the cultivated fields of corn, coca and coffee did not yield much native vegetation, so we took horses for Sunday and

went miles up the river [empty space in original document] nearly to its source where the hills were not so bare and I filled my press. [Davis, personal collection]

The reference to the bare hills is a telling observation indicating the human impact on the environment. Mexía's note that she filled the herbarium press implies that she collected numerous plants making this a significant location for this project. Other notes refer to the Rio Vilcanota, the Rio Chuyapi, the Rio Sambaray, and the "mouth" of the Rio Sambaray. Unfortunately, they are at times contradictory, for example, "not Rio Sambaray" is written over the original typed version that indicated the Rio Sambaray as the source. Also confusing is her use of the initials R.V. which could have referred to two different rivers in the region within close proximity to one another—the Rio Vilcanota and the Rio Vilcabamba. There is a reference to a river located south of town, which implies that Rio Vilcabamba may be the river to which Mexía alluded in that case. The Rio Chuyapi is most likely the river that she traveled by horse "nearly to its source," but the river is forked in three directions at the head waters so it was not possible to determine to which "source" she was referring.

The Mission

After unsuccessfully trying to locate two different geographic clues, it became clear that the search for the original geographic locations of the Mexía collections would, at best, be an approximation. My hope was that the search for the "mission" referenced in the herbarium notes would be more successful. According to Señor Alfredo Martín, a local historian, there were no missions in Quillabamba in 1936 (personal conversation, July 22, 2008). At that time, there was a hacienda named Santa Ana, which later became

engulfed by Quillabamba. He hesitated to refer to either place as pueblos because there were so few people in the area then. Mexía also wrote that the community was “quite primitive.” After speaking with several people in the area about what missions were around during 1936, I was referred to one about eight hours north of town. Considering that it would take a full day to get to the mission using modern transportation, it would have taken a much longer period of time in 1936 by horseback on an undeveloped road. Mexía did not mention going very far north, but she did mention that the mission was “near” Quillabamba, thus ruling out so the one far north as a possibility.

As the search continued for more information about possible missions in the area, a reference to the church of the Virgin of Immaculate Conception was found in a pamphlet written by Chacón (2008). It was one of the original buildings that were part of the hacienda of Santa Ana (Chacón 2008). Few plants remain around the site today and the city of Quillabamba has grown around the former hacienda. Although the church could be the mission that Mexía mentioned, I found no references indicating that it was called a “mission” when she was in the area. Another possibility in the area, but not in operation in 1936, is the “sanctuary” otherwise known as the “mission” of Chinche located about 18 km south of Quillabamba (Chacón 2008). According to Chacón (2008), there is an old locust tree, catholic monastery, and ruins of colonial era cloisters built about three hundred years ago (Figure 7).



Figure 7. Mission of Chinche with arches from colonial era cloisters. Note the bare hills in the distance. Some of my participants mentioned that many of the trees have been removed from the mountains around Quillabamba.

On the first visit to Chinche, I recorded GPS coordinates and conducted a brief reconnaissance of the area. I could not determine definitively that Mexía collected at Chinche, but based on the clues in the botanical collections it is plausible. Although the plants from the collection were not found at the site, a group of people happened to be gathered under the locust tree after a local funeral. This presented an opportunity to query the locals about plants in the collection. One of the men mentioned that he had seen some of the plants in another location not far from Chinche, signifying that there were plants from the collection in the vicinity. As we discussed the plants, the men became interested in my research and allowed me to interview them about other plants

and animals used for subsistence. This, in turn, led to a discussion about the issues associated with the environmental and economic changes in the region. This vignette is developed in chapter 3.

Project Review and Outcome of Phases I and II

Utilizing data from multiple disciplines I identified and located approximate travel routes and probable collection sites (see Figure 6. p. 15). I found that the original travel route used by Mexía has been altered significantly, eliminating the possibility of locating the site where she collected *Ruellia brevifolia*. The references to the sanctuary of Chinche, the Rio Chuyapi and the mouth of the Rio Sambaray in Figure 6 provide toponymic and geographic locations for at least three collection areas.

Using applied anthropology methodologies I corroborated the ethnobotanical use of *matico* (*Piper* spp.) and queried people about ethnobotanical data associated with the other plants in the collection. Three of the participants referred to the photo of *Merremia aegyptia* as the vernacular, yucca, likely due to similarity in leaf structure. One of the participants wrote *bijujo* next to the image of *Oxypetalum dombeyanum*, but there was no claim that it was used in any way. *Ruellia brevifolia* was referred to as “gorioncillo,” and one participant suggested that it is commonly found along the edges of the fields. No ethnobotanical data was collected in association with *Tibouchinia longifolia* although one woman said that it was found deeper in the jungle. (For a detailed account of ethnobotanical data associated with the five plant species from the Mexía collection see Appendix A.)

Recommendations for future research in regard to the Mexía collection include: 1) funding (this entire project was self funded); 2) a longer term study (at least three months); 3) conducting an investigation of all of the plants from the Mexía collection found in the area; 4) conducting a more thorough reconnaissance of the Rio Chuyapi and its tributaries; and 5) conducting ethnographic surveys and interviews with a larger number of people who live near the collection sites to assist with corroboration of locations, and cultural use of plants in the collection.

By using the Mexía botanical collections as a base to launch the research, I developed and tested an interdisciplinary model within the scope of this pilot project. An interdisciplinary approach to data collection coupled with moments of serendipity, such as the interaction with the group in Chinche, produced very rich data that illuminated important patterns and relationships between individuals and the environment. For example, the search for the historical botanical collection sites provided an opportunity to meet the men from Chinche, query them about the plants found in the collection and gather information related to the environment and the transfer of knowledge. Although the attempt to retrace Mexía's travel routes and collection sites presented challenges, interest in the plants from the collection allowed me to establish a rapport with my participants and gather a wealth of ethnographic and ethnobotanical data that was to become the foundation of my research. The focus of this project is an investigation of two distinct but interconnected aspects of Peruvian culture: 1) perspectives regarding environmental change, and 2) the transfer of ethnobotanical and environmental knowledge.

CHAPTER ONE: INTRODUCTION

Environmental Change, Cultural Perceptions and Access to Subsistence Resources in Quillabamba, Peru

People live and interact with the environment within the geographic parameters of physical space that is affected by history, contemporary human activities, and is perceived within a cultural context. The images presented in this research are aesthetically striking, emotionally charged, and express much more than can possibly be described within the body of this document. A child's rendering of the environment in Figure 8 depicts their perception of contemporary changes in the region. The drawing was part of an exhibit consisting of approximately 24 contributions by school children celebrating the 150th anniversary of Quillabamba. Particularly revealing are the contrasting images of a lush, productive and biologically diverse forest adjacent to a landscape that has been denuded by clear cutting, ravaged by fire and rendered unproductive. The fact that several of the images presented in this document are the work of children is especially poignant. Although not the intent of this project to focus on children's perspectives, their voices are evoked in the images they rendered. They depict not only the issues that they are currently experiencing, but also those that they will inherit and ultimately have to resolve in the near future. The perspectives and insight that I hope to convey through ethnographic images and vignettes are based primarily on those of the people who live and work near Quillabamba, Peru.



Figure 8. Child's rendering of environmental change near Quillabamba, Peru.

How people view the world around them, is colored by their cultural context. Throughout my fieldwork, participants invoked cosmological perspectives in reference to various aspects of everyday life—the mundane and the religious. Their cosmovision was often infused subtly and overtly in their daily lives, as a constant reminder of their connection to the world around them. Although I do not delve into the cosmological perspectives of my participants, I make references to them as participants expressed their importance to me, especially in relation to plants, cultural and geographic features in the environment. To exclude these perspectives would be a disservice to those participants who shared their life experience and ideology with me.

The utilization of subsistence resources is an important factor in the diet, heritage and cultural identity of many societies worldwide. Indigenous and non-indigenous

people continue to use plants, animals and other natural resources for food, medicine, shelter and economic supplements. However, due to globalization, cultural transformation and environmental degradation, many of those historically abundant resources are being polluted and depleted along with the cultural knowledge of how to use them (Leatherman 1996; Nash 1994; Wirsing et al. 1985). In addition, the privatization and development of land for agriculture, transportation, and construction fragments the existing ecosystems and creates isolated patches of habitats that were once interconnected and interdependent (Wirsing et al. 1985).

This fragmentation of environmentally and culturally diverse systems results in intellectual and environmental destruction that reduces our cumulative knowledge, understanding, and coevolving relationship with the natural world. Although individuals may also deplete, pollute and restrict access to resources that are or were once commonly shared, this global “tragedy of the commons”³ stems primarily from multinational corporations and politically supported international activities that hasten the depletion and pollution of important subsistence resources worldwide (Edelman 2005; Leatherman 1996; Nash 1994).

Tremendous growth in population and out-migration from small rural communities into larger cities creates a phenomenon in which economic incentives to seek wage employment in cities greatly changes the demography, environment and health of both urban and rural populations (Leatherman 1996; Nash 1994). Issues associated

³ Tragedy of the commons is a concept coined by Garrett Hardin in 1968 which suggests that shared common resources can be subject to overuse resulting in negative consequences for the resource and for the people and animals who utilize them (The Garrett Hardin Society. Electronic document, http://www.garretthardinsociety.org/articles/art_tragedy_of_the_commons.html, accessed March 30,

with urban growth include not only social inequities and lack of infrastructure, but extreme poverty, pollution of soil, air, and water and associated health problems, especially for marginalized populations who often reside in areas with substandard infrastructure (Leatherman 1996; Nash 1994; Sengupta 2003; Wirsing et al.1985). Although not considered a large city compared with urban centers such as Lima and Cusco, Quillabamba is poised to become another focal point for in-migration due to recent natural gas and development interests in the Amazon.

This report examines issues related to urban and rural development while simultaneously revealing perceptions of environmental change and the transfer of ethnobotanical and environmental knowledge. The following questions guided this project: 1) What are the cultural perceptions and perspectives regarding the environment? 2) Have major environmental changes occurred? If so, what are the changes and have they been beneficial or detrimental? 3) How is information and knowledge about the environment legitimized? 4) And finally, how is information about the environment passed on from one generation to the next?

Fieldwork and Data Collection

Each phase of the investigation required a different combination of data collection techniques and methodological approaches based upon the particular set of circumstances and opportunities found in each area of study. Qualitative anthropological methods such as formal and informal interviews, participant observation, photography, video recording and field notes were the primary modes of data collection employed in this investigation

(Ambert et al. 1995; Bailey et al. 1999; Brown 2003; Creswell and Miller 2000; Hammersley 2000; Simco and Warin 1997).

Project Sample and Ethnographic Interviews

I conducted, formal, informal and semi-formal interviews with 12 participants, 4 women and 8 men ranging between the ages of 25-80, using a set of questionnaires written in Spanish. An interpreter assisted with six of the interviews and translations. I conducted the other six interviews on my own. Digital video and audio recordings were conducted when permission was granted. The video recordings provide both audio and visual information that were used to verify ethnographic translations. Audio recordings provided a less intrusive option for those participants who did not want to be filmed. Seven of the participants allowed me to use a camcorder to record the interviews and hikes. Three participants allowed an audio recording. Four participants also provided handwritten answers to the questionnaire or provided handwritten notes about plants. I also had informal conversations with approximately twenty five people at markets and fairs and in textile and herb shops.

Participants were selected using a variety of non-probability methods including convenience sampling, purposive sampling and chain (snowball) sampling (Heckathorn 2002; Patton 1990). All of the participants who were selected had to meet the following criteria of purposive sampling: 1) be at least 18 years-old and residents of Peru their entire life (except for younger family members in inter-generational interviews); 2) live or work in the *campos* (rural areas) for most of their life; and 3) be knowledgeable about edible and medicinal plants. Casual encounters (convenience sampling) would often lead

to an inquiry about my investigation and subsequent interest in participation. Most of the participants were contacted using a chain sampling approach through networks that I developed during fieldwork. My initial encounters with people hitchhiking between villages or to the market (a common practice) led to the recruitment of several people with whom I conducted interviews. All of the participants mentioned in this research were provided with pseudonyms to protect their privacy. Most participants were interviewed in the campos where they resided, however, some took place in the plaza based upon their needs and availability.

Two multi-generational families who lived and worked in the country agreed to be interviewed for this project. Two of the twelve participants were members of the multi-generational families. In each case a group interview was conducted in Spanish with the aid of a translator with three generations of an extended family. One family consisted of the grandfather who was approximately 50 years old, his daughter approximately 30 years old and his two granddaughters, one 13 years old and the other a 3-4-year-old. The other family consisted of the grandmother who was approximately 70 years old, her son approximately 50 years old, his sister, also in her fifties and his nephew who was in his late teens or early twenties who was part of the extended family and treated as his son. I found that it was impolite to ask people their age and in a few cases the participants did not know their exact age or even their date of birth.

Due to logistics and availability of the family members, I performed group interviews with all of the members present, rather than interviews with individual family members. Younger members of the families were also allowed to participate with the

elders' permission in the group interviews. While all of the participants were invaluable to this project, a few became key informants and provided me not only with rich in depth interviews, but with personal accounts regarding their use of plants, hikes to medicinal plant sites, and invitations to dinners and fairs. Verbatim translations of the interviews and hikes, along with thick description of the context surrounding them convey the views and perspectives of the informants.

Field Notes and Journaling

Using a variety of different sized writing pads, I took meticulous notes during and after conversations, detailing as much information about the interaction as possible. I also wrote down visual and auditory observations. When unable or inappropriate to take notes, I wrote down my recollection of the experience when I had the opportunity. I also kept a journal of daily activities and insights related to the project.

Participant observation

Participant observation was another method used to collect data. While in Cusco, I made observations of the surrounding vegetation and of plants while interacting with people in the markets. I engaged in participant observation as a patient during one of three healing sessions conducted by a well known healer and chiropractor in Cusco. Exploration and participation in tours, hikes, local markets and festivals provided a large amount of data regarding subsistence resources, especially plant products.

Photographs

I took photographs of the environment and plants when possible, rather than collecting voucher specimens. Much of the information collected about the plants came

from interviews and handwritten responses to questions. Many of the participants showed me the plants that they mentioned during the interview or pointed out the plants while on hikes or harvesting in the campos. In other cases the plants were not shown because the interview took place in a city plaza or because the plants were located in other regions or were not in season. As previously mentioned, I also took numerous photographs that represent different aspects of the culture and environmental resources including artistic displays of food, drawings, sculpture, textiles and natural forest products.

Participatory action

I incorporated a participatory action research (PAR) approach (Mosse 2005; Whyte 1991) and intercultural education (Aikman 1997) into the research model along with ethnographic interviews to facilitate the search for the Mexía travel routes and the botanical collecting sites. PAR is an inclusive research method in which the participants help to guide the course and actions of the researcher to facilitate the study of issues deemed important by the group or community involved and to develop protocol for feedback (Mosse 2005). I interviewed residents of the Quillabamba region and requested their participation in the search for and identification of extant species of plants that represent those found in the collection.

Plant Identification (Appendix A)

I brought photos of five plant species from the Mexía collections for review by the participants. For each plant, I asked the participants if they recognized the plant and if it had any significance in terms of human use including food, medicine, dye, wood, or

ceremonial purposes. I also asked the participants to identify the plants including both Spanish and Quechua names if known.

Plant Table (Appendix B)

I created a plant table to organize and collate the information associated with each of the plants. Some plants had both Spanish and Quechua names, while others were identified in only one language. I first collated the vernacular Spanish and Quechua names of the plants and then cross-checked the vernacular nomenclature with several references and attempted to match them with their scientific counterparts. Some plant names provided during the interviews could not be matched with a scientific name but were included in the plant table along with the associated ethnographic information. In the text, scientific names are italicized and vernacular Spanish and Quechua names are in bold print. The table includes the vernacular and scientific names of the plant, the utilization, the date of the data collection, and the pseudonym of the participant providing the information. The table provides a visual comparison of the utilization of species that were noted by more than one participant, and allowed for a rapid assessment of the relative commonality or cultural significance of each species.

Organization of Project Report

Chapter two sets the tone for the serendipitous nature of this project. In this chapter I explore sensory ecology and discuss the utilization of plants as a medium or tool for communication. I then present research opportunities in four different locations to emphasize the importance of the cosmological perspectives and the syncretism of belief systems revealed symbolically through welcoming ceremonies, textiles, healing

mesas, healing modalities, and medicinal plants. Finally, I illuminate the issues of bioprospecting by sharing an excerpt from an ethnobotanical interview and a personal account regarding the healing properties of a revered plant.

Chapter three unveils the physical and geographic context of Peru and the Quillabamba region to provide the reader with a sense of place and the environmental milieu for the culture. The relationships between subsistence, economics and food sovereignty are conveyed through ethnographic interviews as I delve deeper into the ethnobotanically related themes of food, markets, health and the environment.

Chapter four provides an analysis of the pressing environmental issues and perspectives in the region. Common themes, issues and concerns are examined using excerpts from the interviews and personal observations. Environmental and cultural issues and associated health problems related to global warming, globalization, and pollution, are explored. Contemporary and pressing environmental problems related to the Camisea Project⁴ are also illuminated and depicted in children's drawings.

Chapter five focuses on the case studies with two families. The families were interviewed about important subsistence foods, medicinal plants and the transfer of ethnobotanical and environmental knowledge. Issues associated with legitimization of knowledge and the out-migration of children seeking employment in the wage economy are highlighted.

⁴ The Camisea Project is a multinational venture to extract natural gas from beneath the Amazon rainforest in Peru. Electronic document, <http://www.iadb.org>, accessed March 30, 2008.

Chapter six is a review of lessons learned related to the research model and the Mexía collections. The significance of this project to applied anthropology and overriding themes concerning human-environment interactions encountered in this investigation are explored. Finally, I present recommendations and opportunities for research reciprocity and intercultural education.

CHAPTER TWO

SENSORY ECOLOGY AND THE MEDIUM OF PLANTS

This project deals with the convergence of culture, history, geography, botany, and cosmology in the face of the inevitability of change. The integration of scientific inquiry with the concepts of sensory ecology and animism adds more complexity to it. I present data in a multifaceted manner drawing on visual, symbolic and narrative representations of the relationships between plants, place and people. The visual and symbolic representations include: photos of maps, textiles, food, architecture and artistic renderings. Vignettes and excerpts from ethnographic interviews and field notes reveal local perceptions of plants, animals, food, medicine, environmental and cultural change and the transfer of knowledge inter-generationally.

Our sensory experiences are by far the most prominent and individually tangible aspects of life, yet it is difficult to capture those senses in text. When I think about the research that I conducted in Peru, I realize, that I'm not thinking so much in terms of words or phrases that convey my experience, but rather sights and sounds and smells and feelings. Shepard (2004) proposed that "sensation can be understood as a biocultural phenomenon rooted in human physiology yet constructed through individual experience and culture." In a comparative study between the Machiguenga and the Yora in the Peruvian Amazon, Shepard (2004) examined the role of the senses in medicinal plant therapy. He modified the concept of "sensory ecology" to bridge the scientific and anthropological insights in relation to human environment interactions and the "limitations of a narrowly defined sensory anthropology (Shepard 2004: 264)."

Sensory ecology is a new ecological approach that incorporates “physiological understanding and cultural constructions of sensory perception within a broad, biocultural model addressing human-environment interactions” Shepard (2004:264). This approach includes the study of taste, olfaction, auditory, and other senses that influence human activities ranging from diet, memory and use of medicinal plants to religion and gender relations and sex. I incorporated the concept of “sensory ecology” as part of a holistic approach that includes the emotional and cosmological relationships or senses between plants and people.

Throughout the fieldwork, plants became the focal point of conversation. Through them I gained trust and confidence in the people I encountered. They allowed me to communicate and to convey knowledge and understanding in a way not anticipated and provided a base from which to launch into topics of environmental change and the transfer of environmental knowledge. The search for geographic and ethnobotanical information associated with five plants from the Mexía collection led to a wealth of knowledge from participants regarding numerous other plants. As my participants became more comfortable speaking with me, the conversation often became surprisingly intimate. Cosmological perspectives were revealed, sometimes subtly, as part of casual conversation about traditional uses of plants, such as mentioning the luck associated with *ruda* (*Ruta graveolens*), and sometimes with obvious conviction such as the belief in plant spirits. In addition, some participants revealed plant names and information about certain plants that they regarded as particularly important, but with the premise that the information not be divulged to outsiders, pharmaceutical companies or bio-prospectors.

In the sections to follow I use vignettes from interviews I conducted in Cusco, Kiswarani, and Chinche to convey the importance of cosmology and symbolism while gathering ethnobotanical data. I then discuss the issues of bioprospecting and provide an excerpt from an ethnographic interview in Quillabamba as a personal account to the healing properties of a native plant.

Culture and Cosmology in Four Places in Peru

The plan was to conduct the bulk of my investigation in Quillabamba, however, I made anthropological, geographic and botanical observations before I stepped off the plane in Cusco. While flying from Lima to Cusco I saw the great expanse of the Andes towering steeply inland from the coast. The verticality of the mountains and the extent of the rain shadow on the western slopes create an arid and looming landscape. Shades of brown and gold and grey-green seemed to dominate the land, while brilliant hues of blue, pink, and purple skies enveloped the snow-capped peaks of the Cordillera Vilcabamba. The view was beautiful, yet ominous and somewhat mysterious. The Inca terraces that I had only seen in documentaries embellished almost every accessible mountain face as far as I could see. The scale of this human endeavor was both awe inspiring and overwhelming. Never had I imagined how vast and expansive the human impact on these mountains could be. I suddenly found myself becoming ever more intrigued with the ingenuity of the people who managed to subsist and survive in a terrain that seemed so unforgiving.

Getting acquainted with Cusco was a sensory experience as it entailed taking in the sights, sounds and smells characteristic of the city. The camphor-like scent of

eucalyptus (*Eucalyptus globulus*) mingled with fumes of exhaust. The air was warm yet I felt the heavy drafts of cold lingering just overhead, creating a thermal inversion that held in the warmth like a blanket over the city, only to be thrown off at the last rays of dusk (Figure 9).



Figure 9. Cusco: Viva El Peru and modern rock glyphs on facing mountainside. A layer of cold air lingers overhead as dusk draws near.

The city became bitterly cold at night, taunting the street vendors and the homeless alike. People in the high Andes dressed in layers of colorful, beautifully decorated, traditional clothing made of wool from alpaca, llama and sheep. Their bronze, rosy cheeks were often slightly bulged from the wads of *coca* leaves (*Erythroxylum coca*), chewed traditionally for millennia (Burchard et al. 1992) to alleviate the negative symptoms of living in a high elevation, low-oxygen environment (Bray et al. 1983; Fuchs

et al. 1978). Coca, chewed in its traditional manner or steeped in water as tea, provides a suite of phyto-chemicals in every leaf including, but not limited to alkaloids, barium, cocaine, beta-amyrin, ecgonine, geraniin, magnesium, phosphorous, rutin, thiamin, and zinc (Dr. Duke's Phytochemical and Ethnobotanical Databases n.d.). The chemistry of the plant helps to increase the blood flow to peripheral areas of the body through an increase in heart rate and opening of the blood vessels allowing the blood to carry more oxygen and alleviating the symptoms associated with *soroche* (altitude sickness). In addition the pain relieving and anti-inflammatory properties help to address other health implications of living at high altitudes under harsh living conditions and engaging in heavy labor (Bray et al. 1983; Fuchs et al. 1978). If the act of walking in high elevations is difficult on the body, then performing labor such as planting or harvesting potatoes at 12000' on incredibly steep mountain slopes is extremely stressful to it. The people who live high in the Andes are uniquely adapted to living in such terrain (Fuchs et al. 1978; Lindgärde et al. 2004). Most tourists, on the other hand, are not.

Kiswarani

As a participant of a study abroad program, I had the opportunity to gather information in Cusco and surrounding communities that was relevant to my proposed research in Quillabamba, Peru. We toured many of the archeological sites around Cusco and in addition, we spent a weekend at Kiswarani also spelled Qishuarani. This visit provided our group with a glimpse of life in a small village at over 13,000' near Lares, Peru. Kiswarani was particularly interesting because the residents were trying to integrate themselves into the global economy by opening their village to foreign travelers

seeking an indigenous experience. We were the second and largest group to visit. The people in the village welcomed us with a showering of red and white flowers followed by several speeches in the native language of Quechua. We were then serenaded with traditional music and dancing, and provided with a warm meal of quinoa and potato soup. The next day, some of us were led on a hike up to the *papa* (potato) fields to observe harvesting (Figure 10). The following morning, I observed and videotaped the villagers making natural dye from plants, spinning wool, and weaving textiles.



Figure 10. Trail to papa fields and glacial lakes above Kiswarani, Peru. Note the harvested papa fields (dark even-colored soil) to the right of the trail as it approaches the waterfall.

The welcoming, the food, and the process of making textiles shown in Figure 11a exemplify the relationships and connections between the people and the environment. Figure 11b depicts the ‘Spiritual Flowerings,’ *baños de florecimiento* (showering of flowers), a tradition that is typically used for cleansing and warding off evil spirits

(Bussmann and Sharon 2006). The villagers in Kiswarani were just as likely protecting themselves from us, as much as they were welcoming us into their village.



Figure 11a. Textile weaving with natural dye made from plants.



Figure 11b. Spiritual flowering. Note the symbols of plants and animals woven into the textiles.

Plants and animals are integral to the very basics of life and are found symbolically represented throughout the culture in the pottery, textiles, architecture and in their cosmology. Traditional healing mesas or altars are often found in homes and in sacred places and include components of symbolism associated with power, healing and purification. The integration of indigenous and Incan cosmological beliefs and customs with those of Catholicism, Christianity and other non-indigenous beliefs are accepted as a normal part of the culture. As depicted in Figure 12, a shaman in Cusco created a healing mesa using a combination of natural objects such as coca leaves, maize, and elements of different religious beliefs. The syncretism of different beliefs, healing modalities and customs is a common theme that was revealed through many observations and conversations from Cusco to Quillabamba. In the subsections to follow, I present vignettes from Cusco and Chinche to exemplify the cosmological and symbolic perspectives that were encountered during this investigation.



Figure 12. Shaman with “traditional mesa” infused with modern symbolism in Cusco, Peru. A collage of colors, religious elements and natural objects adorn the mesa and the shaman.

Mission of Chinche

When someone dies we ring the bell so that the passage to the sky will open.
(Men of Chinche July 15, 2008)

The sky that day was peculiarly blue, almost surreal. A group of people gathered beneath the arms of a grand, old locust tree. The tree loomed tall and wide like a sentinel protecting the mission. A large bell, approximately 300 hundred years old, once adorned the bell tower but now hung from a large branch of the locust (Figure 13). A sense of somber lingered in the air. Two men were conversing with an elderly woman while a younger woman stood patiently near her side. Two other men were sitting with their backs against the tree. Of the interviews conducted, this one was particularly emotionally charged. There was a funeral that day and the people interviewed were mourners and had

been imbibing the maize-based alcoholic beverage known as *chicha*, which may have influenced the conversation.



Figure 13. Three hundred year-old bell in locust tree.

I began the interview by showing photographs of Mexía and the plants that she collected. This prompted the group to query me about her history and sparked their curiosity. Shortly after beginning the interview, one of the men sitting against the tree stood up and began clanging the old mission bell, breaking the somber and halting the conversation with several firm tugs on the rope. When asked for the significance of ringing the bell, one of the men replied, “When someone dies we ring the bell so that the passage to the sky will open.” The reverberation of the bell pulsed through the air as it resonated skyward—a sensory reminiscence for more than three hundred years and a reminder of the Spanish dominion of and integration with the indigenous people and

customs. I thought about the many generations of people who heard that same sound and wondered how it resonated with them.

The infusion of Christianity, especially Catholicism with indigenous Peruvian cosmologies is manifest in religious structures, mesas, fiestas and symbols throughout much of the society. The melding of religious cosmology emanated in this interview with the ringing of the bell. The bell itself represents the religious manifestation of the Catholic mission, while the ringing of the bell “so that the passage to the sky will open” to allow the spirit of “someone” to pass through represents a belief in animism and perhaps a remnant of colonialization and the influence of Catholicism. The locust tree is also imbued with life and symbolism, embracing the group of mourners in a protective solace.

The clothing worn by the women is also symbolic, offering subtle clues about their ethnicity and beliefs. Garbed in a combination of traditional and contemporary clothing, the elderly Quechua-speaking woman wore a layered combination of a Spanish-colonial peasant dress with indigenous styles. Her garb consisted of a pink *pollera* (skirt) covered with a lacey white apron; a long-sleeved, tight-fitting, synthetic shirt covered by a button-up, cream-colored sweater; shoed with sandals made from recycled tires called *ajotas*; and topped off with a white *montera* (hat). The traditional textiles and symbols convey information to others about their community membership and are typically colored using natural dye made from plants, insects or other natural components.

Figure 14 (a-d) depicts textiles, patterns and symbols from Kiswarani, Vilcabamba, Quillabamba and an ethnic group in the Amazon. The symbols of animals

include a llama and a condor, while the other textiles and patterns depict various deities, the Incan *sol* (sun), the Amazon River and the Andes Mountains. Common symbols include animals such the vicuna, puma, snakes, lizards and spiders; plants such as the San Pedro cactus, the cantua flower and coca.



Figure 14. Various textiles, patterns, colors and symbols of Peru.

Each symbol and pattern represents some aspect of the environment that has an associated spirit or deity. Cosmological beliefs are shared through symbolism that permeates all aspects of Peruvian culture and integrates ancient traditions with a modern global economy such as contemporary shamanism (Brown 1988), cosmovision (Ishizawa 2004) culinary representation (Kroegel 2006), and sensory ecology and pharmacology (Shepard 2004). As conveyed in the following observations, cosmological beliefs and traditional plant medicines are infused with modern medical systems as part of the

healing modality. As I delved into the ethnobotanical realm of this project, it became apparent that the perceptions people have of plants, the dyes, the food, the medicine and the environment can only be understood within the context of their cosmology.

Perspectives of a Healer in Cusco

By only using the fallen leaves I do not harm the plant...I resuscitate the plant spirit.
(Juan 2008 Cusco, Peru)

Juan is a respected healer and chiropractor in Cusco. I attended three different “healing” sessions with him. The first two sessions involved a student who had broken her ankle approximately six months prior and it had become inflamed and painful from overuse. Juan invited us to his home clinic and gave us permission to observe him as he diagnosed and massaged the student’s ankle. During the third session I conducted an informal interview and received treatment on my ankle, which had also become sore from a previous injury. I present excerpts from two of the sessions below to convey the importance of syncretic healing systems and the integration of introduced plants with traditional medicine.

June 22, 2008

Upon entering the clinic, we were greeted by Juan’s son and asked to wait in the lobby furnished with a couple wooden benches and a chair. There were some diplomas and certificates hanging on the walls but little else. Shortly after arriving, Juan came out to greet us and invited us to come into his office. The office, not unlike the waiting area was rather small and humble. A few certificates of training adorned the walls along with a couple charts depicting acupressure points. The desk was covered in papers, books and a few miscellaneous jars of ointment that were sitting in a pot of water on a heating

element. Old Suave ® gel jars were recycled and used for the medicinal ointments that he prepared. There was also a wall closet that housed the majority of Juan's massage tools and other supplies that he used in his practice. A massage table was propped up along one side of the room in front of the closet along with a small step stool. The room itself was painted a light sky blue—rather calming like Juan himself (Figure 15).



Figure 15. Therapeutic touch and medicinal massage.

Although not a large man, Juan embodied a commanding presence with a healthy bronze complexion, strong arms, curly grey-brown hair, warm brown eyes and a generous smile, he instilled confidence and trust. Juan asked the student to climb onto the massage table and proceeded to look at and feel her ankle. Upon removing her shoe and sock, he began feeling and massaging her foot and ankle using his hands and especially his thumbs in as stated by Juan, “the traditional Incan” manner. He gently, but firmly massaged and assessed the condition of the student's foot by using his sense of

touch. As a healer, Juan used the sense of touch for diagnosis as well as massage. He then massaged the ankle with a liniment made from the maceration and fermentation of a medicinal plant from the Amazon. He continued to massage the ankle while answering questions posed to him by the group. After he finished, he wrapped the student's foot in an Ace ® bandage. He then left the office and returned with his herbarium collection.

The collection was kept in a large folder containing approximately fifty or more specimens along with handwritten and typed notes associated with each. I recognized many of the plants and in some cases individual species and genera such as *Artemisia*, *Plantago*, *Gentiana*, *Capsella* and *Myrica*. Several of the plants were non-native species. The use of both native and non-native plants, the combination of traditional healing practices with western tools, (i.e., the Ace ® bandage); and the integration of pharmaceuticals with traditional medicine in healing modalities were common practices encountered during this project. The adoption of non-native plants for medicine and food is also reflective of the integration of different cultural preferences in a global economy. Many of the plants used for food and medicine are originally from other parts of the world, but have become commonly cultivated and ecologically adapted to many areas outside of their native range for decades or even centuries (Bennett and Prance 2000). The introduced species are an increasingly important, if not “vital” resource for people throughout much of South America (Bennett and Prance 2000; Del Vitto et al. 1998). Coffee, citrus fruits, mangoes and bananas for example, are considered important non-native commercial crops and are also esteemed for their nutritive and medicinal value (Bennett and Prance 2000; Bussman et al. 2007).

After reviewing his collection, Juan took his traditional medicine kit from the closet and showed us a very large orange-sized opal that he uses as an instrument for massage. He also presented a couple ancient stones of basalt, one, a pestle used for the soles of the feet, and the other, rectangular in shape, which he used on the face around the eyes and sinuses. Both were worn and shining brilliantly from the patina that had built up from years of use. These were passed on to him from his father and from other healers. Juan learned the art of healing from his father who lived to be one hundred years old.

Upon learning of the research that I was conducting in the region, Juan expressed his beliefs and concerns with regard to plants, people and the environment. He emphasized the privacy of indigenous people's knowledge of plants and stressed that I make spiritual connections. He also said that it is important to ask the plant spirit for permission to use it, and to use only those parts of the plant needed. For example, when Juan is with certain groups of indigenous people, he only uses the leaves that have already fallen rather than taking fresh "living" leaves, thereby not offending the communities with which he works. When the people ask him how he is able to use the "dead" leaves, he tells them, *"By only using the fallen leaves I do not harm the plant...I resuscitate the plant spirit."*

July 2, 2008

During the third healing session with Juan, I was granted permission to take some photos and to use an audio recorder. The interpreter helped with translations during the session. I used an observational approach during the first two sessions without asking

formal questions related to the research. The goal of this visit in addition to receiving treatment on my ankle was to ask specific questions regarding the Mexía collection, ethnobotany and the process of preparing the medicinal oils and ointments. Prior to working on my ankle, Juan saw the photos of the plants from the Mexía collection. He recognized one of the plants as a medicinal known as matico and said that it induces lactation in mothers and is very nutritive, but he did not know the other plants. One of the most popular medicinal plants belonging to the Mexía collection is matico (*Piper* spp.). Matico was mentioned by 6 of my participants during interviews and was also referenced by several other people during casual conversations. Also known as *moco moco*, its leaves, stems and flowers are employed for a wide variety of ailments including internal use as a tea for stomach ulcers and to induce lactation. Externally it is used as a wash and poultice for to heal wounds and to alleviate the pain associated with sore muscles and bones. It is also used in steam baths for general malaise of the body, for lungs and flu-like symptoms and in combination with rata rata for headaches (see Appendix A).

After gathering information related to the collections, I asked questions about the preparation of medicinal plants. Juan makes his medicinal oils in a place approximately eight hours from Cusco. Unable to show the actual process, he explained it using photographs of his medicinal preparation workshops. In one of the photos was an image of a pressure pot and a hose contraption leading to another container which was used to capture the essential oils of the medicinal plants. The oils can then be mixed into a carrier oil or fat to make ointments or mixed with alcoholic extracts for internal use or

external liniments. Rather than using alcohol as the menstruum to extract the medicinal properties from the plants as is often the practice in the United States, the plants are fermented to create the medicinal extract. This is an important consideration in areas where alcohol is expensive and difficult to acquire.

Some of the more prominent plants that Juan uses in medicinal creams include *chamana* (*Dodonaea viscosa*), *huamanchilca*, *lambrama*, *maicha*, *matico*, and *muña* (*Minthostachys* spp.). Muñas and other members of the mint family are often used for their carminative properties to alleviate indigestion and flatulence (Bremness 1994). According to Juan, plants that are considered “popular” and used by many people, include *piri piri* varieties (*Cyperus articulatus*) or (*Justicia pectoralis*), *ruda* (*Ruta graveolens*), *svela que svela* (*Pseudelephantopus spicatus*) and *yanahuacta*. Of all of the plants he used, *matico* is the only one that is part of the Mexía collections.

Ruda (*Ruta graveolens*) was perhaps the plant most frequently discussed and observed during my research. Several of my participants referred to *ruda*, *retama* (*Cystisus scoparius*) and *romero* (*Rosmarinus officinalis*) as the “3 r’s.” *Ruda* is often found in vases or bundles behind the counter of business and street vendors. It was mentioned numerous times by several different people in casual conversations and in more formal interviews as a plant that brings good luck. When asked about the luck associated with *ruda*, Juan said that he did not use it and warned that it can pick up on negative energy and bring bad luck as well as good.

After answering a few more questions about plants, Juan proceeded to treat my ankle. Just as he did in the first session, Juan first felt my foot and ankle with his hands

and then began to massage my ankle with a greenish colored ointment. At first the ointment infused a cooling sensation, but as he proceeded to massage my ankle he said, “You are going to start to feel warm.” Shortly thereafter a tingling feeling of warmth spread across my ankle and lower leg.

Before departing, I asked Juan to look at a skin condition known as *Tinea versicolor* to get his perspective on diagnosis and treatment. He was at first reluctant to offer his opinion and suggested that I see a dermatologist. His reluctance may be due to the fact that he specializes in traumatology, or perhaps he felt uncomfortable recommending traditional treatment or revealing his cosmological perspectives to a foreign researcher. After a few more minutes of casual conversation about his practice he decided to take a look at my skin. According to the interpreter, “Juan has some belief that sometimes when the moon and the earth are changing, the time of solstice and equinox, and if you go to the ocean and you swim there that time when it’s solstice, the moon has a different energy and you can get something because it’s changing.” This comment highlights his beliefs about the relationship between health and the environment. To treat the condition he suggested that I eat more fruits and vegetables. As it turned out, that was an easy prescription to fill as Quillabamba has a cornucopia of fruits and vegetables.

The healing session with Juan, the discussion under the locust tree at Chinche, and the showering of flowers at Kiswarani, provide glimpses of the cosmological relationship that the Peruvian people have with plants. In Kiswarani, the plants were used as a means of warding off evil spirits. In Chinche, the revered locust tree and the

intoxicating effects of chicha reveal the subtlety with which plants are incorporated into everyday life. The healing sessions with Juan allowed me to experience the medicinal properties of a plant-based ointment and provided insight regarding the relationship between his cosmological beliefs and plants. Juan showed respect for the indigenous groups he worked with and for the plants that he used for medicine “by only using the fallen leaves.” Respect for plants is an underlying ethnobotanical theme that I encountered with all of my participants. As I continued fieldwork in Quillabamba, this theme was illuminated once again regarding the importance of showing respect not only for the plants, but for the people’s knowledge of the plants. It became evident upon interviewing Carlita, that taking “freely given” plant knowledge and using it for profit is another form of exploitation.

Issues of Bioprospecting

It was dark when we met to conduct the interview. Carlita agreed to meet in a local park where the lighting was dim to obscure her face. She had lived in the Quillabamba area her entire life and knew a lot about medicinal plants but was reluctant to share her knowledge with outsiders. When we met a few days earlier I explained my research to her and she expressed interest in my project. She learned about medicinal plants from her family and through personal experience with a life threatening venomous spider bite and a skin disease known as Leshmaniasis, or *uta* in Quechua.

Carlita explained that a few years earlier she was approached by pharmaceutical bioprospectors who were interested in learning about a plant that she used to heal herself. She refused to divulge information to them due to the potential for *biopiracy* and the

“lack of respect for traditional knowledge.” Carlita’s concerns are well founded.

Biopiracy has increasingly become a politically charged issue, especially in relation to indigenous rights (Conklin 2002; Hayden 2003). In his essay on the role of anthropology in relation to intellectual property rights, Brush (1993) outlines the historical precedents and contemporary issues that have shaped this “commoditization of knowledge.” He notes the ethical issues regarding the use of knowledge that is protected through patents in industrialized Western countries, but often unprotected and freely given in tribal or peasant societies (Brush 1993). The “freely given” knowledge has been taken by industrialized countries and used for profit often in the form of bioprospecting and patents for pharmaceutical discoveries (Brush 1993; Shepard 1997).

Brush (1993) outlines five trends that have affected indigenous people, environmental change, and international trade in the debate surrounding extending intellectual property rights. The first trend is the loss of indigenous people and their knowledge. The second trend is the increase in value of biological resources related to their loss. Third, is the increase in value of biological resources for biotechnology. Fourth, in some industrialized countries intellectual property rights have been extended to include biological materials and new life forms including plant cultivars. Fifth, there is globalized pressure coming from nation-states to standardize intellectual property protection (Brush 1993:2). In the following vignette, Carlita illuminates her concern about some of the trends outlined by Brush (1993). After voicing her suspicions about bioprospecting, I assured Carlita that I respected her perspective and would not reveal the

name or the location of the plant in my project. Carlita expressed her appreciation of what I was doing and agreed to an interview.

That plant I knew in the year 1997 to 98. To me, I got the leishmaniasis... because young people here, every weekend they go to cut coffee to have wealth. On one of those [weekends] after they cut coffee in one of those, I had a fever, quite a fever, and why my leg was burning I did not know because it had started swelling. Months and months passed. And until it went to the middle, but it did not hit me that a spider had bitten. A spider bit me and that started it all.

I was ill for nearly a year and did not know how to cure myself and I made medicine, and was taking medication and nothing. The mother-in-law of my sister, tells me, "Carlita, come on up. I am going to cure you. Come on! Come on!" We crossed the river and she took me to the edge. Elsi took me there. There was a plant and I grabbed the leaflet and dried it. She rubbed it on my leg and she covered it. Like covering the leg here and glued the borders of the leaves on it.

Elsi went back to cross the river, came to my house, I opened the wound and the wound, that plant and water has become iodine. Iodine ... like aloe with a yellow color. It ate down to my foot. It was a hole that went to the bone. Not really sure how I cured it but I kept the wound healing well covered so that it did not advance. That plant, after two days, in the hole, no, really, the bone grew muscle. Another day for the second time, again I go, and the same thing, I look, and it closed. I went to the hospital, for my checkup, to obtain my analysis. I was told "Carlita, you have the start of leishmaniasis." They obtained the culture of the [leishmaniasis] and I left positive. And from there they told me sixty days with injecting pure madness ...on a daily basis. No ... no ... I said "No", and so it passed. Want to see? This was a hole. Now, nothing. Toca! Here there is bone. It's not like this. I pinch it and don't feel it. There is nothing. After twelve years, nothing. According to the doctors, I was told that it would come back in eight years on my throat. There are twelve years that have passed and nothing.

Carlita conveys an emphatic personal account of the healing properties of a plant she used to treat a dangerous disease. She was respectful and protective of the plant, yet was eager to stress the significance of its healing properties by sharing her knowledge and experience with me. The following day she led me on a hike along the Rio Vilcanota. After showing me several medicinal and edible plants, Carlita called me over

to her while pointing to a small, rather inconspicuous green stem with a few leaves and said, “This is the plant that I told you about...the one that healed me. This is the plant whose name you cannot tell them.” She then told me the name of the plant.

The observations in Kiswarani and interviews in Cusco, Chinche and Quillabamba presented many opportunities for cross-cultural exchanges. My queries about plants in the Mexía collection prompted a dialogue about many other plants. When shown a photograph of matico, almost all of my participants recognized it as an important medicinal plant and then shared solicited and unsolicited information about other medicinal and edible plants. Although not part of the collection, the plant described by Carlita acted as a bridge and provided an opportunity to employ intercultural education—to cultivate trust and share insights about our ethnobotanical experiences.

The observations I made and the perspectives revealed to me in four different places in Peru are representative of data gathered throughout my field investigation. More than ubiquitous, plants are woven into the fabric of everyday life and exemplify the connections between cosmology and ethnobotany. According to most of my participants, plants have spirits. They are depicted as symbols and infused into the textiles as dye, in Kiswarani. They are resuscitated as part of syncretic healing practices in Cusco, and are associated with funeral rites in Chinche. They are part of a sensory ecology and are found as the stimulating effects of coca chewed behind bulging cheeks in the cold mountain air. They are the sour taste of citrus and the sweetness of pineapple. They are the aromatic wafts of coffee sold in gunny sacks at the market, and the intoxicating brew

of chicha. They are surreptitiously protected in the “eyebrow of the jungle” and coveted by the pharmaceutical industry. Plants are healers and they are imbued with life.

CHAPTER THREE

WHERE THE PAMPA MEETS THE MOON

Like the confluence of the rivers, Quillabamba is the place where people converge in the Valley of Vilcanota. Once inhabited predominantly by the Yine (Shepard 1997) and Machiguenga, the influx of Inca fleeing the Spanish between 1536 and 1572, displaced the indigenous people, forcing them deeper into the jungle (Chacón 2008). Haciendas began to develop in the valleys of the region and between 1564 and 1650 almost all of the land was granted by the Spanish crown to civil servants, the military, royal descendents of the Incas and missionaries (Chacón 2008; Martín 2007). A Spanish citizen, Don Martín Pío Concha, settled in the area and owned several large estates, giving a portion of his land on June 20, 1881 to create Quillabamba (Chacón 2008; Martín 2007).

Long known as a cultural hub, the name Quillabamba comes from the Quechua words *quilla* (moon) and *bamba* (pampa). The pampa is a flat grassy plain where the Inca and the Machiguenga met to trade goods on the full moon (Chacón 2008; Martín personal communication July 22, 2008). In 2008 with a population of about 20 thousand Quillabamba is a busy little town (Dagron 2001; Martín, personal communication July 22, 2008). Several markets are found nestled around the plazas exuding a kind of unkempt energy, an exuberance of will and passion, where the predominantly Quechua peasants and mestizo population meet and exchange goods with people from the *selva* (jungle) such as the Machiguenga, and the Quechua of the mountains (Chacón 2008;

Dagron 2001). This site, where the pampa meets the moon, continues to serve as a natural gathering place for diverse people.

Bio-Geographical Context

According to Chepstow-Lusty et al. (1998:159) the Central Peruvian Andes is an area of “exceptional natural biodiversity” and a prominent “center of domestication for numerous high altitude crops growing between 2,000-4,500 m a.s.l.” The coast, lowlands and mountains support an incredible diversity of flora and fauna; they provide timber and non-timber forest products for recreation, craft, food, medicine, subsistence, and export commodities. Three geographic regions are formed by the Andes Mountains. The *costa* (coast) is an arid, narrow coastal plain that is fed by several steep, short seasonal rivers. The *sierra* (highlands) includes the highest peak in Peru, Nevado Huascarán at 6,768m (22,205 ft). The *selva* (jungle) includes the vast flat terrain and tributaries of the Amazon rainforest that extends east into Brazil (CIA World Fact Book 2008). Figure 16 depicts the research area within Peru.



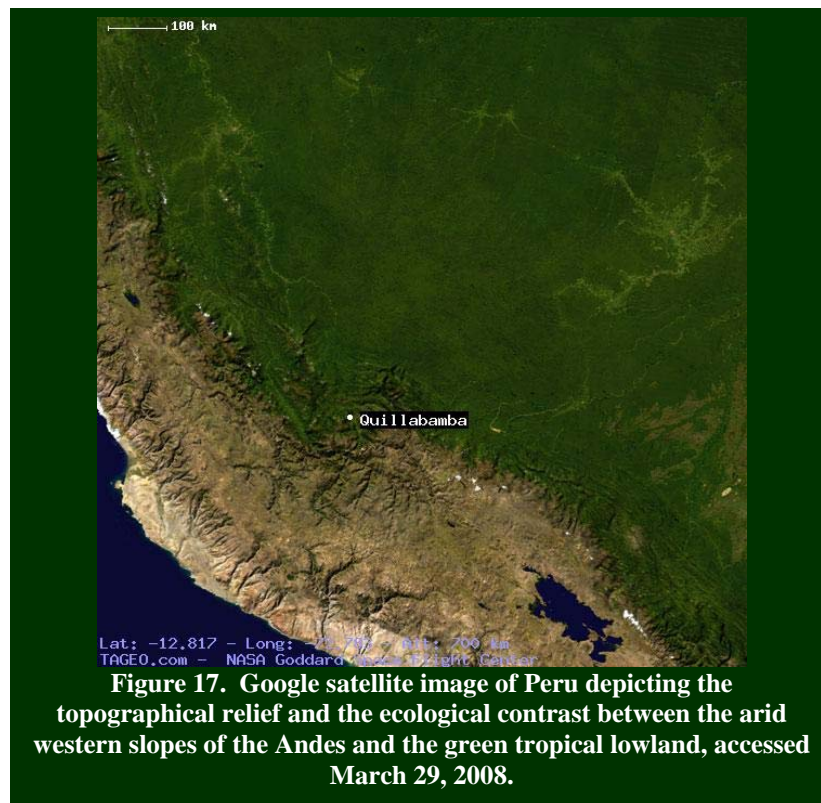
Figure 16. Administrative map of Peru. Electronic document, http://www.outthereliving.com/worldbike/SouthAmerica/maps/Peru_big.gif, accessed April 3, 2008.

The eastern slopes of the Andes of Peru form a unique and complex biogeographical mosaic of ecological diversity that is related to the geological and climatic diversity of the region (Young and León 2000). The variation in altitude, soils, moisture and temperature can vary dramatically in just a few meters creating extreme conditions that include some of the driest, wettest and hottest areas on earth (National Academy Press 1989). From approximately 400m of elevation in the Amazon lowlands to the more than 3500m mountain peaks in the highlands, such contrasts allows for great floral and faunal diversity, and endemism, especially in higher elevations and in isolated

microhabitats. The montane forests of eastern Peru are inhabited by more than 3500 species of vascular plants, 120 mammals, 400 birds, dozens of amphibian species and thousands of invertebrate species (Young and León 2000). As estimated by Gentry (Young et al. 1997), when the bottomlands and highlands are considered, the eastern slopes support nearly half of Peru's 18,000-20,000 plant species.

Where in the world is Quillabamba?

A satellite image of Peru reveals a macro-level perspective of the area of study (Figure 17). The stark contrast between the dry uplands of the west and the verdant



lowlands of the east becomes ecologically and culturally significant as we zoom in to the research site. Considered one of the 'gateways' to the Amazon, it is the last stop for

supplies, before venturing down the Vilcanota River (Urubamba) into the Amazon basin. Geographically, Quillabamba is located at a latitude (DMS) of 12° 49' 0S and a longitude (DMS) of 72° 46' 60W. Situated at an altitude of 1031m (3385 ft), it is the capital city of the province of La Convención.

As part of the Vilcanota River Valley, Quillabamba is in an area of ecological convergence including lowland forest with dry to pluvial premontane and montane forests (Young et al. 1997). Due to the fertile river valleys and the diversity of microclimates, this region of the Andes is also known as a globally important center for crop domestication. The pre-Inca and Inca civilizations took advantage of the contrasting landscape and selected vertically diversified crops that were adapted to different elevations and soil types, using irrigated raised beds along mountain terraces (National Academy Press 1989). Figure 18 shows the variation in the topography.



Figure 18. North of Quillabamba. Note the erosion on the barren hillside.

Primarily an agricultural community, the people of Quillabamba continue to take advantage of the fertile river valley and the diversity of microclimates to produce coffee, *cacao*, coca and several types of fruit. Food, like the textiles, has symbolic meaning and also signals membership in communities that belong to different ecological regions. For instance, the names of potato varieties and other tubers and grains vary depending on the region they are from. Exhibits of edible and medicinal plants, textiles, and animals exemplify the biodiversity and cultural diversity of the area. Figure 19 depicts two different plant displays of products brought in from the mountains and jungle.

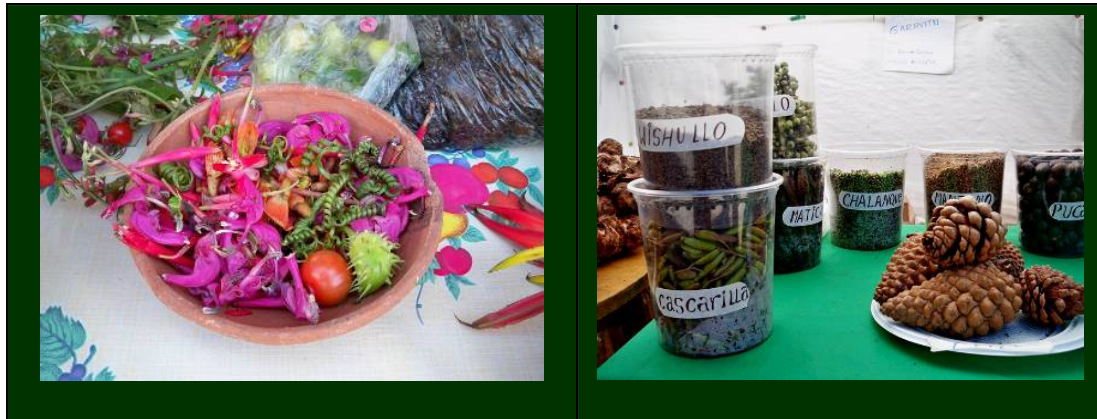


Figure 19. Bowl of tropical flowers and fruits and edible wild fruit from Vilcabamba on display at a festival in Quillabamba.

There are many native, non-native and cultivated plants that are grown or harvested for subsistence, while others are used as commercial products for cash income. Chicken and eggs, quinoa, potatoes, yucca, uncucha (tuber), plantain, onions, tomatoes and a spectrum of fruits and vegetables are commonly served in the local restaurants and in home cooked meals. Breakfast often includes yucca or plantain, eggs, bread and juice depicted in Figure 20a. Many products are locally available and grown or harvested in the region, while trout and potatoes come from mountainous regions of the country

(Figure 20b). One of the few meats typically eaten is hearth baked *cuy* (guinea pig).

According to Krogel (2006:85), *cuy* was domesticated in the Andes over a thousand years ago and is an important protein source for Quechuan families as it has a higher percentage of animal protein than cattle. In addition they reproduce rapidly, and are easy to maintain in a small hutch often located in the home or in the yard (Figure 20c). *Cuy* has also become an important international export for some communities as it is shipped to markets in the France, Spain and the United States (Krogel 2006). I had the honor of being invited to a *cuy* and *camote* (sweet potato) dinner (Figure 20d). The *cuy* was stuffed with a commonly used herb known as *huacatay* in Quechua. Like many plants, the herb is used both as a culinary and a medicinal as part of a food-medicine continuum.



Figure 20a. Plantain, yucca, eggs and fruit juice.



Figure 20b. Trout, onion, plantain, yucca and uncucha.



Figure 20c. Cuy raised at Ricardo's campo.



Figure 20d. Cuy, uncucha and camote dinner with Ricardo's family.

Figure 20. Typical breakfast, lunch and dinner in Quillabamba.

Many of the participants in this project were rural residents who subsist on a diverse combination of native and non-native, cultivated, and wild plants and animals. Mexía noted that the area around Quillabamba was highly cultivated in 1936, forcing her to conduct collections of native plants outside the town (Davis, personal collection). Native ornamentals such as bromeliads, and orchids, and timber trees are generally removed wherever accessible (Young et al. 1997). Wild relatives of important economic plants, and numerous species of plants that have potential medicinal value, inhabit the region; however, according to Young and León (2000) native plant resources are not being used sustainably except by the Machiguenga.

While some of the native plants and other natural resources may be of minor importance to people who do not utilize them for survival or economic livelihood, those same resources are of great significance to indigenous and rural residents who do rely on them for basic subsistence and medicine. The livelihood of the people who reside and work in rural areas near Quillabamba is directly tied to the bounty and health of the surrounding environment. Unfortunately, like canaries in a gold mine, they tend to be the first to notice and experience the repercussions when it is compromised. This project provided an opportunity for them to express their concerns about the environment its relation to their economic survival.

Subsistence and the Economy

Introduced in chapter 2, the conversation at Chinche captures the serendipitous nature of many of the interviews conducted for this project. When showing a photo of Mexía or a plant from her collection, participants and non-participants often expressed

curiosity by approaching and asking about my research. Upon explaining what I was doing and after providing a brief history of Mexía, many people wanted to engage in discussion related to the project. In other cases, horticultural activities, flora and fauna, or features in the surrounding environment stimulated dialogue about the connections between subsistence living, cultivation, edible and medicinal plants, pollution and weather conditions. One topic often acted as a catalyst to explore a range of interrelated issues. During the Chinche interview, a Quechua woman had just come from the market where she purchased some meat and rice prompting a discussion about subsistence needs. As the discussion develops a series of interconnected themes emerge, such as the relationships between food security, changes to the environment, availability and access to water, political and economic influences, and employment in a wage economy. When asked about the plants that are used for food, the conversation started to take on a tone of lament.

Q: What do you use for subsistence?

Man 1: We cultivate a little corn, uncucha (tuber), potatoes, plantains, beans, sweet potatoes...Sometimes we have animals. When we don't have money we kill the young chickens. When we don't have money we sacrifice our animals—sometimes when there is a birthday. But there are days that we have to go to the market and buy.

We farm some corn, but we haven't had rain and the plants are drying up. It is not sufficient to irrigate all of the plants. Before, about thirty years ago we had a lot of water and a lot of rain. Now there is not much. The dryness is why there are fires in the mountain.

Now for example, the government does not help us. We have asked for help and we don't have any. Sometimes the fire gets worse [pointing to a burned area on the mountain] and comes down and we don't have water. One wants to conserve, but there are others that don't

conserve. There are other people who have said the government would help but it has not happened yet. It is not permanent.

Q. *Have you protested?*

Man 2: All too often. We have [protested] a little for coffee and they sell almost all of it to the rich. In the time of Fujimori, all was different. The people of the country are suffering.

Man 3: What we want is for other countries to come and help us.

Man 4: Life is very expensive now.

Q. *Do you work only in the country?*

Man 1: Currently in the country...we have animals that can be killed, but we do not have help or a veterinarian to look after the new animals.

Man 4: The yucca is dry now. The oranges are bad. The fruit is falling down.

Q. *Do the environmental changes affect all of it—and how?*

Man 1: Of course! It affects everything! The prices of production are down and therefore when we buy, everything is expensive. The gasoline is expensive, food...

Man 2: One kilo for noodles is about one and a half *soles*—a kilo! I don't understand. The price is four soles for lunch.

Q. *How many children do you have?*

Man 1: I have four, but they are older. But there are other people who have more and they are small and in school and they do not have enough to survive!

The interview at Chinche verifies the increased dependency of rural people on wage work and its repercussions. They were neither able to meet their basic needs solely in the formal wage economy, nor could they sustain themselves through agricultural activities. This semi-proletariat group of farmers found little stability in the formal wage

economy in which work is irregular and wages are low. The economic dependency of indigenous and mestizo farmers on transnational companies prevents them from growing crops that would be part of their subsistence—in essence, there is little incentive to grow crops for family food when the economy demands growing commodities that are not edible or have less nutritive value (Spencer 2000).

Coca (*Erythroxylum coca*) for example, is cultivated not only for its traditional use as a medicine, but for the illegal cocaine market as well. Although it provides virtually no nutritional value, the potential economic benefit creates a greater incentive to cultivate market driven products such as coca and café than food commodities. The following excerpt from Carlita’s interview aptly illuminates how this dependency on transnational markets, affect the subsistent economy of people in Quillabamba.

Well, most people here are from the eyebrow of the jungle, the jungle around Quillabamba, is not the same as the jungle, but the eyebrow of the jungle, is between the entrance to the jungle and Quillabamba. So here they live in adobe houses made of earth with reed. Further down in the jungle...with only straw and logs, wood, nothing more for houses. But here you live like that.

We do not control the price of coffee here. Up and down. The big companies that buy coffee sell it for a higher price there. They set their price but the people here in the country sometimes live from coffee, cocoa, or achiote. But they don’t have much. This is lost. People are devoted to fun to drinking a lot of beer and partying. For example, Peru before, exported enough gold, now it does not export gold and silver. Now it does not.

Carlita emphasized the differences between how people live in Quillabamba “the eyebrow of the jungle” with those who live deeper in the jungle by comparing the material used to build homes. Her matter of fact attitude, “But here you live like that,” is indicative of the sort of complacency that I encountered with many people in

Quillabamba. “We do not control the price of coffee here,” is another example of how many people felt in regard to the economy and their powerless position. The sense of not being in control and being subject to outside forces was a commonly shared perspective among the participants. At one of the local fairs a larger than life sculpture acted as a visual representative of the *campesinos*, portraying a saddened and frustrated demeanor with a frowning face and a furrowed brow (Figure 21). The sculpted face conveys the emotional and physical expression of hardship and dependency that characterize the way of life for many people of Peru. The dependency on the transnational market of coffee and other commodities grown in the area creates a modern version of indentured servitude. Artistic expressions in sculpture, paintings and textiles depict not only reflections of the tangible, but of the ethereal and emotional as well. The constant tension between pride and humility creates a hardened and determined exterior, like wearing an armor of will.

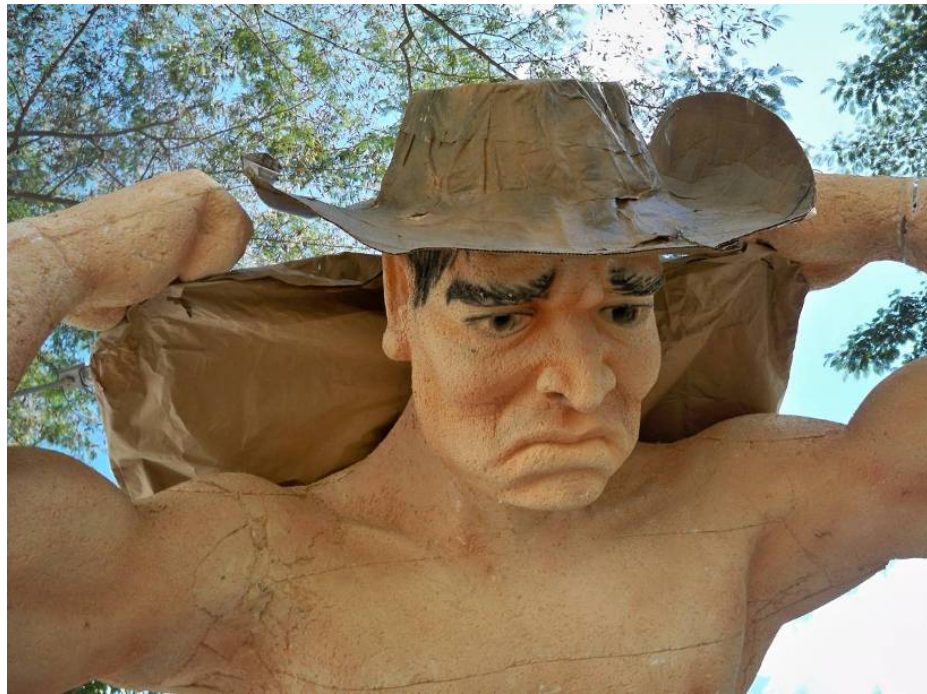


Figure 21. Larger than life sculpture of a man hauling a bag of coffee on display in Quillabamba.

The interviews presented here highlight the connections between food security, economics, politics and environmental change. The people with whom I spoke expressed their concerns about the changes to the environment caused by economic development in the region and the repercussions of climate change as indicated by the lack of rain and availability of water. The lack of water impedes the production of crops that in turn reduces their ability to feed themselves or participate in a market economy. In addition, the pollution and depletion of natural resources, prevents them from meeting their basic subsistence needs.

The importance of subsistence economy and food security is more pronounced as people become subsumed in neoliberal and agricultural reforms that have increased dependence on foreign investment, forced people into low wage economies, exacerbated unemployment, increased rural poverty and prevented access to arable land and subsistent

resources (Spencer 2000). The abandonment of ecologically stable, traditional forms of agriculture that amply fed larger populations than currently exist in the same region, is just one of many problems associated with the introduction of inappropriate agricultural technology and economic policies (Nash 1994; Scanlan 2001; Spencer 2000). The misapplied technologies and policies have expanded the gap between the rich and the poor, and have led to large populations of people who are malnourished (Nash 1994; Scanlan 2001; Spencer 2000). As the interview in Chinche highlights, residents of the Quillabamba region are feeling the effects of being peripheral participants in the global economy as they struggle to nourish themselves while more and more commodity crops are produced in the area.

Food Sovereignty

They are with their myths and work the land.
(Carlita July 12, 2008)

“Agricultural production in Mexico and Peru has [...] increased since 1980, but has not kept pace with the growth in the human population” (Spencer 2000:4). Limited resources, external debt, and an increase in rural poverty are contributing factors to food scarcity, food access, and food utilization. Spencer (2000) estimates that the average daily intake of food in Peru is around 2300 calories, much less than the world wide average of 2700 calories extrapolated from the Food and Agriculture Organization (FAO) 1992 estimates, and significantly less compared to the United States average of 3500-3600 calories per day. According to Scanlan (2001), caloric intake and availability of food need to be considered in the larger context of food access and utilization. Various definitions of *food security* developed by Reutlinger (1986), the *United Nations*

Development Program (UNDP) (1994) and Tweeten (1997) expand the limited notion of caloric intake to include availability of, access to, and physical utilization of food. Empty calories or food lacking in sufficient vitamins and nutrients are important considerations when using caloric intake as a measure of food security. Scanlan (2001) also explores the UNDP premise that people have entitlement to food as a basic human right. Others, like Edelman (2005) examine this right as “food sovereignty” in the moral economy of transnational peasant movements.

According to Edelman (2005) the concept of food sovereignty goes beyond food security and includes the consumer’s right not only to availability and access, but the right to know where the food comes from and how it is produced. Like many cultures throughout the world, Peruvians are also facing health issues associated with a changing diet. Many of the people encountered in the larger communities of Peru such as Lima, Cusco and Quillabamba, have integrated many Western foods into their diet, leading to an increase in obesity, diabetes, arteriosclerosis and other health problems (Broadhurst 1997; Canedo et al. 2008; Leatherman 1996; Lindgärde et al. 2004; Lindgärde and Ahén 2007; Sengupta 2003). The interview with Carlita illuminates the concept of food sovereignty by conveying local perspectives about diet and dietary changes.

Today the food is not the same. According to how the time is passed. I think ... or so I imagine that the food was good because of the land. A reference, let me give you. My dad told me, "When I was a child, I lived in the mountains far from Cusco, I ate cheese, toast, *chunche* soup, corn, but now we eat noodles, tuna. Before it was better, the food. Before now, the potatoes—we had good food.” My dad is fifty... I do not remember, but he was a stout, young, man and now at sixty he looks good because he had good food as a child. And I at twenty seven...

My dad did not suffer much from disease. When we were raised we ate noodles. The food we ate was natural. Potatoes are not made that way today and the children do not like them. Before, it was your duty to eat the food because you were so hungry, not like now. It is important to me. It has helped me to mature. Today I'm fine without any problem.

Carlita conveys the relationship between food and health using her father as an example. According to her, he has not suffered much from disease and he “looks good because he had good food as a child.” She attributed his good health to the natural, unprocessed food he ate as a child. In fact most of the participants had a very thorough understanding of the macro-level relationships between human well-being and environmental health. Several people expressed concern about the loss of soil fertility and productivity and their impact on food. Elsa explains, “Before the products were more natural. Products now require more manure and fertilizer for the same wear and tear on the land. There is no closed season to the farmer in his fields and production diminishes.” Carlita conveys a similar response in regard to the productivity of the soil.

If ... if there is a shortage...if there is shortage. For example, here in Quillabamba, the yucca is something here that is ... is that of the same jungle. You can not grow it in Cusco or at high altitude. It is of the same jungle the yucca. For example, before one had two or three hectares of yucca, now you can not plant. You can plant one or two hectares or no you can't. Sometimes the earth no longer produces. For example, the coffee produced plenty here. Now the coffee does not produce much, and there is a drop in price.

Now people are going the other way and do not produce. For the production is so low. Very few are engaged in agriculture. More people live in the city than in the country. Do you understand? There are some that are maintained...they are with their myths and work the land.

Carlita's comments are a telling reflection of the relationships between current agricultural practices which degrade the soil and crop production, and traditional

agriculture, which produces fertile soil and maintains production of crops. As implied in her statement “they are with their myths and work the land,” support of the cosmological traditions will inherently lead to rejuvenative agricultural processes resulting in more productive land. The myths and working of the land are part of traditional practices in which people enrich the poor soil by using organic matter from animal manure and crop residue while simultaneously praying to *Pachamama* (mother earth) and other deities. The “mythological” approach to agriculture reflects their dependence upon, and understanding of, the natural cycles in an unpredictable environment with nutritive poor soils (Leatherman 1996). According to Leatherman (1996:479) in a study of health and household economics in southern Peru, “the marginality of Andean producers has less to do with marginal environments than with centuries of conquest, colonization, and domination by others controlling their access to land and labor.” The marginality of the environment was overcome through agricultural practices and techniques that took advantage of the diversity of microclimates for successful farming and herding. Ishisawa (2004:6-7) suggests that peasant agriculture in Peru is equivalent to in situ conservation due to their cosmological beliefs in nurturing the land and all of its inhabitants. This cosmological respect for Pachamama and other organisms is embodied within the Andean culture, but it is being challenged by aspects of globalization and agricultural techniques that tend to disregard, if not disrespect traditional ways of life. The negative environmental and social repercussions related to using non-traditional methods of cultivation are associated with economic dependence on a global market that encourages monoculture (Spencer 2000). As noted previously in this chapter, Mexía mentioned the

extensive cultivation in the region and the lack of native flora. In letters written to friends and colleagues, Mexía expressed concern about environmental impacts and loss of plant diversity in the region (Davis, personal collection). Her observations and insight of the surrounding environment was a portent of much larger environmental issues to come.

CHAPTER FOUR

CURRENT ISSUES

Environmental Perspectives

In the long run, if the water dries up, how are the people going to live?
(Ferdinando July 18, 2008)

As I searched for information about the Mexía collection sites along the Rio Sambaray and Rio Vilcanota, environmental concerns abounded. In each interview, discussions about the history of Mexía and the plants in the collection were always linked to changes in the environment, especially the rivers. Rivers, mountains and fields are embodied in the people of Quillabamba. They are the canvas of the region, shaping the natural cycles of life and the cosmology of the people.

From my seat in the open-air restaurant in Sambaray, I watched the Rio Vilcanota flow. There were locals and Peruvian tourists hanging out drinking and dining—enjoying the ambiance of the river and beautiful surroundings (Figure 22). The river was gorgeous, but I was disappointed to see all of the trash deposited in its immediate surroundings. Hillsides along the valley of Vilcanota were diminished in beauty by the accumulating garbage. It seemed every open slope with access above the river was used as a dumping ground. On a hike with one of the participants to find medicinal plants we walked across a small stream filled with garbage and raw sewage. It was representative of numerous tributaries that flow into the Vilcanota from Cusco to its meeting with the Rio Ucayali. In the few campos where I observed the presence of plumbing, it typically ran directly from the homes into the river. In Quillabamba, there were no landfills and the 40 year old water and sewer treatment facility did not produce potable water (*Inter-*

American Development Bank 2006:11). Everything was dumped into the rivers there. A further complication, is the increased use of products and containers that are not biodegradable. Even in villages as remote as Kiswarani this is a growing environmental concern.

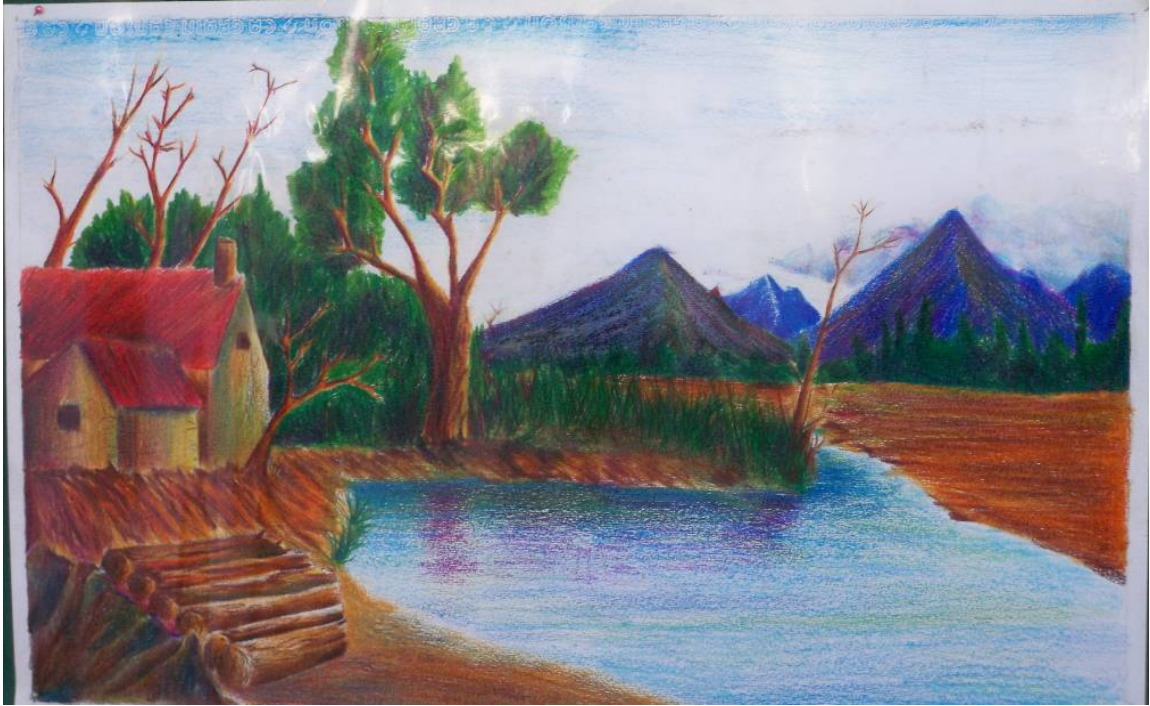


Figure 22. Child's painting on display in Quillabamba, Peru depicting the Rio Vilcanota.

Ricardo has a large pampa that overlooks the Rio Vilcanota. He has tended the land and lived in the same area for most of his life. When asked what fish were in the river he replied,

Jagas, lenton, saba, and mamui, but there are very few [they have] disappeared. The fish come from below. The pollution has killed. All drains [sewer] come here and kill them. There is no place for trash.

Ricardo said that when he was a child there were many fish and they were larger than they are now. I asked him why he thought that there were fewer fish. He responded that there is no landfill and the sewer drains feed directly into the river.

While hiking with Carlita to search for medicinal plants, we crossed a smaller tributary that flows into the Rio Vilcanota. Approaching the stream, we worked our way carefully through the heaps of garbage that had been dumped over the edge. The stream was gray-brown as if it were discolored from a storm, but it hadn't rained in months and the smell of raw sewage permeated the air confirming my fear that we were about to walk through a cesspool. Just a few meters away we could see the mass of green algae building on the sediment from excess nitrogen as the sewage dumped into the beautiful blue water of the Vilcanota. The fact that sewage fed directly into the stream didn't really surprise me, but the lack of concern or rather its general acceptance or normalcy did. When I asked Carlita about the issue, she expressed disappointment that the sewage was causing contamination, but like so many issues that the people face in Quillabamba, there was little she could do about it except voice her frustration.

Most of the people I spoke with recognized that their own well-being depends upon and is influenced by the health of the environment. The association between contamination of the environment and poor health was emphasized by numerous people. Health issues such as gastrointestinal problems, intestinal parasites, and malnutrition stemming from poor food production were commonly associated with soil and water contamination. Carlita expressed her perspectives regarding contamination from a local mine:

There is a recent uncovered mine, but people do not want it operating because it will pollute the environment and the people that live from their crops. The people on that side do not eat as much bread as here, there is very little. They live off their land. That's why they say to not exploit the mine, they want it to stop. Because when one takes gold, it contaminates the production, or land, or it filters into the water. That's why there are many problems.

These concerns are not unfounded. Mining in neighboring Brazil resulted in lasting environmental damage and the destruction of the way of life of indigenous groups in the region. Poor air quality in Quillabamba and Ollantaytambo were also blamed for health problems such as colds and bronchitis. An educator in Quillabamba commented that more children are now suffering from asthma and allergies than in the past due to air contamination from forest fires and the burning of garbage (Donna, personal communication, July 19, 2008). The issue of air contamination is often even more pronounced in mountainous regions, such as in Cusco and Ollantaytambo, due to thermal inversions. The following excerpt conveys not only the concern regarding the aforementioned issues, but also depicts the connection between economic hardship, access to healthy food and loss of cultural “identity.” Maria’s comments highlight the connection between health and the environment when asked about the most severe environmental impacts and changes to the culture.

Very many! We have more... we are more prone to diseases, bacteria—we can feel it in the air. The air is no longer pure. We have many bronchial and digestive diseases.

I remember when I was a child there was not a lot of environmental contamination. But now we burn a lot of garbage on the banks of the rivers. It is very regrettable. People do not have much education, they have no identity. They eat anything and in addition, the biscuits thrown on the street. That's not happened before.

Another participant, Ferdinando, exclaimed,

For me the problem is the climate. Now it's colder than before. We have never had to use ... we now have to put on more clothes or else get the flu. The scarcity of water is another climatic problem. The amount of water is not like before in the region. Yes. It's bad. Because it is not just for farmers but also for the people.

The climatic changes are very strong, sometimes they are more abrupt than others. I have received this type of talk. This is worrying. We know about climate change and we do not know what will be in the future. This is my granddaughter. We do not know if she will be with the same climate of now or if it will be worse. It is serious. It is worrisome. In the long run, if the water dries up, how are the people going to live?

Here where I live, they burn for pleasure. The fire is up for two months and when the rain comes it is extinguished. I, too, am a farmer but I disagree with forest fires—twenty to thirty hectares for pleasure. In rural areas they use insecticides and people are sick with cancer.

The concern that Maria and Ferdinando expressed regarding health and the environment was a common theme conveyed by numerous participants. Most of the people interviewed mentioned the contamination of air, water and soil in association with larger cities such as Cusco. There were also several references to climate change, lower water tables and contamination from smoke associated with slash and burn agriculture and burning refuse. The interviews suggest extensive knowledge and awareness about the relationship between the environment and health, however, there they also convey a lack of power in the face of progress.

Upon completion of the interviews, I asked participants what information they wanted to ask of me and if they wanted me to include anything in the report that was not covered in the interview. The responses I received were varied, yet all stressed the importance of educating future generations about the environment. Ferdinando exclaimed,

The situation is getting bad, worse everyday, it's about people...they are worrying. Well convey to them...speak and comment that the climate was well before this era and now it is this!

City of Eternal Summer

Every town for miles around seemed to be in a state of flux, all in a harried pace of construction—paving roads, building schools and government offices and creating recreational areas. Driving between communities included long stretches of dusty gravel roads that would suddenly turn to asphalt or concrete and then without warning abruptly return to gravel just outside the town limit. Life in La Convención was changing rapidly and I was witnessing the transformation.

The citizens of Quillabamba, Echarati, and Santa Teresa were all preparing for festivities during the time that I conducted my research. Quillabamba was about to celebrate its 150th anniversary and went through an incredible renovation. In just the span of a few weeks, the people of Quillabamba installed a dramatically sculpted arc depicting parrots, monkeys and a jungle theme as a prominent entry to the town. Within the city, streets were cleaned and an array of large sculptures depicting the people, plants and animals of the region was erected in the median of one of the main thoroughfares. Everyone seemed to be cleaning, painting, and building in anticipation of the anniversary celebration on July 25, 2008.

Currently, Quillabamba is not known as a popular tourist destination, although a few people do stop through there for supplies as they venture deeper into the jungle. Just as the power of landslides and floods shape the landscape so do the people. Quillabamba and nearby communities are experiencing rapid change and development from royalties

related to the Camisea Project and the influx of migrants from outside of the region.

Figure 23 shows the perspective of the change through the eyes of a child. What was once jungle is now a scarred vista of a natural gas sub-station.



Figure 23. Child's depiction of their village. Note the natural gas plant in the background, the tree stumps and the dead animals lying in and near the desiccated body of water.

The Camisea Project is a transnational pipeline that recently completed its first phase of implementation to pump liquefied natural gas from underneath the Amazonian jungle. Both negative and positive outcomes are associated with it. The project has caused severe environmental impacts to the Amazon, its tributaries, and inhabitants of the region (Hearne 2007). It has also brought in energy, money and jobs that were not available prior to construction of the pipeline (*Inter-American Development Bank* 2006).

The project consists of numerous small flow lines totaling 58 km within the area of extraction to the Las Malvinas gas plant and two main pipelines (see Figure 24); one built for natural gas (NG) extending 714 km through three different ecological zones from Las Malvinas to Lima, and the other for natural gas liquids (NGL) covering an expanse of 540 km from Las Malvinas to a marine terminal at Playa Lobería near Pisco (*Inter-American Development Bank* 2003:13). The pipeline lengths do not include distribution of NG in Lima and Callao, the 3200 meters of underwater pipeline extended from the marine terminal to shipping transport, nor the proposal for future extensions of pipelines in 2025 (*Inter-American Development Bank* 2003:3-14). It is difficult to determine the total area affected by this project. The *Inter-American Development Bank* (IDB) (2003) Environmental Impact Assessment (EIA) states that Block 88 concession area is 1,435km² and that the footprint for the project gas field and associated facilities is only 10km², however this does not include the seismic drop sites or work camps. The total area affected by the pipelines, associated trenching, forest clearing, helicopter pads, roads and other associated components of the project are not adequately addressed in the 2003 EIA.



Figure 24. This map shows the existing Camisea pipeline (black dotted line) and the proposed liquefied natural gas (LNG) route (blue). Note that the black line ends in Las Malvinas located north of Quillabamba and runs within a few hours of my project area. Electronic document, <http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=793018>, accessed April 6, 2008.

With the influx of royalties from the Camisea Project and the rapid pace of change, Quillabamba is currently being marketed by government officials in charge of tourism as “City of Eternal Summer” (Chacon 2008) and seems contradictorily reluctant and ready to welcome tourists and venture capitalists alike. As a prominent part of the Government of Peru’s (GOP) energy policy, the project involves the exploitation and transportation of NG and liquefied natural gas from the gas deposits in the Amazon to international and Peruvian markets (*Inter-American Development Bank* 2003:1). Supported by the IDB, it is a resource extraction and development venture that has awarded licenses for the “upstream” and “downstream” components of the project to a consortium of multinational corporations including: Pluspetrol (Argentina), Hunt Oil (USA), SK Corporation (South Korea) and Tecpetrol (Argentina), Tecgas (Argentina), Sonatrach (Algeria) and Graña Montero (Perú) (*Inter-American Development Bank*

2003:1). According to the IDB's environmental and social impact report, "...the Camisea Project is located in areas of extremely rich and diverse environmental and social characteristics that warrant very special attention since they could be significantly negatively impacted if the Camisea Project is not properly developed, constructed and operated (*Inter-American Development Bank* 2003:2)."

Of the many issues that arose during my investigation, the Camisea Project seems to be one of the most controversial. Several people mentioned that it has brought many new jobs and wealth to the region; however, most of the people I met who were directly involved with the project, had been brought in from outside the region for their expertise. The royalties from the project have allowed the province of La Convención to construct new roads, buildings, schools and government offices that directly benefit the people in Quillabamba by providing employment opportunities and access to natural gas for heating, cooking, refrigeration and transportation (*Inter-American Development Bank* 2006). The economic benefits also allow people who would traditionally work in agriculture to gain employment in other sectors associated with the project such as construction and government jobs (Hamilton 2006; *Inter-American Development Bank* 2006; Montgomery 2005). Unfortunately, environmental impacts such as deforestation, erosion and contamination of soil and rivers associated with road building, the installation and leakage of gas pipelines; and increased road and river traffic are also related to the Camisea Project (Garriguez 2006; Garriguez 2007; Hearn 2007; Shoobridge 2004).

While some of the inhabitants of the region gained employment and directly benefited from Camisea, other people were detrimentally impacted. Jáme expressed his concern below when I asked if he noticed significant changes to the region:

Yes, not only gradual, also violent changes. The extraction of gas from Camisea and its connotations for the environment and groups of humans nearby. The existing imbalance disrupts their livelihood and also obstructs cultural development in a natural way. In the case of the Camisea gas, it has leakage and also machinery that breaks with the harmony of the ecological zone.

The “violent” changes that Jáme mentioned were exquisitely depicted in several children’s pastel drawings that were on display in Quillabamba’s anniversary festivities. The drawings are not only beautiful, but very telling of the environmental perspectives of the youth who live near the substations and pipelines associated with the Camisea Project (Figures 25a, 25b). The images depicted are rich with detail about the surrounding environment and the repercussions of development in the region. They provide visual testimony to the structural, environmental violence that exists today.



Figure 25a. Child’s depiction of clearcuts and fires. Note the proximity of the river to deforested areas.



Figure 25b. Child’s depiction of the forest and mountains before the clearcut and after.

Negative social and cultural impacts to the indigenous Machiguenga and Yine communities have been documented by Shepard (1997), Shoobridge (2004) and Garrigues (2006; 2007). The Machiguenga are an ethnic group who live primarily along the Urubamba and Madre de Dios river drainages in the upper montane forest of Southeastern Peru (Shepard 1997; Shoobridge 2004). Linguistically, they are distantly related to the Arawak groups who formerly inhabited the Caribbean, but were extirpated due to disease, and assimilated since the arrival of Christopher Columbus (Shepard 1997). Made up of extended families, some Machiguenga communities continue to follow a dispersed settlement pattern of hunting-gathering supplemented by long-fallow swidden agriculture, while others have adopted a more sedentary pattern associated with an increased agricultural, subsistence-based economy supplemented by hunting and fishing (Shepard 1997; Shoobridge 2004). Sedentary communities have sprung up around Catholic and Protestant missions and government schools; and more recently, around Evangelical missionary outposts and the Camisea Project sites and airport where they have greater access to Western goods through trade and employment in a wage economy (Shoobridge 2004). According to Shoobridge (2004), the communities along the Urubamba River have developed strong relationships with the outside market that are becoming more prominent.

Another group of people known as the Yine (formerly “Piros”) dominate the trade in the region as “original” inhabitants along the Urubamba River (Shoobridge 2004). The Yine have a longer history with the market economy as subsistent agriculturalists and by selling excess produce and commodities obtained by fishing, hunting, timbering and crafts (Shoobridge 2004). According to Garrigues (2006) traditional hunting and fishing has been abandoned by many of the Machiguenga and Yine communities due to the scarcity of fish

and game animals, resulting in a move into the labor market and the adoption of consumerist habits that have been influenced by outside interests and the Camisea Project (Figure 26).



Figure 26. Child's art of an ethnic group working in the forest along a tributary of the Amazon.

Interviews conducted by Garrigues (2006) with people who live along the Urubamba River, illuminate the issues that stem from the project. New construction projects have created jobs, but few Machiguenga are hired due to lack of skills. Workers are often brought in from outside the community or from larger cities such as Lima and Cusco (Garrigues 2006, personal communication with anonymous government employees in Echarati, July 14, 2008). Sexually transmitted diseases, such as syphilis, have also been reported in communities where the project companies have set up work camps (Garrigues 2006). Women sometimes resort to prostitution as economic pressures create new dependencies (Garrigues 2006). According to Garrigues (2006) there have

been three deaths and numerous health issues such as severe diarrhea, digestive problems, skin diseases and respiratory problems associated with gas spills from the project. One informant, Walter Kategari, head of the Machiguenga Council of the Urubamba River (COMARU) said that they are suffering from new diseases related to changes to the environment and their diet (Garrigues 2006).

Dr. Efrain Vilcapata and Dr. Meliton Concha, reflect their concerns in an interview with Garrigues (2007) regarding the overall health of the Machiguenga and other communities. Dr. Vilcapata works with isolated healthy communities of Machiguenga who rely on traditional hunting and fishing and do not have diseases found among non-isolated Machiguenga. Dr. Concha is the director of health for the Quillabamba region and works with communities who are affected by the project. He attributes the health problems to dietary changes brought on by activities of the Camisea Project (Garrigues 2007). According to Garrigues (2006), “The buzz of helicopters, the churning waters of transport boats, the gas leaks that caused fish to die and skin to burn have been continual reminders [of the negative repercussions associated with the project] in this territory that was once exclusive to the Machiguenga and other peoples.”

As the Camisea Project continues undeterred, impacts to the environment and economy affect people not only in the short-term but also in the long-term. As described by Mexía, changes to the native vegetation and local landscape were already apparent in 1936 due to economic and cultural influences at that time. The Camisea Project did not exist then; however, immediate impacts have shown both positive and negative effects. Long term effects remain to be seen. This investigation is concerned with real and

perceived effects at the interface of humans and the environment. While the Camisea Project is a prominent current issue that deserves attention, other problems such as those associated with global warming, deforestation and pollution from other activities were explored in this investigation. The indigenous communities and mestizo population of Quillabamba and nearby communities in the province of La Convención are currently grappling with such matters.

CHAPTER FIVE

THE TRANSFER OF KNOWLEDGE TO FUTURE GENERATIONS

It is assumed that they are more intelligent than me and so they are learning more than I do. Besides they learn in school. I'm sure they have a better understanding than me.

(Ferdinando July 18, 2008)

During my initial investigation of the Mexía collections, I learned not only about the history of this remarkable woman, but about her subtle insights about the cultures and environments where she worked and traveled. By retracing her footsteps, I have a better understanding of what she valued and how she moved through the world. By studying her botanical documents and reading some of her letters, I feel as though she transferred her knowledge to me. Out of respect for the wisdom of past generations, part of my research included interviews regarding the transfer of knowledge between generations.

I explained my research objectives and introduced people to the history of Mexía, The older generations (those over 40) took special interest and seemed to appreciate the fact that I was gathering information related to someone who passed away decades earlier. Each of my participants agreed that it was important to pass on knowledge about the environment, edible and medicinal plants and cultural traditions to future generations. However, some of the older participants seemed to be frustrated about outside influences and the lack of appreciation that young people had for their customs and way of life. They revealed a wealth of knowledge about the natural world although when initially asked, they often expressed that they knew very little. Once the interviews began, it became obvious that they underestimated or delegitimized their own expertise. Ricardo, for example, had incredible knowledge about medicinal and edible plants, and the

environment in general, but mentioned that his son was simply not interested in plants or the environment. The transfer of environmental knowledge to the next generation is a natural part of the cosmological cycle that the people in Quillabamba embody; however, the rapid influx of change and ties to international trade and a wage economy have created challenges and issues that tend to undermine and contradict connections that have allowed them to survive. Many of the participants interviewed explained the importance of passing on information about the environment from one generation to the next, but also expressed that many young people show a lack of interest. When I asked the men from Chinche if they think it is important to transmit their knowledge to future generations they replied,

Yes, Yes. Well we have a committee for it, but they can't [pass on knowledge about farming]. Well, when the children are educated they are on the other side of the field and they don't want to know more about the farm because they know what is here.

The men from Chinche revealed that the children were physically separated from learning about farming because the school was located on the "other side of the field." One of the men mentioned that his son was not interested in learning about farming while another said that his son left the region to go to Spain. The comment, "...because they know what is here," is very intriguing. It implies that "what is here" is not desirable. The comment seemed to be a reflection of apathy toward their current living conditions. Based on the frustration that they and other participants expressed regarding economic issues and the hardships of subsistence living, it is no wonder that their children are seeking alternatives to their traditional way of life.

Most of the younger people (early twenties) I spoke with were interested in getting a formal education and seeking employment in a trade or business. Cell phones, television, internet and nightclubs were prominent in their daily lives. The young people with whom I had contact conveyed an understanding of global warming and the issues of the environment in general but seemed to know less detailed information about specific plants, animals or the ecology of their local region. A few of the participants involved in education have developed media and curricula to address this issue. Donna, a professor at one of the local universities and long time resident of the area conveys her perspective in the following excerpt:

Look, we have started working on starting at a young age. Like primary and secondary where they, children and teens, become aware of the importance of having a healthier environment. Being aware...it is important because in this way they will learn to conserve. Because if we do not convey, and they are not aware, they may not do anything.

Several people expressed the importance of formal education while retaining aspects of traditional culture by involving children in public displays and festivals that promote long-standing cultural and cosmological values. As depicted in Figure 27, children in Ollantaytambo are adorned in traditional clothing. The festival is representative of many of the parades I observed in Quillabamba, Echarati and other communities where cultural pride and values are instilled in their young people during public events. Although such displays are common in tourist destinations, Quillabamba and Echarati do not have the tourist economy of larger cities and yet still practice their customs in the public domain.



Figure 27. School children gathered for festival in Ollantaytambo wearing traditional clothing.

Interviews with Multigenerational Families

Two inter-generational interviews conducted during this investigation provide insight regarding the transfer of knowledge. They provide a glimpse of informal pedagogy within two extended families as we discuss the topics of food, medicinal plants, and environmental issues. The interviews also reveal contradictions between what people know and how that knowledge is valued or devalued in the larger society. The humility with which they convey knowledge about subsistence, the environment, and ethnobotany suggests they have internalized mainstream knowledge as perhaps more important and valid than their own.

I drove with my interpreter to a campo on the outskirts of Quillabamba to interview two different extended families. The first family interviewed lived several miles from Quillabamba and owned about forty acres. Unlike most of the campos I

visited, this one was not part of a cooperative and had been passed down from previous generations. Ricardo lived with his mother Yadira, his sister Angela and his sister's son Alex. When we first arrived, we were greeted by the entire family and offered some wood-fired lemonade. After a brief introduction, Ricardo led us around the area to point out a variety of edible and medicinal plants. His knowledge of the surrounding vegetation and environment was remarkable.

We spent approximately two hours wandering around his property while he conveyed information about the plants and changes to the environment, especially the river. As previously mentioned, the Rio Vilcanota has become extensively polluted and the fish have become depleted. Ricardo raised milk cows and guinea pigs, but also was employed as a forestry engineer by the Camisea Project. He proudly showed me some photos of the reforestation projects that he managed several hours downstream from his home.

We returned from the tour and his mother, sister and nephew were waiting for us. They gathered around a table in an open shed that served as their kitchen. Ricardo's mother, Yadira looked as though she was in her seventies or eighties, Ricardo was probably in his fifties and his sister was a few years younger. His nephew was in his early twenties and seemed reluctant to stay for the interview. The interview conducted was very informal and Yadira was unwilling to be recorded using an audio or video recorder – a typical response from the older generations of people who I encountered. In contrast, Younger generations, excited by the new technology, seemed anxious to be videotaped and enjoyed watching themselves on the camcorder.

I asked Ricardo how he knew so much about the plants and he nodded toward his mother and said that his father taught him about the environment. Yadira spoke Quechua and proudly acknowledged her responsibility in teaching Ricardo and his sister about life in the campo. Yadira explained,

I grew up in the *montaña* (mountain) as a little girl and learned all about the plants and the animals. We ate quinoa, potatoes, and other tubers. Sometimes we would sacrifice a young sheep to celebrate a birthday or some festival. We worked very hard and rarely saw people from the outside.

When I asked how she came to live near Quillabamba, she said that her family went to the market in Quillabamba and that is where she met her husband. Her husband (now deceased) was from the selva and frequently came up river to deliver fish and fruit to the market. Yadira said that Ricardo learned from both of them and that is why he knows so much about the plants.

Q. Angela, do you also know about the plants?

Angela: Yes, but not as much as Ricardo. Ricardo went to the selva more frequently with his father and so he learned more about the plants and animals there.

Q. Have you taught your son about plants and animals?

Angela: Yes, some, but he has learned more from Ricardo. But he is not really interested.

I looked at Alex for confirmation. Alex nodded.

Q. Alex, are you interested about the plants and the environment?

Alex: More or less, but I do not want to work in the campo. I am attending the university to become a mechanical engineer. The life here in the campo is hard and we do not make enough money. My sister is now in the United States—in California. Someday I would also like to go there.

Angela: I miss my daughter very much, but she lives near Los Angeles and is with her husband who is from Mexico.

Q. *How often does she return?*

Angela (in a lamenting tone): It has been seven years since she left. She has not returned because it is too expensive.

Q. *How often do you communicate with her?*

Angela: Only once or twice a year during holidays, her birthday—we speak on the telephone, but I have to go to Quillabamba. She also uses the Internet, but I do not. Will you contact her for me?

“Yes,” I said, “please write down what you want me to say to her.”

As I drove to the next campo, like the plumes of dust kicked up by the truck, my thoughts swirled with the multitude of conversations I had with people who were just trying to survive in a world where their cultural and physical environment was being strained by global forces outside of their control. Those thoughts lingered as we pulled up to the campo for my next interview. The home was made of brick and adobe that was peeling from the outer walls. Some chickens and young dogs roamed around outside, seemingly curious about the unfamiliar visitors. Quechua music could be heard coming from a radio inside the home. Ferdinando had lived in the area all of his life, but spent many days and weeks away from home working the fields on a cooperative several hours from Quillabamba. His daughter who was approximately thirty and two granddaughters, one thirteen and the other 3 or 4 years old sat with us during the interview and answered a few questions as well. One of the granddaughters was too young to answer direct questions but responded with the help of her older sister and was intrigued by the interaction. We started the conversation as usual, by showing photos from the Mexía

collection and asking about edible and medicinal uses of plants. Like Ricardo, Ferdinando possessed a wealth of information related to plants and the environment. He began by providing an account of a medicinal tree used to heal his son's broken arm.

Q. *What is the name of the plant?*

Ferdinando: It is a tree. You must rub it, it is a milk [latex]...you do not have to cut the plant, the milk just falls.

Sara (granddaughter repeating while sitting up in a mango tree): The milk just falls.

Ferdinando: The milk becomes hard and is covered with a cloth so it does not move. It prevents infection so that it does not swell.

Q. *The bone has to be in position?*

Ferdinando: Yes, the bone has to be in position. If the bone is in several pieces you have to go to the hospital.

Q. *And when it is a simple cut?*

Ferdinando: My son was cut and we used that.

Q. *And his arm is normal?*

Ferdinando: Yes, his arm is normal. My son now works. He is also in the university. When it is very cold it hurts and must be well wrapped.

Q. *How old is he now?*

Ferdinando: Sixteen.

Q. *How old was he when it happened?*

Ferdinando: When he was four years old...playing.

Q. *What plants are used for fever?*

Diana : Oh yes...*rata rata, caña caña*. It is taken too, grated, it is taken and you squeeze it for fever.

Q. *Do you boil it?*

Diana: No. You just grate it.

Q. *What is the rata rata used for?*

Diana: It is also for fever and wounds.

Ferdinando: You have to rub it and it looks like gum and you massage it on your skin.

Q. *Like gum?*

Ferdinando: Yes, like latex.

Q. Pointing to the plant Diana was holding: *What is that?*

Ferdinando: That is *caña caña*. It is used for fever. It is like *juquito*. It is used for cough, flu...we have to wash with hot water.

Q. *Do they use it?* (Referring to the granddaughters.)

Ferdinando: Yes, they use it when I am not at home. (His daughter and granddaughter nod their heads in agreement.)

We then walked around the property and looked at some of the plants. Diana mentioned that *yerba buena* was a mint used for stomach aches and that aloe was used on the face. At this time my interpreter also chimed in confirming their use. There were several trees on the property including mango, orange and cacao. I asked about the trees, and walked around with the entire family to sample some of the cacao fruits that were lying on the ground.

Cacao has a hardened outer shell enclosing numerous cacao seeds in a sweet, fleshy pulp—very similar to the pulp around the seeds of passion flower (*Passiflora* spp.). Ferdinando explained the process of drying the cacao seeds in the sun to be used for chocolate. We continued our conversation about edible and medicinal plants while

Diana and her daughters went into the house and brought out some ripe bananas for us to eat.

The granddaughters Sara and Susana were anxious to show me some of the fruits and other plants on the property. Although they respectfully and quietly listened to Ferdinando answer most of the questions, it was obvious that they wanted to share some of their acquired knowledge. This provided a brief opportunity to direct some questions to Diana and her daughter, Sara. Diana pointed to some wild roses and mentioned that they eat the flowers. They were unfamiliar with the use of rose hips so we discussed their use as food and medicine. I noticed burdock (*Arctium lappa*) nearby and asked if they used it for food. Ferdinando mentioned that he did not know the scientific name but that they called it “chard.” An engineer from his cooperative visited them and told them that it was good to eat, but they were unfamiliar with its use prior to then. Although I knew it was non-native and was familiar with its use as a food and medicine, I wanted to know their knowledge of it.

Q. *How it was used?*

Diana: I chop it and sauté it.

Q. *Do you use it for medicine?*

Diana: No, only the leaves...that one is too old.

Ferdinando chimed in: We cook it with eggs and onion and *harina* sauce and eat it with bread.

Q. *Do you cook, Sara?*

Sara: Yes, I cook for us when my mother is busy. She taught me how to cook and what plants to use.

We then turned to a discussion about environmental issues and climate change. After Ferdinando and Diana expressed their concerns about drought and fire, the topic turned to the transfer of knowledge.

Q. What do your children know about plants and the environment?

Ferdinando: They know a little....It is assumed that they are more intelligent than me and so they are learning more than I do. Besides they learn in school. I'm sure they have a better understanding than me.

Diana: The information is passed through the family and school and that is important.

Sara: (Nodding in response to the discussion of climate change and knowledge.) Now this property is hotter and all is important to convey.

Q. Do you help to teach your little sister?

Susana and Sara: Yes.

Sara replied bashfully: I teach her how to cook.

Ferdinando chimes in again: The environment, the one thing I can say is that I do not like the manner that they can obtain information about the local environment on the Internet.

Ferdinando decried the fact that his knowledge was being undermined and devalued not only by formal pedagogy but by modern access to communication and information technology via the Internet. In the above quote, he conveys an internalization of other people's perspectives concerning education and the environment. Ferdinando seems to question and simultaneously validate the assumption that because his children are learning "in school" that they are more "intelligent" and have a "better understanding" of the environment than he does. The influence of mainstream society has promulgated the importance of formal pedagogy over informal knowledge and experience. Ferdinando has in effect delegitimized his own knowledge via the hegemony of the literate, modernized and globalized larger society. His extensive practical

knowledge and experience working with medicinal plants and our discussion of global warming, on the contrary, conveys that he has a very personal, direct and detailed understanding of the environment, climatic change and the long-term consequences of environmental change, that is, "...if the water dries up how are we going to live?"

The interviews with Ferdinando and Ricardo and their families, as well as interviews with numerous other people elucidate the issues of intellectual property rights and legitimization of knowledge. Just as biopiracy focuses on the issues of taking biological organisms, *knowledge* piracy blatantly and subtly undermines people's confidence in what they know by compromising the inter-generational transfer of knowledge through formal pedagogy and global information technology. If the Internet co-opts and replaces the validity of real life experience with electronic transmission of text and images, the need and desire to transmit experiential knowledge inter-generationally may be diffused and lost altogether.

Moral arguments during the 1980s and 1990s in relation to indigenous rights to resources and land were often framed in the context of protecting or conserving global biological diversity. By placing people's collective behavior in the context of environmental sustainability, any perceived abuse or neglect of that sustainability could undermine the moral argument to protect the rights of a specific group of people (Conklin 2002). More recently, the arguments have shifted to a discourse that frames the value of knowledge and intellectual property rights as a means of protecting biological and cultural diversity (Conklin 2002; Muehlebach 2001; Shepard 2004). By reconceptualizing people in terms of their collective knowledge and experience the value

of knowledge is emphasized rather than the actions of a group of people. “Whereas Native peoples formerly were positioned as guardians of the forest itself, now they are positioned as guardians of knowledge of the forest” (Conklin 2002:1056).

This is not to say that only “native,” “indigenous,” or “shamans” are the only holders of specialized knowledge (Bussman and Sharon 2006; Conklin 2002; Plotkin 2003). As Bussman and Sharon (2006) point out, the distinction between “indigenous” and “local community” needs to be addressed before making evaluations pertaining to who owns knowledge. Knowledge of plants and animals used for food and medicine is often shared among different members of the community including both men and women (Plotkin 2003). This research project also confirms a widely shared environmental and ethnobotanical knowledge among diverse members of the community including professionals such as Juan and Donna, holders of specialized knowledge such as Carlita, and campesinos such as Romero and Ferdinando. Each participant offered a unique perspective, expertise and experience regarding their relationship with plants and by extension, the economy and changes to the environment.

CHAPTER SIX

CONCLUSION: LESSONS LEARNED

Project Review and Outcome

Here I provide an overview of the outcome and relevance of this interdisciplinary model and pilot project. I begin by recapping the issues encountered during Phases I and II while I researched the historical literature that ultimately led to a search for and attempt to map Ynés Mexía's travel routes and collection sites. I then review the ethnobotanical data and discuss the importance of introduced plants in the local pharmacopeia.

Phases III and IV, which became central to my project, are examined as I discuss the problems encountered. To clarify the discrepancies between the proposal and field reality, I address the lessons learned when unforeseen circumstances, both positive and negative changed the trajectory of the project. This section stresses the importance of flexibility as it enabled me to maximize opportunities as they presented themselves. I examine advantages of using digital photography, audio and visual recordings as essential tools for conducting fieldwork. I then unpack the relevant themes and insights regarding the economic and environmental issues that emerged from ethnographic interviews and assorted visual representations. Finally, I discuss the relevance of this project to intercultural education proposed in Phase IV.

The Mexía Collections and Ethnobotanical Data

The impetus for this project was the story and history of Mexía. The goal of this pilot project was to determine if it was possible to retrace a small portion of Mexía's travels and therefore possibly apply the model to a more extensive journey in the future.

Although I encountered several unexpected issues, the model proved useful. As with most research endeavors, there are variables that can not be predicted and call for modifications. The thing to keep in mind is that with every test, there are lessons learned and sometimes the unanticipated outcomes prove to be the most valuable. This project is inherently interdisciplinary. One of my goals was to bridge the gap between disciplines and to tie ethnobotanical data to a sample of plants from the collection. To accomplish this, I employed applied anthropology methodologies to gather information about cultural uses of plants and the environment.

I researched the historical documents associated with the botanical collections and letters of Ynés Mexía in Phase I. Although most of the documents are filed by the year, the search for information pertaining to the Quillabamba region of Peru proved to be challenging. Many of the references were found in handwritten letters that were often faint, difficult to read and at times ambiguous. Another problem that arose early in the project is the fact that I could find very little information about Quillabamba before my departure. When planning my trip, no active satellite images or maps were available for the town. Since then, that information has become available and can be downloaded from the Internet. There were also no topographic maps available for the region. In fact, I could not find any useful topographic maps while in Peru and I am still waiting for a topographic map of Quillabamba that I ordered in July of 2008!

One of the initial problems that I encountered while traveling the route that Mexía mapped out in 1936, was that the road had changed and a large portion of that route was no longer accessible. One of the five plants researched in this project was collected along

the portion of the route that is no longer accessible. However, I did find that species (*Ruellia brevifolia*) in another location. In addition, the region is very mountainous and subject to dramatic landscape changes such as landslides and flooding.

One of the objectives of Phases I and II was to search for ethnobotanical data associated with five plant species included in the Mexía collection (*Oxypetalum dombeyanum*, *Merremia aegyptia*, *Ruellia brevifolia*, *Piper elongatum*, *Tibouchina longifolia*). A synopsis of Phases I and II and the data associated with the five plant species are found in the prologue. (For additional data see Appendix A). Another goal of my project was to obtain ethnobotanical information associated with commonly used plants not found in the collection and to this end extensive ethnobotanical data was collected. It is incorporated throughout this document in vignettes, interviews and images as a means of connecting the themes of food, medicine, cosmology and the environment.

As can be seen in Appendix B, a total of 110 different plant species were documented for this project. Of those documented at least 50 are introduced species. More than 70 of the 110 are used for medicine and of those, 35 are used for both food and medicine. The remaining plants are used primarily for food or commerce and 3 plants are used for either fiber, lumber or heating. Of the 110 plants, matico was the most popular. Other plants that were commonly used and referenced by my participants include: *achiote* (*Bixa orellana*), cacao (*Theobroma cacao*), coca (*Erythroxylum coca*), *cola de raton*, eucalypto (*Eucalyptus globulus*), *palta* (*Persea americana*), *rata rata*, *yuca* (*Manihot esculenta*) and *sábila* (*Aloe vera*).

As conveyed throughout the body of this document, plants are infused into all aspects of life including the physical, social and psychological. The “new sensory ecology” modified by Shephard (2004) stresses the importance of the relationship between the physical attributes of plants including their aroma, taste, color and texture, with the social aspects of tradition and symbolism, and the psychological or cosmological belief in plant spirits. This approach to ethnobotanical research is holistic and inclusive of the spectrum of interactions people have with plants as evident in this project. Like the syncretism of their cosmological beliefs and healing modalities, the people of Peru have integrated a variety of native and introduced plants into their pharmacopeia (personal observation June-July 2008; Vandebroek et al. 2004). According to Bennett and Prance (2000), the importance of introduced plants in indigenous pharmacopoeias is often overlooked by researchers studying medicinal plants; while food researchers often overlook the importance of medicinal properties found in common plant foods. Often, part of the plant is used as food and another part as medicine. Carlita explained,

The bud of achiote is good, and the bud of coffee is good for the heart. The coffee, they take the leaf for the heart. There's a lot. For example, cacao, its shell is gathered and dried in the sun, and is burned. The ashes are mixed with water, and you make a ball and it is taken with a little coca. It is very good because it holds to the teeth and prevents tooth decay. But just a little! It has no flavor, but it numbs the mouth. It is made by the people in the country to eat with coca.

The food-medicine continuum introduced in chapter 3, and elaborated here by Carlita, is an important consideration when working with edible and medicinal plants. There are numerous plants that contain edible, medicinal and toxic properties. A thorough

understanding of these properties is required when utilizing plants for food or medicine. How people ascertain that understanding is of vital importance, especially in places like Quillabamba where there exists a strong dependence upon the subsistence economy.

Perceptions of Change

As discussed in Phase III of the Prologue, when I first embarked on this fieldwork, I anticipated that I would be able to obtain information to develop cultural maps. Unfortunately, this phase could not be completed as originally proposed. One of the lessons learned when conducting fieldwork is that sometimes things do not go as planned and flexibility is crucial. Just as I had difficulty finding the Mexía collection sites, I also encountered problems when attempting to create cultural maps. I did not anticipate the extent of cultivated land in the area, nor did I know, prior to my arrival, that few of my participants harvested or utilized the native flora and fauna. Those who did were reluctant to reveal their collection locations and did not want that knowledge to be mapped or shared with others. I was fortunate, however, to be granted permission to go on hikes and gather a few plants with a couple of my participants. I felt especially privileged to be shown the location of the medicinal plant that Carlita used to treat herself.

Given the restriction that I faced creating cultural maps, I changed my strategy and used a different set of tools to obtain the kind of information they would have provided. Using a digital camera and video recorder, I was able to record valuable information such as interviews with participants and images of textiles, food, crafts, sculpture, and children's drawings. Each image provides visual data that includes

cultural uses of plants, symbols, and toponymic information. Of the numerous images that I recorded, the children's drawings provide vivid representation of the environment and alterations to the landscape. I used the videos and children's drawings as primary sources to interpret and analyze perceptions of change.

The willingness of several of my participants to be videotaped during the interviews contributed details that would have otherwise eluded the project. These recordings proved very important as they provided a visual and audio account of my interviews that were interpreted at a later date. Without this, the conversations would have been much more difficult to translate. The visual and audio recordings also allowed me to observe the people and the surroundings in greater depth and gave me the opportunity to see and hear things that I did not notice during the interviews.

A serendipitous component of my fieldwork was that I happened to be in the region during several celebrations. Quillabamba celebrated its 150th anniversary, while other nearby communities celebrated theirs. The fairs, markets and festivities that were associated with the anniversaries provided numerous opportunities to collect data that would not have been available during other times of the year. In addition, they allowed me to see people, crafts and produce brought by a spectrum of ethnic groups from the jungle and mountains. Other fortuitous events included the observation of people making plant dyes and weaving textiles in Kiswarani, the opportunity to attend treatments and interview a healer in Cusco, and the encounter with the people at Chinche after a funeral. Although each group of people had unique way of life in vastly different biogeographical and topographical regions of Peru, they had shared traditions and cosmological

perspectives that were revealed through their relationship to, and use of, plants for dye, medicine and food.

The people of Quillabamba and surrounding regions are dealing with multiple issues associated with rapid cultural and environmental transformation. The Mexía collections provided a time frame and references to document changes to the environment. When she was in the area in 1936, Quillabamba was barely recognized as a town, but even then she noted the intensively cultivated land. Observations and interviews conducted during this research indicate that the prime land of the pampa has since become less productive. The depletion of soil fertility, deforestation, erosion, and contamination have now culminated into serious economic and health repercussions for the people who live in the town and surrounding regions. As they attempt to address the aforementioned issues they will have to grapple with both the beneficial and detrimental effects from globalization and development.

Economic and political influences have disrupted cultural relationships between groups of people who utilize the environment for different purposes. My research in Quillabamba revealed that some people benefited from economic development while others suffered. As participants explained, this economic inequity sometimes creates resentment between those groups of people who want development for jobs, and those who lose access to subsistence resources due to economic activities and associated environmental pollution. Those people who use the environment for subsistence are often impacted by the activities, policies and agendas of economic development that are imposed by outside interests who in seeking profit tend to deplete and restrict access to

commonly shared resources that are part of cultural heritage and survival (Nash 1994; Wirsing et al. 1985). While projects such as the Camisea Project offer mitigation for environmental and cultural impacts, the associated losses may never be adequately compensated.

With the rapid pace of change new pressures are being placed not only on the environment, but on young people as well. Opportunities to work in a wage economy often avert their attention from working in the campos, their families, and subsistent ways of life. While their lives may be improved and easier than in the campos, the generation of young people who move away may lose access to the experience and knowledge that has traditionally been transferred to them via their families.

Intercultural Education and Research Reciprocity

...the question I ask of you, all this information that you are collecting, what is the purpose, what is your goal? (Carlita July 12, 2008)

When Carlita asked why this investigation was being conducted, I gave her a synopsis of the Mexía collection and the search for associated ethnobotanical and environmental information. I told her that by searching for the plants and collection sites of Mexía, I had the opportunity to come to Quillabamba and learn about the people and the environment. The Mexía collections provided the impetus to go to Peru to see if it was possible to retrace her travels based on historical clues and by extension, learn about ethnobotanical and environmental relationships. It was apparent Carlita was not as interested in the research project as she was in how that information would be utilized.

Carlita wanted to know more about my personal connection to the plants and people and why it was so important to me. I explained to her that I have always had a

deep connection with plants and the environment due to my upbringing and continued passion for understanding our relationship with the environment. I expressed to the people who I met that I am interested in the relationship between people and the environment everywhere, because I believe that it is the place where we all come together—the place where we can all relate, even if we have become detached. Carlita responded,

It is good to know. Sometimes those little things you learn from what you're doing and recording, but what of those things that you are conveying? Maybe arriving to the United States, you will begin to have the same experience yourself that we are conveying; narrating...you provide the information. There are few people involved in this. There are many who are involved in travel, adventure ... but very few are investigating. For example, people I have met are almost no good to anybody; you're the first person I know who I will allow to investigate.

I felt honored that Carlita and the other participants in Peru, allowed me into their world, to hear their voice and to learn their perspectives. All they asked in return was that I share my story with them and their story with others. Jáme explained, “If you do not know what is happening in our region, you will not appreciate or want the environment in which we live. It is important to convey information to our people.” A few weeks after Jáme’s comment, new exhibits promoting environmental awareness and healthy living were prominently displayed in plazas and fairgrounds throughout the region. Figure 28 is in an attempt to draw awareness to the issues of environmental contamination.



Figure 28. Banner at local festival promoting environmental awareness.

Insights regarding environmental and cultural relationships gained during this research stem directly from the environment and people of Peru. They are keenly aware of what is going on not only at the local level, but at the global level as well. They are keenly aware of it because they are being affected by it in their small villages and towns. Their ways of life are being disrupted and altered, in some ways permanently. By sharing perspectives and insights through the process of interculturality we can learn about the common challenges that affect us globally so that we can share local solutions. The cultural and environmental issues that they face—indeed, that we all face, cannot be expressed more poignantly, than in their own images and their own words. To acknowledge their contribution to my understanding and to this research project, rather than concluding in my own voice, I have chosen to use my participant, Maria's.

I, since I was a very little girl I liked a lot the countryside. My parents took me on walks where they cultivated their land with corn. While walking along the road, my mother taught me the name of the plant and for what it could be used. I learned well. I also appreciate the plants so much more because they were our greatest allies. I started helping the environment because of my mother.

The museum of biodiversity was opened with the idea of promoting bio-cultural and biological diversity of the Andes. I led the museum ... it was my own initiative with the purpose that all my neighbors can appreciate the great biodiversity we have here. I want to convey that to my children and my neighbors...the identification with our culture.

We are very rich here. Just as my mother shared with me so I also guide and share with all.... For me it is very important because we need to save our home. For me, our environment, our planet is like our home. If our house we have to look after, we also have to take care of our planet.

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Appendix A: Plant Data Associated with the Ynés Mexía Collection in Peru.

Spanish	Quechua	Species	Location/Use	Source
Yuca? Handwritten by informant on photograph of <i>Merremia</i>		<i>Merremia aegyptia</i> 	May 12, 1936 Provincia La Convencion; S. Of Quillabamba	Mexía Collection #8048
	Called Bijujo? by Carlita when I showed her the photograph of <i>Oxypetalum</i>	<i>Oxypetalum dombeyanum</i> 	May 10, 1936 Provincia La Convencion; valley of Rio Vilcanota; Mission of Quillabamba; climbing hedgerows. Alt. 1010 m. Vine; greenish white flower; slightly fragrant; milky juice.	Mexía Collection #8046
Verdulaga		<i>Peperomia vilcanotana</i> 	May 11, 1936 Provincia La Convencion; Valley of Rio Sambray; on rocks in shade. Alt. 1000 m. Common herb, "Verdulaga."	Mexía Collection # 8047
Verdulaga, verdolaga		<i>Portulaca oleracea</i> L. Potulacaceae (Vitto et al. 1998) (Bennett and Prance 2000) introduced	Photo from Mexía collection. "It is medicinal. There are many."	07/21/08 Car Video/formal interview and informal discussion.



APPENDIX A: Ethnobotanical Data Associated with the Mexía Collections

Spanish	Quechua	Species	Location/Use	Source
Matico	Moco Moco	<i>Piper elongatum</i> 	May 9, 1936 Provincia La Convencion; Valley of Vilcanota; near Quillabamba.	Mexía Collection #8025
Matico	Moco moco	<i>Piper aduncum</i> Piperaceae (Beltran and Benavente n.d.) <i>P. angustifolium</i> (Falconí et al. 2007)	Matico helps to induce lactation in mothers.	07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.
Matico	Moco Moco	<i>Piper angustifolium</i> (Falconí et al. 2007) Piperaceae	Used for legs and sore muscles.	07/12/08 Ang Audio/semi-formal interview; handwritten answers.
Matico	Moco Moco	<i>Piper angustifolium</i> (Falconí et al. 2007) Piperaceae 	The leaves are used externally for healing wounds and internally as a tea for stomachache, ulcers and the flu. Used by mountain children to wash themselves."	07/07/08 Jorge Informal Interview and tour of COCLA Cooperative
Matico	Moco moco	<i>Piper</i> spp. <i>Piper aduncum</i> , <i>P. angustifolium</i> Piperaceae	"Use for pain in the bones, wash the affected part with matico boiled in hot water."	07/11/08 Fer Video/semiformal and formal interview 07/17/08 Fer Received handwritten note with sample of plant.

APPENDIX A: Ethnobotanical Data Associated with the Mexía Collections

Spanish	Quechua	Species	Location/Use	Source
Matico	Mocco Mocco	<i>Piper</i> spp. <i>Piper aduncum</i> , <i>P. angustifolium</i> Piperaceae	“Medicinal plant that can be used dry or green both the leaves, joint and flower are used for the lungs as an infusion and as a water bath and steam when you have general malaise of the body, exists throughout the valley of La Convención (Quillabamba) throughout the year. Humid [moist] ground, more or less at 1200m.”	07/19/08 Els Written answers to questionnaire. Informal discussion.
Matico	Moco Moco	<i>Piper</i> spp. <i>Piper aduncum</i> , <i>P. angustifolium</i> Piperaceae	“One of most favorite medicinal plants. Used for fever together with Rata Rata. I had a fever, a headache and my mom grabbed the two plants, the Moco Moco and the Rata Rata, boiled the plants in the pit in the grass field with full sun...and there I took a steam bath head down.”	07/21/08 Car Video/formal interview and informal discussion.

APPENDIX A: Ethnobotanical Data Associated With the Mexía Collections

Spanish	Quechua	Species	Location/Use	Source
	Gorrioncillo Written by one of the participants on the photograph of <i>Ruellia</i> .	<i>Ruellia brevifolia</i> 	May 16 or May 17, 1936 Provincia La Convencion; Valley of Vilcanota, road Macchu-Picchu to Quillabamba near km. 153 Note: July 2008 current road marker km. 153 taken out by landslide. Specimen of <i>Ruellia brevifolia</i> found at Siete Tenejas North of Quillabamba.	Mexía Collection #8088 07/06/08
		<i>Tibouchina longifolia</i> 	May 18, 1936 Provincia La Convencion; Valley of Vilcanota; Mission near Quillabamba. Note: Two informants mentioned that they recognized the plant, but that it is found in another zone.	Mexía Collection #8091

Appendix B: Ethnobotanical data created from interviews and observations in Peru.

Spanish	Quechua	English	Scientific Name/ Reference	Utilization/Notes/ Direct Quotes	Source/Method
		Peruvian palm			07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.
Castilla negra	(name omitted) "It is like saying bone- bone in English." Yanahuacta			Used to treat the wound from a spider bite and also used to treat Leishmaniasis. Important plant for medicinal use.	07/21/08 Car Video/formal interview and informal discussion. 07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.
Chamba				Alimento para credos. Food for animals	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Chamba				"This is good for animals and people. It has complex vitamins. Cut the leaf and squeeze it and take it. It's taken in juice. Nutritious; for anemia. Another thing is also for growth and prevents hair loss. Take it internally."	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Chichipa				Dry chichipa, use for stomach and diarrhea.	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Chunqui tree				"You must rub it. It's a milk [sap]. You do not have to cut the plant. Only the milk falls. The milk becomes hard and is covered with cloth so it does not move. It prevents infection so that it does not swell. Yes, the bone has to be in its position. If the bone is in several pieces you have to go to the hospital."	07/011/08 Fer Video/semiformal and formal interview

Spanish	Quechua	English	Scientific Name/ Reference	Utilization/Notes/ Direct Quotes	Source/Method
Cicillano, cecillano				Vine and fruit in juice for hangover. "It is good for the liver. For the hangover it is taken to taste."	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Cola de Raton	Hukijcha chupa			"Take as tea for ulcers. The leaves increase heart rate. Use the total plant for infusion."	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Cola de Raton	Jank'u chuta			"For relaxing the tendons, put it in the bath. Grind into a paste or when the hand or the foot has been twisted. Use it for bruises as a poultice to relax muscles; boil and put in bath."	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Cola de Raton	Jucucha chupa			"That plant when you have a cut, a wound. You chew it and put it on the edge of the wound, not in the wound, on the edge. It helps the infection and it heals rapidly. Oh, but it is milled. The little flower is yellow. It grows with a bad herb. "	07/21/08 Car Video/formal interview and informal discussion.
Costilla negra	Yanahuacta			"This is another laxative. It is also good for the stomach."	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Miel		Honey		Important resource for food and commerce. "The honey is also exported. The honey is sold out a lot. The honey bee, they remove the propolis and that has good demand here."	07/21/08 Car Video/formal interview and informal discussion.
Minto		Mint	Lamiaceae	"It is used a lot for medicinal creams."	07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.

Spanish	Quechua	English	Scientific Name/ Reference	Utilization/Notes/ Direct Quotes	Source/Method
Pesuña de la Mula				"There is a plant that is called The Pesuña de la Mula. It is a plant that ulitiza as a natural anti-contraceptive. Then specifically for women."	Mar 07/27/08 Video/Photos/ formal interview and informal discussion.
Rata Rata				"Anti-inflammatory plant, used in infusion, bathroom, and enemas."	07/19/08 Els Written answers to questionnaire. Informal discussion.
Rata Rata				"It is used for bathing."	07/20/08 Chinche Video/informal interview.
Rata Rata				"Used for fever together with Rata Rata. I had a fever, a headache and my mom grabbed the two plants, the Moco Moco and the Rata Rata, boiled the plants in the pit in the grass field with full sun...and there I took a steam bath head down."	07/21/08 Car Video/formal interview and informal discussion.
Rata Rata				Used in bath.	07/22/08 Car Video/informal tour near Rio Vilcanota south of Quillabamba.
Saño saño				"Used externally in shower for skin."	07/12/08 Ang Audio/semi- formal interview; handwritten answers.
Silcua				"Use it in tea for the headache."	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Uncucha	Ucuncha			"We cultivate a little for food."	07/20/08 Chinche Video/informal interview.
Witoc				"It is used for asthma. Boil ½ round slice in 1 liter of water. Take a half hour before breakfast and a half hour before sleep. It takes five to ten years to mature. Fruit develops in August and matures in January."	07/06/08 I. S.T. Photo/Informal conversation and written notes.

Spanish	Quechua	English	Scientific Name Reference	Utilization/Notes/ Direct Quotes	Source/Method
Zambellano? Response to photo in Mexía collection.				Photo from Mexía collection. "It is medicinal, but it does not stop it [cancer, infection?]."	07/21/08 Car Video/formal interview and informal discussion.
Cebolla		Onion	<i>Allium cepa</i> Liliaceae (Falconí et al. 2007) (Vitto et al. 1998) (Bennett and Prance 2000) introduced	Used for subsistence.	07/12/08 Ang Audio/semi-formal interview; handwritten answers.
Cebolla		Onion	<i>Allium cepa</i> Liliaceae (Falconí et al. 2007) (Vitto et al. 1998) (Bennett and Prance 2000) introduced	Used for subsistence. "They are bought and sold."	07/21/08 Car Video/formal interview and informal discussion.
Sábila	Maguey, Pajpa	Aloe	<i>Aloe vera</i> L. Liliaceae (Vitto et al. 1998) (Barros Cáuper 2006) (Bennett and Prance 2000) introduced	"It is used for arthritis; for rope."	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Sábila	Maguey, Pajpa	Aloe	<i>Aloe vera</i> L. Liliaceae (Vitto et al. 1998) (Barros Cáuper 2006) (Bennett and Prance 2000) introduced	"It is used for skin on face."	07/11/08 Fer Video/semi-formal interview.
Sábila	Maguey, Pajpa	Aloe	<i>Aloe vera</i> L. Liliaceae (Vitto et al. 1998) (Barros Cáuper 2006) (Bennett and Prance 2000) introduced	Commonly used medicine.	07/20/08 Chinche Video/informal interview.
Cedroncillo			<i>Aloysia triphylla</i> (L. Her.) Britt. Verbenaceae Cedron	"Digestive; take in tea and for nervousness."	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.
Marcju	Marcju?		<i>Ambrosia peruviana</i> Marcju (Falconí et al. 2007)	Used externally in shower for skin.	07/12/08 Ang Audio/semi-formal interview; handwritten answers.

Spanish	Quechua	English	Scientific Name/ Reference	Utilization/Notes/ Direct Quotes	Source/Method
Piña		Pineapple fruit	<i>Ananas sativus</i> Schult. (Barros Cáuper 2006) <i>Ananas comosus</i> (L.) Merrill.) Bromeliaceae (Egg 2003) Introduced	Used for subsistence.	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Masasamba		Soursop	<i>Annona muricata</i> Annonaceae Native (Egg 2003)	For diabetes and cancer in infusion. Leaves and fruit.	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Masasamba		Soursop, Custard Apple	<i>Annona muricata</i> Annonaceae Native (Egg 2003)	“The skin is used for fruit jams. It was discovered that the little leaves of the tree, the youngest are gathered together and boiled, allowed to settle and taken...and that helps you... to prevent cancer. And when you take this not half an hour passes and you go to the bathroom. You spend all day in the bathroom. You’re clean.”	07/21/08 Car Video/formal interview and informal discussion.
Guanábana	Mazasamba	Soursop	<i>Annona muricata</i> L. Annonaceae (Egg 2003) (Falconí et. al 2007)	Fruit and leaves in infusion help the immune system.	07/19/08 Els Written answers to questionnaire. Informal discussion.
Apio, Arracacha?		Celery	<i>Apium graveolens</i> (Vitto et al. 1998) (Bennett and Prance 2000) introduced	Used for subsistence.	07/12/08 Ang Audio/semi- formal interview; handwritten answers.
Maní, Habilla, Maní del monte			<i>Arachis hypogea</i> (Pastor 2006) <i>Fevillea cordifolia</i> L. Fabaceae (Habilla, Maní del monte) (Egg 2003) (Falconí et al. 2007)	Important resource for food and commerce.	07/21/08 Car Video/formal interview and informal discussion.
Acelga		Chard, Burdock	<i>Arctium lappa</i> L. (Linn et al. 1996) (Personal identification.)	Fresh young leaves chopped up and sautéed with eggs, onions, etc.	07/011/08 Fer (wife) Video/semiformal and formal interview.

Spanish	Quechua	English	Scientific Name Reference	Utilization/Notes/ Direct Quotes	Source/Method
Ajenjo		Wormwood	<i>Artemisia absinthium</i> Asteraceae (Vitto et al. 1998) (Falconí 2007) (Bennett and Prance 2000) introduced	For stomachache, insomnia.	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.
Achiote	Quisqaccana	Annatto	<i>Bixa orellana</i> Bixaceae (Barros Cáuper 2006); (Van Wyk and Erik 2005); (Egg 2003)	Take the bud in an infusion for the prostate.	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Achiote	Quisqaccana	Annatto	<i>Bixa orellana</i> Bixaceae (Barros Cáuper 2006); (Van Wyk and Erik 2005); (Egg 2003)	"It cures the prostate and is anti-inflammatory. Take as tea."	7/17/08 Fer Photo/written notes.
Achiote	Quisqaccana	Annatto	<i>Bixa orellana</i> Bixaceae (Barros Cáuper 2006); (Van Wyk and Ben Erik 2005); (Egg 2003)	"Take the leaf of achiote, in infusion for use as anti-inflammatory for the urinary tract and especially in the man for the treatment of the prostate."	07/19/08 Els Written answers to questionnaire. Informal discussion.
Achiote	Quisqaccana	Annatto	<i>Bixa orellana</i> Bixaceae (Barros Cáuper 2006); (Van Wyk with Ben Erik 2005); (Egg 2003)	Used for medicine. Important resource for commerce. "The bud of achiote is good for the heart."	07/21/08 Car Video/formal interview and informal discussion.
Repollo		Cabbage	<i>Brassica oleracea</i> Brassicaceae (Bennett and Prance 2000) introduced	Used for subsistence. "Here they are bought and sold."	07/21/08 Car Video/formal interview and informal discussion.
Gorrioncillo?			<i>Calandrinia</i> sp?	Medicinal plant?	07/21/08 Car Video/formal interview and informal discussion.
Campanis			<i>Campanula</i> sp.?	"We also have other plants like Campanis, which is also a digestive ... serves for an anti-bacterial."	Mar 07/27/08 Video/Photos/ formal interview and informal discussion. Tour of biodiversity museum.
Rocoto, Roccoto	Piris?		<i>Capsicum pubescens</i> Solanaceae (Egg 2003) (Falconí 2007) Native	"It's like a hot pepper."	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.

Spanish	Quechua	English	Scientific Name Reference	Utilization/Notes/ Direct Quotes	Source/Method
Papaya		Papaya	<i>Carica papaya</i> L. (Egg 2003) Caricaceae	Flower infusion for bronchitis.	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Papaya		Papaya	<i>Carica papaya</i> L. (Egg 2003) Caricaceae	Used for food. "The latex from the green fruit is used to prevent tartar."	07/21/08 Car Video/formal interview and informal discussion.
Quínua, Quínhua,	Quinua	Quinoa	<i>Chenopodium quinoa</i> Chenopodiaceae (Pastor et. al 2006) <i>C. album</i> (Vitto et. al 1998)	Used for subsistence.	07/27/08 Biodiversity Museum
Lima		Lime	<i>Citrus limetta</i> Risso. Rutaceae (Egg 2003) (Bennett and Prance 2000) introduced	Used for subsistence.	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Mandarina		Mandarin	<i>Citrus reticulata</i> Blanco Rutaceae (Egg 2003) (Bennett and Prance 2000) introduced	Used for subsistence.	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Naranja		Orange	<i>Citrus sinensis</i> Rutaceae (Egg 2003) (Bennett and Prance 2000) introduced	Used for subsistence.	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Café		Coffee	<i>Coffea arabica</i> Rubiaceae (Brownrigg 1996) (Bennett and Prance 2000) introduced	"The bud is used in an infusion for a bad heart. "Use as infusion. "Gwié del café."	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Café		Coffee	<i>Coffea arabica</i> Rubiaceae (Brownrigg 1996) (Bennett and Prance 2000) introduced	Used for subsistence.	07/19/08 Els Written answers to questionnaire. Informal discussion.
Café		Coffee	<i>Coffea arabica</i> Rubiaceae (Brownrigg 1996) (Bennett and Prance 2000) introduced	Important resource for commerce. "The bud of coffee is good for the heart. The coffee they take the leaf bud for the heart."	07/21/08 Car Video/formal interview and informal discussion.
Café		Coffee	<i>Coffea arabica</i> Rubiaceae (Brownrigg 1996)	Used for subsistence.	07/01/08 Fer Video/semiformal and formal interview

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Huamanchilca		Incan cherry	<i>Cordia fruticosa?</i>		07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.
Caña caña			<i>Costus acreanus?</i> (Loes.) Convolvulaceae Maas caña agria(b), caña-caña (Alexiades 1999) <i>Lycaste gigantea</i> Lindl. Orchidaceae Caña Caña (Bussmann et al. 2007)	“It is taken too, grated, it is taken and you squeeze it for fever. Used in juice for fever and cuts. It’s like juquito. It is used for the cough and flu. We have to wash with it in hot water.”	07/011/08 Fer Video/semiformal and formal interview.
Zapallo		Giant Squash	<i>Cucurbita maxima</i> Cucurbitaceae (Egg 2003) (Falconí 2007)	Used for subsistence.	07/12/08 Ang Audio/semi-formal interview; handwritten answers.
Piri piri	yahuar piri piri		Cyperus sp. Cyperaceae	Piri piri varieties Most are in the Cypress family There are more than sixty varieties (Ramírez 2008: 44).	07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.
Retama		Scotch Broom	<i>Cystisus scoparius</i> Fabaceae Retama (Falconí et al 2007) Note: Although there are several plants commonly known as “Broom,” the species that I was shown was <i>Cystisus scoparius</i> . <i>Senna reticulata</i> <i>Cashea reticulata</i> Caesalpinaceae (Barros Cáuper 2006) <i>Spartium junceum</i> L. Retama (Bussmann et al. 2007)	“Three “R’s” for good lucki: Retama, Romero, Ruda. It is a repellent and the tea of yellow flower it’s for high-blood pressure.”	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.

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Retama		Scotch Broom	<i>Cystisus scoparius</i> Fabaceae <i>Cystisus scoparius</i> Fabaceae Retama (Falconí et al 2007) Note: Although there are several plants commonly known as "Broom," the species that my informants showed me was <i>Cystisus scoparius</i> .	Three "R's for good luck: Retama, Romero, Ruda.	07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.
Zanahoria		Carrot	<i>Daucus carota</i> Apiaceae (Vitto et. al 1998) (Bennett and Prance 2000) introduced	Used for subsistence.	Car 07/21/08 Video/formal interview and informal discussion.
Zanahoria		Carrot	<i>Daucus carota</i> L. Apiaceae (Vitto et. al 1998) (Bennett and Prance 2000) introduced	Used for subsistence.	07/12/08 Ang Audio/semi-formal interview; handwritten answers.
Runa	Manayupa		<i>Desmodium molliculum</i> (Fournet et al. 1994)	"Take for stomach inflammation as tea. It does not smell strong, it smells smooth. It alleviates the stomach."	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Rata Rata	Pega Pega		<i>Desmodium triflorum?</i> (L.) DC Fabaceae Pega Pega (Bussmann et al. 2007)	"It is also for fever and wounds. You have to rub it and it looks like gum and you massage it on your skin. Yeah, like latex."	07/011/08 Fer Video/semiformal and formal interview
	(name omitted)		<i>Dichaea</i> sp.? (Orchidaceae) #186. carahuaja huasca tuyu ("fish vine bone") Used to clean kidneys, and for bones and inflammation of the ovaries. ... (Laferriere 1994)	"When my leg was wounded, this is the plant that helped to grow the muscle. It contains a sap like aloe."	07/22/08 Car Video/GPS/informal tour near Rio Vilcanota south of Quillabamba.
Chamana		Hopbush	<i>Dodonea viscosa</i> Sapindaceae (Fournet et al. 1994) (Prendergast and Pearman 2001)	Used in cream for traumatology. Used in tea for bronchitis.	07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.

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Cola de caballo			<i>Equisetum arvense</i> <i>E. giganteum</i> Equisetaceae (Bussmann et al. 2007)	Used for medicine, commercial.	07/21/08 Car Video/formal interview and informal discussion.
Nispero, Nispero del Japón			<i>Eriobotrya japonica</i> (Thunb.) Rosaceae (Egg 2003) introduced	Used for subsistence. "The fruit is a yellow color."	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.
Coca		Coca	<i>Erythroxylum coca</i> Erythroxylaceae (Egg 2003) (Bussmann et al. 2007)		07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Coca		Coca	<i>Erythroxylum coca</i> Erythroxylaceae (Burchard 1992; Egg 2003; Bussman and Sharon 2006)	Drought tolerant and sun loving.	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Coca		Coca	<i>Erythroxylum coca</i> Erythroxylaceae (Egg 2003)	"Use as infusion, in bath."	07/19/08 Els Written answers to questionnaire. Informal discussion.
Coca		Coca	<i>Erythroxylum coca</i> Erythroxylaceae (Egg 2003) (Bussmann et al. 2007)	"For example, cocoa, its shell is gathered and dried in the sun, and is burned. The ashes are mixed with water, and you make a ball and it is taken with a little coca leaf. It is very good because it holds to the teeth and prevents tooth decay. But just a little! It has no flavor, but it numbs the mouth. It is made by the people in the country to eat with coca."	07/21/08 Car Video/formal interview and informal discussion.
Coca		Coca	<i>Erythroxylum coca</i> Erythroxylaceae (Egg 2003)	"Coca has always been in my family."	07/27/08 Mar Video/Photos/ formal interview and informal discussion. Tour of biodiversity museum.

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Coca			<i>Erythroxylum coca</i> Erythroxylaceae (Egg 2003)	"The most important thing is coca. It is a very important plant. Thanks to its medicinal properties, spiritual...the medicinal properties, is that it acts as an anti-bacterial, also prevents cavities, strengthens the digestive system, also it prevents premature aging. Therefore we consume a lot here. It is also an energizer. The neighboring families, my parents and grandparents were accustomed and chewed coca to prevent cavities and to have more strength." Invasive. "It is now everywhere and has taken over native plants."	07/27/08 Mar Video/Photos/ formal interview and informal discussion. Tour of biodiversity museum.
Eucalipto		Eucalyptus	<i>Eucalyptus globulus</i> Myrtaceae (Bennett and Prance 2000) introduced		07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.
Eucalipto		Eucalyptus	<i>Eucalyptus globulus</i> Myrtaceae (Bennett and Prance 2000) introduced	Invasive.	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Eucalipto		Eucalyptus	<i>Eucalyptus globulus</i> Myrtaceae (Bennett and Prance 2000) introduced	"Used externally in shower for skin."	07/12/08 Ang Audio/semi- formal interview; handwritten answers.
Frejol de Palo		Legumes, Beans	Fabaceae	At entrance of driveway to organic orchard. Seed is edible member of pea family.	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Legumbres		Legumes, Beans	Fabaceae	Used for subsistence.	07/19/08 Els Written answers to questionnaire. Informal discussion.

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Ojé		Oje tree	<i>Ficus insipida</i> ? Moraceae	Super alimenticia para los niños—produce milk. It helps with lactation. Ojé Merepopa Remove the resin (latex) and mix with three tablespoons of sugar, ¼ bottle of brandy and macerate 3 days. Then make a tbsp fasting for 3 days. (eye) macerate 8 days buried. For desparasitar.	07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.
Matapalo		Ficus	<i>Ficus sp.</i> Moraceae topical poultice (Fournet et al. 1994) (Meerman and Boomsma 1993)	Matapalo Aporocki Resin to remove the plasters. Fractures, blows (Fournet et al. 1994)	07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.
Hinojo		Anis	<i>Foeniculum vulgare</i> L. (Vitto et. al 1998) <i>Phoeniculum vulgare</i> (Falconí et al. 2007) (Bennett and Prance 2000) introduced	Medicinal plant.	07/12/08 Ang Audio/semi- formal interview; handwritten answers.

Spanish	Quechua	English	Scientific Name Reference	Utilization/Notes/ Direct Quotes	Source/Method
	Soliman		<i>Hura crepitans</i> L. Euphorbiaceae (Used for treating Leishmaniasis as poultice) (Fournet et al. 1994)	Speckled leaf used externally for poisonous snake and spider bites. "It is first put into a fire and then on the wound. For the liver it is good and detoxifies. You put fire to it and then on your foot."	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Camote		Sweet potato	<i>Ipomoea batatas</i> L. Convolvulaceae (Egg 2003)	We cultivate a little for food.	07/20/08 Chinche Video/informal interview.
Camote		Sweet potato	<i>Ipomoea batatas</i> L. Convolvulaceae (Egg 2003) (Alexiades 1999)	Used for subsistence.	07/011/08 Fer Video/semiformal and formal interview
Achecoria	Quisqaccana	Lettuce, Poor-man's Opium	<i>Lactuca sativa</i> Asteraceae (Bennett and Prance 2000) introduced	Lactuca juice used for liver. Use lactuca juice in infusion. For the headache as tea. It does everything.	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Lactuca, Lechuga		Lettuce, Poor-man's Opium	<i>Lactuca sativa</i> Asteraceae (Bennett and Prance 2000) introduced	Used for subsistence. Leaves used for salad. Roots only used for sleep.	07/12/08 Ang Audio/semi-formal interview; handwritten answers.
Laurajmana		Lantana	<i>Lantana camara</i> Verbenaceae (Egg 2003)	Take as tea for stomach. It has a strong smell.	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Aldeana	Behuco, Be`ju`co	Liana= Climbing woody vines	<i>Mandevilla trianae</i> Apocynaceae Bejuco (Bussmann et al. 2007) Bejuco de Caballo <i>Petrea volubilis</i> , <i>P. arborea</i> . Verbenaceae (Meerman and Boomsma 1993)	Vine used for strength. "It's a vine to make houses. It has a yellow flower."	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Mango			<i>Mangifera indica</i> L. Anacardiaceae (Egg 2003) (Bennett and Prance 2000) introduced	Used for food.	07/22/08 Car Video/GPS/informal tour near Rio Vilcanota south of Quillabamba.
Yuca		yuca; cassava; manioc	<i>Manihot esculenta</i> Euphorbiaceae (Egg 2003)	Tuber like papa for food	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.

Spanish	Quechua	English	Scientific Name Reference	Utilization/Notes/ Direct Quotes	Source/Method
Yuca			<i>Manihot esculenta</i> Euphorbiaceae (Egg 2003)	Used for food. Mashed into a dough...it is nutritious.	07/21/08 Car Video/formal interview and informal discussion.
Yuca			<i>Manihot esculenta</i> Euphorbiaceae (Egg 2003) (Falconí et. al 2007)	Used for subsistence.	07/011/08 Fer Video/semiformal and formal interview
Manzanilla		Chamomile	<i>Matricaria recutita</i> L. Asteraceae (Vitto et. al 1998) (Bennett and Prance 2000) introduced	Infusion used for cold.	07/12/08 Ang Audio/semi- formal interview; handwritten answers.
Toronjil		Lemon Balm	<i>Melissa officinalis</i> L. Lamiaceae (Vitto et. al 1998) (Falconí 2007) (Bennett and Prance 2000) introduced	Toronjil is very aromatic.	07/12/08 Ang Audio/semi- formal interview; handwritten answers.
Mento		Mint	<i>Mentha</i> spp. Lamiaceae (Bennett and Prance 2000) introduced	Used for subsistence.	07/12/08 Ang Audio/semi- formal interview; handwritten answers.
Yerba Buena, Hierba Buena			<i>Mentha</i> spp. <i>Mentha spicata</i> Lamiaceae (Bennett and Prance 2000) <i>Mentha spicata</i> L. Hierba Buena (Bussmann et al. 2007) introduced	Used in salads.	07/011/08 Fer Video/semiformal and formal interview.
Muña, Muña muña			<i>Minthostachys mollis</i> Lamiaceae (Beltran and Benavente n.d.)	Nice smell, strong	07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.
Muña, Muña muña	Granja kaira?		<i>Minthostachys</i> spp. Lamiaceae <i>Minthostachys andina</i> (Britt.) <i>Satureja boliviana</i> (Benth) Briq (Fournet et al. 1994) <i>Minthostachys mollis</i> Griesbach Muña (Bussmann et al. 2007)	Used for digestive problems. It helps a lot with mountain sickness. [antirheumatism, stomachic insecticide]	Mar 07/27/08 Video/Photos/ formal interview and informal discussion. Tour of biodiversity museum.

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Platano		Plantain	<i>Musa</i> spp. Musaceae (Bennett and Prance 2000) <i>Musa x paradisica</i> L. Beldaco, Platano (Bussmann et al. 2007) introduced	We cultivate a little for food.	07/20/08 Chinche Video/informal interview.
Platano		Plantain	<i>Musa</i> spp. Musaceae (Bennett and Prance 2000) introduced	Used for food. Dried.	07/21/08 Car Video/formal interview and informal discussion.
Oregano		Oregano	<i>Origanum vulgare</i> Lamiaceae (Bennett and Prance 2000) introduced	Used for subsistence.	07/12/08 Ang Audio/semi- formal interview; handwritten answers.
Arroz		Rice	<i>Oryza sativa</i> Poaceae (Bennett and Prance 2000) introduced	Used for subsistence.	07/12/08 Ang Audio/semi- formal interview; handwritten answers.
Arroz		Rice	<i>Oryza sativa</i> Poaceae (Bennett and Prance 2000) introduced	Used for subsistence.	07/20/08 Chinche Video/informal interview.
Granadilla	Maracuyá	Granadilla	<i>Passiflora edulis</i> Passifloraceae (Egg 2003) (Falconí 2007)	“It is like the granadilla. It is used for food and refreshment.”	07/22/08 Car Video/GPS/informal tour near Rio Vilcanota south of Quillabamba.
Granadilla	Maracuyá	Granadilla	Passifloraceae <i>Passiflora edulis</i> Passifloraceae (Egg 2003)	Used for subsistence.	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.
Tumbo Tumbo gigante		Passionflower	<i>Passiflora mollissima</i> (Tumbo, Ucucha) <i>Passiflora mixta</i> (Inca tumbo) Passifloraceae (Egg 2003)	“It’s good for gastric.”	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.
Malva aromatica		Scented Geranium	<i>Pelargonium graveolens</i> L. Geraniaceae (Bennett and Prance 2000) introduced	Drink in tea for stomachache.	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.

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Congona			<i>Peperomia inaequalifolia</i> R. & P. Piperaceae Congona (Bussmann et al. 2007)	It's for earaches. Put in slices in the ear.	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.
Palta	Aguacate	Avacado	<i>Persea americana</i> L. Lauraceae (Barros Cáuper 2006) (Egg 2003)	Used for subsistence.	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Palta	Aguacate	Avacado	<i>Persea americana</i> L. Lauraceae (Barros Cáuper 2006) (Egg 2003)	Used for subsistence.	07/12/08 Ang Audio/semi-formal interview; handwritten answers.
Palta	Aguacate	Avacado	<i>Persea americana</i> L. Lauraceae (Barros Cáuper 2006) (Egg 2003)	"The seed of the avocado is very important. The seed is split in two pits and boiled in water. My mom taught me. You have vaginal washings at the pharmacy...you get vaginal washings. It is very good. She taught me. It is washed twice a day for infection and for a week was washed well with the pit of avocado and aloe. I wash and I am fresh!"	07/21/08 Car Video/formal interview and informal discussion.
Perejil		Parsley	<i>Petroselinium crispum</i> L. Apiaceae (Vitto et al. 1998) (Bennett and Prance 2000) introduced	Used for subsistence.	07/12/08 Ang Audio/semi-formal interview; handwritten answers.
Frijoles	nuña	Beans	<i>Phaseolus vulgaris</i> Fabaceae (Egg 2003) (Falconí 2007)	"We cultivate a little for food."	07/20/08 Chinche Video/informal interview.
Frijoles	nuña	Beans	<i>Phaseolus vulgaris</i> Fabaceae (Egg 2003) (Falconí 2007)	Used for subsistence.	07/21/08 Car Video/formal interview and informal discussion.

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Suelda con suelda			<i>Phthirusa pyrifolia</i> Suelda com suleda (Kunth) Eichler. Loranthaceae. (Barros Cáuper 2006)	Used for fractures.	07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.
Chanca piedra?		Stone breaker	<i>Phyllanthus niruri</i> , <i>Phyllanthus</i> <i>stipulatus</i> (Bussmann et. al. 2007) Euphorbiaceae <i>Phyllanthus niruri</i> (Beltran and Benavente n.d.) <i>Phyllanthus</i> <i>stipulatus</i> (Raf.) Webster chanca piedra blanca(p) sosó ma'yaji, soso shijaja "mal de riñón" (kidney aches) (Alexiades 1999)	Take as infusion. Informant wrote the name, "Chanca Piedra" on photo of Mexía herbarium specimen <i>Peperomia</i> <i>vilcanotana</i> .	07/19/08 Els Written answers to questionnaire. Informal discussion.
Aguaymanto, Ahuarmanto			<i>Physalis</i> <i>peruviana</i> Solanaceae (Egg 2003) (Falconí 2007)	"Use for typical marmalade (yellow color)."	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.
Matico	Moco moco		<i>Piper aduncum</i> Piperaceae (Beltran and Benavente n.d.) <i>P. angustifolium</i> (Falconí et. al 2007)	Matico helps to induce lactation in mothers.	07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.
Matico	Moco Moco		<i>Piper</i> <i>angustifolium</i> (Falconí et al. 2007) Piperaceae	Used for legs and sore muscles.	07/12/08 Ang Audio/semi- formal interview; handwritten answers.
Santa María			<i>Piper peltatum</i> L. sipo-sipo(b), santamaría (Alexiades 1999)	"Used for stomachache."	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.

Spanish	Quechua	English	Scientific Name Reference	Utilization/Notes/ Direct Quotes	Source/Method
Matico	Moco Moco		<i>Piper</i> sp. (Falconí et al. 2007) Piperaceae 	When I asked Jorge about it, he told me that it was called <i>Moco Moco</i> here, but was known as <i>Matico</i> at the coast, and that this particular tree was a special variety from Argentina. He said that the leaves were used for healing wounds externally and that the leaves were used internally as a tea for stomach ulcers and the flu. He said to drink 3-4 cups. He also mentioned that the plants leaves were also used by mountain children to wash themselves.	07/07/08 Jorge
Matico	Moco moco		<i>Piper</i> spp. <i>Piper aduncum</i> , <i>P. angustifolium</i> Piperaceae	“Use for pain in the bones, wash the affected part with matico boiled in hot water.”	07/17/08 Fer 07/011/08 Fer Video/semiformal and formal interview
Matico	Mocco Mocco		<i>Piper</i> spp. <i>Piper aduncum</i> , <i>P. angustifolium</i> Piperaceae	“Medicinal plant that can be used dry or green both the leaves, joint and flower are used for the lungs as an infusion and as a water bath and steam when you have general malaise of the body, exists throughout the valley of La Convención (Quillabamba) throughout the year. Humid [moist] ground, more or less at 1200m.”	07/19/08 Els Written answers to questionnaire. Informal discussion.

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Matico	Moco Moco		<i>Piper</i> spp. <i>Piper aduncum</i> , <i>P. angustifolium</i> Piperaceae	"One of most favorite medicinal plants. Used for fever together with Rata Rata. I had a fever, a headache and my mom grabbed the two plants, the Moco Moco and the Rata Rata, boiled the plants in the pit in the grass field with full sun...and there I took a steam bath head down."	07/21/08 Car Video/formal interview and informal discussion.
	Sacha inchik, Sacha inchi, Inka Inchi		<i>Plukenetia volubilis</i> Euphorbiaceae (Egg 2003) (Falconi et al. 2007)	"It is used as food and for oil. Omega three. Vine with heart shaped leaves."	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Verdulaga, verdolaga		Portulaca	<i>Portulaca oleracea</i> L. Potulacaceae (Vitto et al. 1998) (Bennett and Prance 2000)	Photo from Mexia collection. "It is medicinal. There are many."	07/21/08 Car Video/formal interview and informal discussion.
Lúcuma			introduced <i>Pouteria lucuma</i> Sapotaceae (Egg 2003) (NRC2005)	Fruit used for subsistence.	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.
Rata Rata	Pega Pega		<i>Priva lappulacea</i> Verbenaceae (Meerman and Boomsma 1993)	"The inner bark is used as mucilage to heal wounds. It is good for the hair and is better than any shampoo. The bud and flower is taken as tea for the stomach to treat indigestion and gastrointestinal problems."	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Algarrobo		Carob	<i>Prosopis chilensis</i> (Molina)Stunz.), <i>P. alba</i> , <i>P. pallida</i> Mimosaceae Native, wild and cultivated in Peru. (Egg 2003)	"Used for cooking, for heat, for building when larger. Very strong wood lasts many years. Can live to be two hundred years old." Drought tolerant. "For vigor and wood. On the beach there was pure algarrobo. It does not rot."	07/11/08 Ric Video/semiformal interview and informal tour of farm.

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Algarrobo			<i>Prosopis</i> spp.	Important resource pharmaceutical medicine.	07/21/08 Car Video/formal interview and informal discussion.
Guayaba	Sahuento		<i>Psidium guajava</i> L. Myrtaceae (Egg 2003)	“Leaves used in mate for diarrhea. Fruit used for food in April/May when ripe (yellow color).”	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Arrayan, Arrayan de Atiquipa?, see Saucó?			<i>Psidium sartorianum</i> (Hernandez et al. 2004) Or <i>Luma</i> sp. Arrayan de Atiquipa <i>Myrcanthes ferrryae</i> (Egg 2003)	“In the country the people put it on people when they die and use it in a bath for children.”	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.
Helecho		Fern	<i>Pteridium caudatum</i> Polypodiaceae (Meerman and Boomsma 1993)	“For any swelling, it does not cure any illness, just the swelling; shower the affected areas with hot water using the boiling milk.”	7/17/08 Fer Photo/written notes.
Rosa		Rose	<i>Rosa</i> sp. L. Rosaceae (Vitto et al. 1998) <i>Rosa gallica</i> (Bennett and Prance 2000) introduced	“Flowers are used for food.”	07/011/08 Fer (wife) Video/semiformal and formal interview.
Romero		Rosemary	<i>Rosmarinus officinalis</i> L. Lamiaceae (Vitto et al. 1998) (Falconí et al. 2007) (Bennett and Prance 2000) introduced	“Three “R”s for good lucki : Retama, Romero, Ruda.”	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.
Romero		Rosemary	<i>Rosmarinus officinalis</i> L. Lamiaceae (Vitto et al. 1998) (Bennett and Prance 2000) introduced	Retama, Romero, Ruda: three R’s for luck.	07/02/08 Juan Audio/ Photos/, participant observation (treatment), informal interview and discussion.
Ruda		Rue	<i>Ruta graveolens</i> Rutaceae (Barros Cáuper 2006) (Falconí 2007) (Bennett and Prance 2000) introduced	“Used for headache, nausea, put in fire then smell and take through body (external).”	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.

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Ruda		Rue	<i>Ruta graveolens</i> Rutaceae (Barros Cáuper 2006) (Bennett and Prance 2000) introduced	Juan does not use Ruda in his healing. He mentions that it is associated with both good and bad luck, but that it can pick up on negative energy and bring bad luck.	07/02/08 Juan Audio/ Photos/, participant observation (treatment), informal interview and discussion.
Ruda		Rue	<i>Ruta graveolens</i> Rutaceae (Barros Cáuper 2006) (Bennett and Prance 2000) introduced	Used externally.	07/12/08 Ang Audio/semi-formal interview; handwritten answers
Caña de azúcar		Sugar cane	<i>Saccharum officinarum</i> (Bennett and Prance 2000) introduced	Used for subsistence.	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Caña de azúcar		Sugar cane	<i>Saccharum officinarum</i> (Bennett and Prance 2000) introduced	Used for subsistence.	07/12/08 Ang Audio/semi-formal interview; handwritten answers.
Salvia; Salvia grande		Sage	<i>Salvia</i> spp. L. Lamiaceae (Vitto et. al 1998) <i>Satureja boliviana</i> (Benth) Briq (Fournet et al. 1994)	Used for medicine. Used in tea and as poultice.	07/12/08 Ang Audio/semi-formal interview; handwritten answers.
Sauco, Sauco peruano, Arrayan		Elderberry	<i>Sambucus peruviana</i> Caprifoliaceae (Egg 2003) (Pastor 2006) Native	For typical marmalade.	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.
Molle			<i>Schinus molle</i> Anacardiaceae (Egg 2003) Native	“Used for rheumatism—put in alcohol then on body.”	06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.
Molle			<i>Schinus molle</i> Anacardiaceae (Egg 2003) (Falconí et. al 2007) Native	Important medicinal plant.	07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.
Maicha			<i>Senecio clivicola</i> Wedd. Asteraceae (Fournet et al. 1994)	Used in tea to treat diarrhea.	07/02/08 Juan Audio/ Photos/ participant observation (treatment), informal interview and discussion.

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Llaccón, Jacón, Yacón			<i>Smallanthus sonchifolius</i> (Egg 2003) <i>Polymnia sonchifolia</i> Asteraceae (NRC 2005)	"The tuber is used for gastritis and subsistence."	07/12/08 Ang Audio/semi-formal interview; handwritten answers.
Papas		Potatoes	<i>Solanum tuberosum</i> L. Solanaceae (Vitto et al. 1998)	Used for subsistence.	07/12/08 Ang Audio/semi-formal interview; handwritten answers.
Papas		Potatoes	<i>Solanum</i> spp. <i>Solanum tuberosum</i> L. Solanaceae (Vitto et al. 1998)	"We cultivate a little for food."	07/20/08 Chinche Video/informal interview.
Papas		Potatoes	<i>Solanum</i> spp. <i>Solanum tuberosum</i> L. Solanaceae (Vitto et al. 1998)	Used for subsistence. "Here they are bought and sold."	07/21/08 Car Video/formal interview and informal discussion.
Papas		Potatoes	<i>Solanum</i> spp. <i>Solanum tuberosum</i> L. Solanaceae (Vitto et al. 1998)	Used for subsistence.	07/011/08 Fer Video/semiformal and formal interview.
Santa Maria			<i>Solanum</i> spp. <i>Tanacetum parthenium</i> Santa María (Falconí et. al 2007) (Bennett and Prance 2000) introduced	"Used externally in shower for skin."	07/12/08 Ang Audio/semi-formal interview; handwritten answers.
Cacao		Cocoa	<i>Theobroma cacao</i> L. Sterculiaceae (Egg 2003) (Falconí 2007)	Used for subsistence. Fruit, leaves.	07/06/08 Mig Photo/informal discussion and tour of organic orchard near Echarate, Peru.
Cacao		Cocoa	<i>Theobroma cacao</i> L. Sterculiaceae (Egg 2003) (Falconí 2007)	Used for subsistence.	07/19/08 Els Written answers to questionnaire. Informal discussion.
Cacao		Cocoa	<i>Theobroma cacao</i> L. Sterculiaceae (Egg 2003) (Falconí 2007)	Used for subsistence. "Seeds laid out in sun to dry."	07/011/08 Fer Video/semiformal and formal interview

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Cacao		Cocoa	<i>Theobroma cacao</i> L. Sterculiaceae (Egg 2003) (Falconí 2007)	Used for subsistence. “Important resource for commerce. Its shell is gathered and dried in the sun and it is burned. The ashes are mixed with water, and you make a ball and it is taken with a little coca leaf. It is very good because it holds to the teeth and prevents tooth decay. But just a little! It has no flavor, but it numbs the mouth. It is made by the people in the country to eat with coca.”	07/21/08 Car Video/formal interview and informal discussion.
Trebol plant Trebol rosado		Clover Red clover	<i>Trifolium glomeratum</i> ; <i>T. pratense</i> <i>Trifolium repens</i> L. (Trebol de Agua) Fabaceae (Bussmann et al. 2007)		06/28/08 Sher Photo/informal discussion and observation notes of Saturday market in Cusco, Peru.
Palo Santo			<i>Triplaris setosa</i> Rusby (Fournet et al. 1994) Polygonaceae <i>Triplaris poeppigiana</i> Wedd. palo santo (Alexiades 1999) Burseraceae <i>Bursera graveolens</i> (H.B.K.) Triana & Planchon Palo Santo (Bussman et al. 2007)	“It makes you hot. When you drink this you’ll be very hot for sex. Only for boys. You take it like tea, the bark.”	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Machua, Mashua			<i>Tropaeolum tuberosum</i> Tropaeolaceae (Egg 2003) (NRC 2005)	“It is a bit of potato that is used as an aphrodisiac. It helps with inflammation of the prostate, but only for boys.”	Mar 07/27/08 Video/Photos/ formal interview and informal discussion. Tour of biodiversity museum.
Ulluco			<i>Ullucus tuberosus</i> Basellaceae (Flores et al. 2003)	Used for subsistence.	07/27/08 Biodiversity Museum

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Vervena (rata rata?)		Verbena	<i>Verbena littoralis</i> Verbenaceae (Falconi et al. 2007)	"For the liver. It is very good. You crush it and take it in juice. For detoxification."	07/11/08 Ric Video/semiformal interview and informal tour of farm.
Chancho Chancho blanco		White yemeri	<i>Vochysia guatemalensis</i> chancho Note: also an animal cariblanco Tayassu pecari	"When you eat this, it does not have much grease. It has more protein than grease."	07/22/08 Car Video/GPS/informal tour near Rio Vilcanota south of Quillabamba.
Unchuca	uncucha	Ucuncha	<i>Xanthosoma sagittifolium</i> (L.) Schott Araceae (Egg 2003) (Bermejo 1994)	"It is like yucca for eating. It is more expensive than potato. Around here [Quillabamba] it grows normally. This way it is near what they sow."	07/01/08 Fer Video/semiformal and formal interview.
Caña del Inca		Corn stalk	<i>Zea mays</i> Poaceae (Egg 2003)	It is a plant that is obtained from the corn. It is the trunk of the corn. It is special because when we travel to the countryside, if we do not take water, we drink from the trunk for our thirst. It is important.	Mar 07/27/08 Video/Photos/ formal interview and informal discussion. Tour of biodiversity museum.
Choclo		Corn (fresh not dried)	<i>Zea mays</i> Poaceae (Egg 2003)	"When it is dry it is maiz, when it is the plant it is choclo." Used for subsistence.	07/01/08 Fer Video/semiformal and formal interview
Maíz		Corn	<i>Zea mays</i> Poaceae (Egg 2003)	Used for subsistence.	07/12/08 Ang Audio/semi-formal interview; handwritten answers.
Maíz		Corn	<i>Zea mays</i> Poaceae (Egg 2003)	We cultivate a little for food.	07/20/08 Chinche Video/informal interview.