CATTLE-BASED LIVELIHOODS AND THE BEAR “PROBLEM”

IN NORTHERN ECUADOR

A Thesis in
Geography and Women’s Studies

by

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ABSTRACT

This project investigates cattle-based livelihoods in the northern Ecuadorian Andes in the context of increasing reports of Andean bear attacks on cattle since 2009. This qualitative study describes how, over the past two decades, raising cattle became an important livelihood strategy in Pimampiro, Ecuador, and contextualizes bears as one of many threats to livelihoods. Two months of interview-based research in 2012 grounded in the feminist theory of situated knowledges inform this thesis, which highlights the perspectives of people living and working in the region. Interviews with smallholding farmers and ranchers reveal a new reliance on cattle. The dairy economy organizes cattle-raising in the region, and brings rewards such as steady income, as well as new risks including the threat of bear attacks. Dairy also provides a viable livelihood for those remaining in the countryside following five decades of rural outmigration. These farmers and ranchers remain committed to living in the countryside for reasons related to preference and socioeconomic structure. This case study shows that the confluence of the challenges of making a living in rural spaces, the risks of raising cattle, the encroachment on bear habitat, and the frustration with government policies have created a context in which bears have become a “problem.” It also suggests that the threat of bears is produced by a variety of decisions regarding livelihoods and illustrates how regional economic processes of migration and dairy production influence human-wildlife relations on the agricultural frontier. This work contributes to scholarship on livelihoods, the new rurality, human-wildlife relations, and feminist approaches to research in political ecology.
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Chapter 1: Introduction and Literature Review

Motivation for study

A specific human-wildlife interaction motivated this project, which investigates cattle-based livelihoods in the northern Ecuadorian Andes in the context of increasing reports of Andean bear attacks on cattle since 2009 (see Figure 1). These incidents and subsequent threats of Andean bear poaching have been largely understudied (Laguna 2011). Andean bears are vulnerable to extinction due to habitat loss and fragmentation, poaching, and lack of knowledge about their distribution and status (Goldstein et al. 2008). They are also currently protected under Ecuadorian law (Castellanos et al. 2010, 3). An April 2013 online feature from *Smithsonian Magazine* tells one version of the story of the bear attacks on cattle: In November 2009, one “problem bear,” to use the term from conservation biology, developed a taste for beef after discovering two bulls that had tumbled from their pasture into a gully at the base of a ravine (Bland 2013). As of March 2013, 261 bear attacks on livestock had been reported in the region (Laguna 2013). In turn, cattle owners no longer view bears as benign and in some cases, their anger has led to the killing of bears as well as failed hunting attempts. Over the past several decades, habitat loss and fragmentation from agriculture and raising cattle has isolated bears and pushed them against the agricultural frontier. Shifting land use on the agricultural frontier and dynamic changes in the forest influence relationships among people, cattle, and bears in the larger landscape along the eastern range (cordillera) of the Andes.

The Andean Bear Foundation (ABF), an Ecuadorian-run NGO, is the primary group studying Andean bears in Ecuador. However, due to lack of funding, neither the ABF nor the Ecuadorian Ministry of Environment have been able to complete a study on the issue or address it in a systematic way (Castellanos, Laguna, and Clifford 2011). Both the ABF and residents in the region lament the lack of government attention, intervention, and commitment to addressing their complementary conservation and
The cantón of Pimampiro, Ecuador and its capital of the same name are located in the northern Ecuadorian Andes and abut the ecological reserve Cayambe-Coca. An increasing number of Andean bear attacks on cattle has occurred in the northern Ecuadorian Andes since 2009 (yellow dots).


Map by Paulo J. Raposo.

livelihood concerns. Providing a complementary critical social science perspective to the existing conservation biology framing of the human-bear “problem” is the principal open-ended goal of this study. Within this context, this research began with two open-ended questions:

(1) How has raising cattle become a form of livelihood in the northern Ecuadorian Andes?

(2) How have the indigenous Andean bears come to represent a threat in this landscape?
This thesis is primarily about dairy production, one increasingly important way of making a living in Pimampiro, Ecuador, the study site in the northern Ecuadorian Andes, and how the expansion of dairy production and land used for pasture intersects with forest dynamics on the agricultural frontier. The thesis demonstrates that Andean bears are one of many threats to cattle-based livelihoods in the context of shifting land use and migration.

Overview

This thesis is divided into five chapters. Chapter 1, “Introduction and Literature Review,” lays out the motivation for the project and the study site and context, and reviews the relevant literature on the livelihoods and new rurality approaches for understanding how people make a living in rural places, and on dairy production in the Andes and human-wildlife interactions on the agricultural frontier. It also indicates intersections with geographical scholarship on human-wildlife interactions, livestock economies, and political ecology. Following this introduction, Chapter 2, “Feminist Methodology and Methods,” explains my methodological framework grounded in feminist theory. This chapter discusses the concept of situated knowledges, which approaches knowledge as a product of a specific context and a person’s particular social location. This study focuses on the knowledge of smallholding farmers in the northern Ecuadorian Andes. This chapter also details the specific methods used. Chapter 3, “Rewards and Risks of Cattle-Based Livelihoods,” draws on interview data to describe the shift to increased reliance on cattle-based livelihoods, the organization of the dairy economy, and the landscape of risks threatening these livelihoods. Despite the challenges, however, cattle-based livelihoods have a logic of economic viability, especially when compared with growing crops. Next, Chapter 4, “Commitment to the Countryside,” delves further into the role of migration, which plays a role the shift to cattle-based livelihoods, and the relationship between two populations living on the agricultural frontier: people remaining in the countryside following five decades of rural outmigration and Andean bears. Dairy production allows those who remain “committed to the countryside” to pursue viable livelihoods. Finally,
Chapter 5, “Conclusions,” returns to the initial research questions, considers how uncertainty, situated knowledges, and positionality influence how bears have come to be perceived as a “problem,” and implications for policy and opportunities for further research.

Study site and context

**Pimampiro, Ecuador**

This research is based on two months of intensive fieldwork in the rural zone of the *cantón* (similar to a county) of Pimampiro, Imbabura, Ecuador, chosen for the frequency and intensity of Andean bear attacks on cattle there as well as favorable research logistics. The *cantón* Pimampiro is located on the eastern range (*cordillera*) of the Ecuadorian Andes about 100 road miles (4-5 hours by bus) and 60 miles as the crow flies from the capital city, Quito, sixty miles south of the Ecuador-Colombian border, and immediately to the north of the million-acre Cayambe-Coca Ecological Reserve (see Figure 1, Figure 2).

**Figure 2. View of cantón Pimampiro from Pan-American Highway.**

Photo by author.
The region is topographically, climatically, culturally, and economically diverse. Altitudes range from 1,600 to 4,000 meters above sea level, engendering four distinct vegetation types: lowland evergreen montane forest, cloud forest, high evergreen montane forest, and páramo (Echavarria 2004). Rainfall can vary as widely as less than 500mm per year in the urban center to 1300mm per year, within 7 km (Preston 1995, 549). Such significant variation in rainfall, temperature, and soil ecology influences the diversity of crops, which range from avocados and sugarcane at lower elevations to potatoes and broad beans at higher elevations.

The town of Pimampiro has a long history as a commercial crossroads with tens of thousands of people living in the area in pre-Columbian times (Sarmiento and Frolich 2002, 285; Sarmiento 2002, 226). “Pimampiro” is the name of the canton, one of the four parishes in the canton, and the capital of the canton. Throughout this thesis unless otherwise specified, Pimampiro refers to the capital, which is a town of about 5,000 people or 40% of the population of the canton (INEC 2010). About 12,900 people live in the canton’s four parishes with a little over 30% living in the three rural parishes (INEC 2010). In the past century, people cleared forest east and south of the town of Pimampiro and settled the rural parishes in two waves. First, indigenous people from elsewhere in the province came to the area in the early 1900s and settled in Mariano Acosta, the parish now known for being most indigenous and for its unified and oppositional political structure. Second, mestizo residents from the town of Pimampiro and from the provinces of Carchi, Ecuador and Nariño, Colombia colonized the other parishes in the 1930s (Preston 1995, 550; interviews). Most came as economic migrants in search of arable land, and fertile forest soil yielded good harvests.

1 In this study, *indigenous* and *mestizo* are used as people self-identify in Ecuador, with indigenous generally referring to “Indians” and mestizo to people of mixed colonial Spanish and Indian descent. However, this is an overly simplistic explanation and the social construction of race in Ecuador is far too complex to detail here. In her excellent ethnography on assisted reproduction in contemporary Ecuador, Roberts (2012, 116-125) provides a nuanced treatment of how *raza* functions in Ecuador and compares it with *race* in the US. The *cantón* of Pimampiro is currently primarily mestizo (77% mestizo, 14% indigenous, 4% Afro-Ecuadorian). This study was conducted in a predominantly mestizo parish and does not seek to make any specific statements or conclusions with regards to commonalities and differences between indigenous and mestizo populations. Further research (see Chapter 5) might seek understanding of cattle-raising and relationships with bears in the more predominantly indigenous parish.
According to David Preston's (1990; 1995) accounts, by the middle of the 1950s, widespread agricultural expansion had already taken place, leaving only high valley sides available to clear for new farmland. Between the 1950s and the 1980s, much of the best land, especially close to town, became used for intensive crops such as tomatoes rather than single annual crops like barley. Closer to town, changes in landholding patterns promoted the growth of a bourgeois middle class. However, longstanding smallholders on steeply sloping, marginal lands in the wetter surrounding areas were not upwardly mobile like the new middle class, and remained poorer than their urban counterparts. Whereas the urban center grew in size, people were outmigrating from the rural areas as early as the 1960s and the overall population of the parish decreased between 1960 and 1990 and continued to do so between 1990 and 2010 (INEC 2010). During this time, Preston (1995, 37) remarked, a “major geographical contrast” developed “between the stagnant social environment with an aging population farming impoverished hillsides in the periphery and the younger, more dynamic population, with access to a widening range of services, engaged in trade or farming that is evidently profitable in the town and everywhere within thirty minutes walk from it.” In these rural areas, moreover, Preston (1995, 35) noted a change “less-striking” than the land-use changes around town: “More land is now used as pasture for livestock rather than for field crops. This represents a less labour-intensive land use, appropriate in an area with such a high rate of population decrease.” This study focuses on those more marginal lands, the people making a living off that land, and the continuing trend to increased pasture-based production.

**Andean context**

Pimampiro’s location in the Ecuadorian Andes, or Sierra region of the country, warrants considering both what it means to be Andean and what it means to be Ecuadorian. The Andes is the world’s highest mountain range outside of Asia with an average height of 4,000 meters (13,000 feet) and is physically and socially diverse; as anthropologist Ben Orlove (1985, 46) wrote: “It is difficult to generalize about the Andes. The diversity comes in part from the geography. The Andes, a mountain chain of great length and often considerable breadth, extend into several climatic zones which,
superimposed on the variations in elevation, soils, and presence of mineral deposits, create many distinct economic possibilities.” As such, despite great climatic and topographical diversity, the Andean region of Colombia, just sixty miles from the study site, in many ways shares more in common in terms of culture and economy than the Ecuadorian Andes and the Ecuadorian coast. This is significant for this study because Andean bears traverse national borders. Situating this study as Andean highlights the relevance of the insights for similar human-wildlife concerns taking place in Colombia (Torres 2008) and Argentina (Lucherini and Merino 2008), for example. Moreover, the Andean context connects this study to transitions to dairy production elsewhere in the Andes (see Chapter 1). In Latin America, cattle economies in the Andes have received relatively less scholarly attention compared with those in coastal lowlands or in rainforests (e.g. Hecht 1993; Walker et al. 2009; Pacheco and Poccard-Chapuis 2012).

**Ecuadorian context**

The national context of Ecuador also merits consideration, given its specific history of the hacienda system and land reform, political instability and macroeconomic crisis, and contemporary political radicalization and increased environmental management. The hacienda or *huasipungo* system of land-labor exchange defined rural life in Ecuador from the mid-1500s until agrarian reform in 1964 and impacts of this system, its dismantling, and subsequent effects on rural life are still felt widely throughout the Andean highlands, or Sierra region. According to anthropologist Barry Lyons, much of the historical memory about hacienda life is lost, but the effects of this structural system continue to shape agrarian life in Ecuador today in terms of social stratification and land tenure (Lyons 2006). Land reform in 1964 led to abolishing the *huasipungo* system, but not to effective redistribution of land or income, and in the 1970s, agricultural production in the rural Sierra stagnated (Peek 1980). The 1970s also were a time of a massive inflow of income from oil. Because the central bank fixed the exchange rate and over-valued the currency, imports were artificially cheap for urban consumers and relatively expensive for farmers (Southgate, Bravo-Ureta, and Whitaker 2005, 256). From the 1950s through the 1970s, the country urbanized rapidly; in 1950 only 20% of the population lived in “places with more than 20,000 persons,”
but by 1982, almost 50% lived in such places (Rudel and Richards 1990, 77). Economic and political crises defined the 1980s and 1990s in the wake of structural adjustment and neoliberal reforms (Lind 2005, 3-4), and macroeconomic crisis led to Ecuador’s adoption of the US dollar as its official currency in 2000 (“dollarization”). These shifts in agricultural structures and monetary policies continue to affect rural life in terms of settlement patterns, circulation and migration, and livelihood strategies.

Politically, a “turn to the left” and increased stability characterizes present-day Ecuador. President Rafael Correa entered office in 2007 and since then has promoted his “Citizen’s Revolution” and economic development based on the indigenous concept of living well. The country adopted a new Constitution in 2008, which emphasizes the role of the welfare state. Improved state functionality has meant expanded social services, though the extent to which this represents a radical rupture with development based on economic growth remains contested (Escobar 2010; Walsh 2010; Radcliffe 2012). The new Constitution also grants rights to nature, making Ecuador the first country to do so, though many raise doubts regarding the implementation and enforcement of those rights (Whittemore 2011). The changes in laws and also in government organization have led to updating and increased enforcement of environmental laws. Both the changes in social spending between 2007 and 2012 and increased environmental law enforcement have affected how Ecuadorians view the government and their relationships with government agencies such as the Ministry of Agriculture, Livestock, Aquaculture, and Fisheries (MAGAP) and the Ministry of Environment (MAE). These institutions play a role in relationships among humans, cattle, and bears, whether through their presence or noticed absence.

**Literature review**

This study contributes to three sets of literatures, each of which intersects with the geographical scholarship as well as other disciplines such as rural sociology, agrarian studies, and conservation biology. First, this research examines one particular rural livelihood development, the transition from crops to dairy production in the study region. This study shows that cattle-based livelihoods incorporate
elements of the “new rurality,” or rural spaces that are not agrarian, though they are not emblematic “new rurality” livelihoods. Second, this research adds to the empirical literature on dairy production in the Andes, which is a growing sector about which little has been written thus far. Third, it adds nuance to understandings of human-wildlife interactions on the dynamic agricultural frontier between field and forest. The following review addresses each of these areas in turn.

**Livelihoods approach**

Livelihoods are understood as the basis for people making a living, and the concept continues to be used in development studies, political ecology, and conservation science (King 2011). In their influential paper, Robert Chambers and Gordon Conway (1992, 6) defined a livelihood as encompassing the “capabilities, assets, and activities required for a means of living.” Drawing on Amartya Sen’s work, they described capabilities as an ability to pursue livelihood opportunities and cope with stresses and shocks. Assets include tangible resources and stores, for example food stocks or savings, and intangible claims and access, such as social network norms. Ian Scoones (1998) and Anthony Bebbington (1999) further developed the idea of assets into categories of assets or capitals: natural, economic, human, social, and physical. This “asset pentagon” later fell out of favor for its checklist-like nature, though some researchers continue to use the model (Scoones 2009, 178). Activities are what people actually do, and how they draw on those capabilities and assets in order to make a living, and to do so meaningfully (Bebbington 1999). Scholarship and practice in rural development adopted livelihood frameworks to analyze issues as varied as forest use, agriculture, and urban development. Those employing the livelihoods approach sought to reach development economists on their terms and to connect economic concepts of assets and employment to larger concerns about well-being and sustainability (Scoones 2009).

In the geographical literature on livelihoods and development, Bebbington’s (2000) paper on livelihood transitions in the Andes has particular relevance for this study. He explored how in development studies, both the post-structural critique, with its focus on discourse, and the neoliberal interpretation, with its focus on “viability,” are insufficient for understanding transformations in highland
Ecuador. Economists and populists there promoted supporting peasant migration to the city and into nonfarm jobs in favor of reviving the “nonviable” and “uncompetitive and inefficient campesino sector” (499, 516 n14). However, in the three places he studied, Quichua people turned to “economically viable livelihood strategies that, while neither agricultural nor necessarily rural, allow people to sustain a link with rural places” (495). Many who migrated built houses in their home communities to sustain cultural links, and in some cases migration supported subsistence agriculture there in order to maintain a sense of identity, despite the lack of economic “logic.” I argue that cattle-based livelihoods in Pimampiro offer a third option, in which people turn from subsistence agriculture to another land-based livelihood, and also avoid migration. This study’s similar approach to livelihoods first and foremost grounds the findings in people’s choices (agency) and experiences in the larger regional environmental and economic context (structure). Chapter 3 explains how raising cattle has emerged as a “viable” agrarian livelihood. Chapter 4 then shows how raising cattle not only “guarantee[s] the material basis” of their livelihoods but also allows people to “build something of their own” (Bebbington 2000, 500). This study also demonstrates how such an approach is also helpful not only when considering indigenous populations but also mestizo residents in the rural highlands.

Despite the conceptual usefulness of livelihoods as a lens for analysis, several scholars have raised questions regarding its limits. In his critique, Scoones (2009) applauds the livelihoods approach for its focus on the real world and actual people, as well as for its cross-disciplinary appeal. Yet he explains that perspective is not as widely used as it was in the late 1990s, due to four major failings: insufficient attention to economic globalization, politics and governance, climate change, and “long-term shifts in rural economies and wider questions about agrarian change” (Scoones 2009, 181-182). In short, livelihood analyses did not adequately engage with wider social and institutional dimensions.

To address these concerns, researchers such as Edward Carr (2013) have sought to use modified or theoretically innovative livelihoods approaches. In his analysis of livelihoods in Ghana’s Central Region, Carr illustrates how moving beyond the instrumental livelihoods approach focused on the
management of material assets can reveal the role of noneconomic factors such as cultural dynamics. He points out that perceived “inefficiencies” in household economics may not be the result of issues best described in economic language, such as failed bargaining. Rather, sometimes “inefficient” livelihood choices serve noneconomic purposes. In Carr’s study, men limited their wives’ income from their agricultural plots and their non-farm employment because they felt threatened by their wives’ financial autonomy, especially in the extremely patriarchal context. In this case, Carr argues, the “social goal” of men preserving their social positions of authority in the household “trump[s] material factors in livelihoods decision-making” (78). My analysis of cattle-based livelihoods in the Andes shows that these livelihoods not only meet material needs (Chapter 3), but also allow people to remain in the countryside and make a living meaningfully (Chapter 4).

Brian King (2011) also engages with power and politics and argues for incorporating geographical and spatial analysis in livelihoods research. Drawing on a case study from South Africa, King demonstrates that the country’s history of colonial and apartheid spatial policies of racial segregation and contemporary conservation have shaped access to natural resources and clusters of households pursuing different livelihoods. He contends that careful attention to space yields additional detail about livelihood diversification, differences within communities, and the role of both structure and agency in affecting decision making and, consequently, the impacts of livelihood choices on social and environmental systems. This study also incorporates an explicit spatial component to understanding livelihoods and their effects on environmental systems in three ways. First, spatial conditions preexisting (e.g. steep slopes) and produced (e.g. road networks) shape dairy livelihoods in the study region (Chapter 3). Second, cultural conceptions of rural and urban spaces, their characteristics, and circulation of people and products across these spaces shape rural outmigration and the livelihoods of those remaining committed to the countryside (Chapter 4). Third, these livelihoods, in turn, affect the complex relationships among humans, bears, and cattle along the agricultural frontier (Chapter 5).
New rurality approach

Whereas the livelihoods approach developed in Europe and the US, the new rurality approach has its origins in Latin America. Most new rurality scholarship highlights the diversification of rural activities (i.e. livelihood practices) and the role of market integration to show how neoliberal globalization since the 1980s has transformed rural life and spaces such that they are not defined by land-based production or agricultural commodities. The new ruralists emphasize four major transformations in rural economy and society in terms of increases in: 1) rural non-farm activities; 2) flexibilization and feminization of rural work; 3) rural-urban interactions; and 4) the importance of migration (Kay 2008). All four of these elements are present in Pimampiro. This study in particular highlights the latter two and moreover, demonstrates how they specifically link to on-farm activities, that is, the persistence of land-based livelihoods. New rurality scholarship shares much topically with the livelihoods literature, including work on off-farm livelihoods (Reardon et al. 2007; Haggblade, Hazell, and Reardon 2009).

In his retrospective on the new rurality approach, Cristobal Kay (2008) raises critiques similar to Scoones’ (2009) critiques of the livelihoods approach: an absence of analysis of class and political forces. Despite Kay’s concern about a lack of class-based analysis, some new rurality scholarship explicitly locates itself in a longer history of work in political economy (connected with sociology), in contrast to the connection between livelihoods analyses and mainstream economics (connected with development). Attention to what macro-analyses missed in the past reveals that some of what new ruralists highlight is not necessarily new in terms of people’s lives but rather newly highlighted in the scholarly literature, such as rural households holding multiple on- and off-farm jobs (pluriactivity). On the other hand, rural spaces have been increasingly performing new social functions in addition to food production, such as tourism, thus rupturing the link between the rural and the agrarian (Romero 2012). This study takes these critiques

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2 Considering the diffuse scholarship related to the “new rurality,” which has not proliferated in English in the same way as the livelihoods literature, is in part my attempt to address Sundberg’s (2005, 24) critique that geographers conducting research in Latin America tend to work very little with scholarship from the region. For this reason I also bring in this literature, though it is more centered in rural sociology. In geography, authors such as Hecht (2010) and Yarnall and Price (2010) use the term “new rurality” without fully developing the idea of “newness.”
into account, and demonstrates that class relations and political forces such as market integration and monetary policy (dollarization) shape livelihoods in rural spaces. Moreover, livelihood transitions and subsequent rewards and risks to those livelihoods are unevenly distributed within the class of smallholding farmers (Chapter 3). Cattle-based livelihoods also perform social functions, or an “exit from the problems arising from post-fordist modernity, like stress, restlessness, lack of solidarity, poor nutrition” and, at a greater level, “environmental problems, pollution, noise pollution, traffic” (Romero 2012, 24), as people avoid migration (Chapter 4).

**Dairy production in the Andes**

Dairy production is important to contemporary rural livelihoods in Pimampiro and the rural spaces they produce. This section reviews the transitions to dairy production in highland Ecuador, similar transitions in the Andean region, and the specific role of migration and gendered division of labor in that transition. Figure 1 provides additional orientation to the case studies referred to in the next three subsections.

**Transitions in highland Ecuador**

Dairy production across highland Ecuador has increased since the 1970s with regional variation. Smallholder production in particular has increased. Writing in the late 1950s before agrarian reform, E.V. Miller (1959, 203) did not relate any information about smallholder dairy operations and instead emphasized the larger haciendas of the warmer inter-Andean basins, in which “a man of means counts himself well off” with a dairy farm that would “provide both income and a country vacation place.” He noted: “Dairying benefits an equatorial country such as Ecuador, which might otherwise remain largely dependent on imported powdered milk for its nutritional needs.” However, rapid urbanization in the 1940s and 1950s had already begun to stimulate domestic urban markets and land reform may merely have accelerated processes already underway (Commander and Peek 1986, 81). Milk prices were first fixed in 1982 (Park 1985) and the combination of petrodollars and subsidies led to drops in wheat
production and rising concentration on dairy (Byerlee 1989). The Development Bank of Ecuador (Banco del Fomento, and still a major force) also provided long-term low-interest loans (Lehmann 1986). Dairy production increased especially on medium and large farms (Lehmann 1986; Commander and Peek 1986, 82). In Carchi province in the 1980s, for instance, “in the place of labour-intensive, high-risk, potato production, the more prosperous ‘middling farmers’” were “turning toward the much less risky and less labour-intensive business of specialized dairy farming” (Lehmann 1986, 336). As agricultural enterprises serving urban consumers grew, production of crops like wheat and potatoes for household consumption declined (Rudel and Richards 1990, 77). Currently, the Sierra (Andean highlands) produces 70% of the country’s milk (Contero 2008). Moreover, many smallholders have also turned to dairy production, as documented in this study.

James Keese (1998, 457) calls this transition to dairy production continuing into the 1990s and 2000s the “most significant change” in agricultural production in highland Ecuador. Keese’s (1998) study in the 1990s documented the shift from traditional grains and tubers in Cañar in the southern Andes, especially on holdings larger than 10 hectares. Also in Cañar, Matthew Himley (2009, 837) noted that farmers demonstrated “increasing reliance on dairy ranching” following agrarian reform. Likewise, Brad Jokisch and Bridget Lair (2002, 241) found that Cañar province “witnessed a 151 percent increase in cattle and a 314 percent increase in pasture” from 1974 to 1999, driven by the combination of domestic demand for meat and dairy products, road access, and secure land tenure. In the Chimbo River sub-watershed in the provinces of Bolivar and Chimborazo south of Quito, Victor Barrera et al. (2012, 775-776) described farmers “moving toward dairy production with continuous pasture” in the face of increasingly variable prices for potatoes and other crops in the 2000s. In this region, better forage, sanitation, and feeding practices improved milk production, and the authors recommended further research on higher-value chains such as dairy production in order to improve livelihoods. These contemporary cases are all from the southern Ecuadorian Andes (Figure 1). This study complements that literature in documenting a more recent transition in the northern Andes.
Regional transitions

Trends in Peru and Bolivia mirror the trends in Ecuador and the literature on dairy in these countries provides a point of comparison. In Peru, dairy production has grown “significantly in the Andes and on the Pacific coast” since the 1990s and without any specific government intervention except a tariff on imported dairy (Aubron et al. 2009, 407; Aubron and Cochet 2009, 231). There, the combination of national policy supporting stable milk prices, expansion of the internal market due to population growth and urbanization, and improved infrastructure and the decline of the Shining Path’s violent insurgency and influence in the countryside promoted growth of the milk production sector (Aubron and Cochet 2009, 219-221). Claire Aubron’s half-dozen or so single and co-authored publications based on her 2006 dissertation illuminate some of the finer points about Peruvian dairy production. She studied the rural community of Sinto on the western slope of the Peruvian Andes. Following agrarian reform in 1969, the community began a cooperative and with support from the Swiss began to make cheese. Especially in the past two decades with less disruption from the Shining Path, families increased their dairy production by reaching into more marginal spaces, to the point where they have expanded “to the limit” (Aubron and Cochet 2009, 226-227). Most families produce milk with a combination of intensive pasture management, growing alfalfa for year-round milk production, and extensive pasture management for beef cattle, which contribute to about one-quarter of the families’ gross earnings. The “artisanal” (artesanal) milk market is organized in three ways: producers sell raw milk close to the cities, producers make cheese to sell to middlemen working in urban areas, and small cheese factories collect the milk locally and make value-added products (cheese, yogurt). Dairy production in this “marginal milkshed” in the Peruvian Andes has increased so substantially that many families are much less diversified than in the past and rely on dairy for food security (Aubron et al. 2009, 408). Milk forms the basis of the economic logic, providing a relatively stable income, whereas animals for meat serve as wealth storage and are sold much less frequently, when people need money. This description closely resembles the findings of this study about
dairy in Pimampiro, down to the phrase “cuando se necesita” (when you need to) to describe when and why people choose to sell cattle.

Indeed, Aubron’s descriptions of the region share many similarities with the region detailed in this study, with families owning between 1 and 40 head of cattle (in Pimampiro, usually between 1 and 60, though sometimes more), and steep slopes. Just as Sinto lacks comparative advantage, especially with respect to more productive milksheds, Pimampiro also lacks comparative advantage with major dairy regions such as Cayambe, a relatively flatter region closer to the country capital (Bonifaz García and Requelme 2011). Moreover, in both cases, dairy farmers are not part of the agro-exportation sector, and rely on the regular sale of cheese or milk to small local factories for their weekly food purchases.

Likewise, when people do sell cheese, it is not to add value to their milk but rather as a form of storage. In the case of Sinto as well as Pimampiro, a “dense relation” exists between the countryside and city in terms of producer-consumer relations and nonagricultural activities of farm households, relating to elements of the new rurality (Aubron et al. 2009; Aubron and Cochet 2009). Chapter 3 details the organization of the dairy economy in Pimampiro, and Chapter 4 further explores the relationship between the countryside and city.

In Bolivia, following structural adjustment in the 1980s, dairy production was promoted with the support of the Danish government to improve milk access for urban populations (Markowitz and Valdivia 2001, in Valdivia 2004, 72). Corinne Valdivia (2004) studied a community in the Bolivian Altiplano in three separate years in the 1990s to analyze livelihood diversification and the role of livestock. Households relying more on potatoes for the bulk of income were increasingly integrated into the market, and livestock assets followed potato production; during good years people increased their savings through livestock, and in bad years (due to climate), depleted their livestock assets to compensate. Dairy production was used as collateral for potato production, and livestock served as wealth storage, playing a role in coping with stress or shock. In Pimampiro, livestock’s function as wealth storage has the perverse
effect of making a single bear incident more of a threat than it would be for crops, as further detailed in Chapter 3.

Aubron et al.'s (2009) studies of Andean dairy production are limited to Peru, Bolivia, and southern Ecuador and do not include any sites north of the equator (north of Quito, Ecuador) (see Figure 1). This study adds such a site and contributes to the relatively sparse literature on smallholder dairy production in the Andes. Moreover, it also highlights how dairy production systems interface with forest dynamics and conservation concerns on the agricultural frontier.

**Migration and gendered division of labor**

The role of migration and the gendered division of labor warrants special mention in transitions from growing crops to cattle-based livelihoods. Though none of the reviewed literature adopts an explicitly gendered focus, almost all of the literature acknowledges the role of gender relations in the shift to dairy production. For example, Aubron et al. (2009, 414) found that in dairy production, men are “liberated” from agricultural work and therefore able to generate income outside of the community. Maintaining dairy cattle requires fewer hands than growing crops, and women do the bulk of the daily work with the help of their children (Aubron and Cochet 2009). In Aubron’s Peruvian case, some of this gender division of labor exists because of the paucity of employment opportunities for women outside of the countryside. Likewise, in Ecuador, Keese (1998) found that livestock increased agricultural income without requiring a corresponding increase in on-farm labor in terms of number of people. For women, however, heavy labor demands increased. Neither of these studies mentions the role of remittances. In contrast, Jokisch (2002) found that for some households in the southern Ecuadorian Andes, remittances promoted the growth of dairy production, funding pasture for cattle cared for by remaining family members.

Clark Gray’s (2009a; 2009b; 2010) quantitative analyses of outmigration from the southern Ecuadorian Andes chart the reasons for outmigration and its effects on agricultural production, though in his original household survey data set focuses only on decision making in the past year and for this reason
does not include long-run outcomes such as cattle ownership. He found that outmigration and remittances have different effects on agricultural outcomes based on the gender of the migrants and remaining household members as well as their destinations; in his study, households with men migrating internationally increased maize production. Most of all, though, he found that smallholder agriculture remains resilient regardless of migration patterns, and posits that in most cases in the developing world, out-migration and remittances promote “altered agricultural strategies” rather than abandonment or commercialization or “large-scale agricultural change in origin areas of migration” (2009b, 214). He also notes that smallholder agriculture “will likely endure” due to its ability to provide for the household even when members have limited education and job opportunities (ibid.). Likewise, in this study, land-based livelihoods persist rather than outmigration leading to abandonment and reforestation (Chapter 4). In terms of specific factors, Gray’s (2010) data also show that education is selective for men’s but not women’s migration, in Gray’s Ecuador case, given the few employment opportunities for uneducated men outside agriculture. Chapter 4 in part discusses this phenomenon of many more young men than women remaining in the countryside, as uneducated women can more easily move to the city and marry and/or work in domestic employment.

Yet migration and agrarian transitions to cattle-based livelihoods in the Andes are not necessarily new stories. For example, in province of Carchi just north of Pimampiro, stressors such as disease, frost, drought, and increasing input costs for potatoes pushed people from potatoes, first profitable in the 1950s, to dairy (Lehmann 1986, 388). David Lehmann (1986, 336) predicted that pesticide use, climatic change, and reduction in rainfall due to deforestation would “herald the end of the potato boom,” and although potato production continues on a large scale in Carchi (see for example Paredes 2010), the reasons he cited were prescient (Chapter 3). Outmigration and out-circulation or seasonal migration also occurred regularly throughout the Sierra over the past several decades, since land reform created economic pressures that promoted circulation and migration formalized the shift toward “feudal to commodified
labor and production structures” that had already begun before the 1964 change (L. A. Brown, Brea, and Goetz 1988).

The above three sections contextualized dairy production in terms of highland Ecuador, the Andean region, and the ways in which migration and gender shape the dairy economy. This collection of somewhat disparate studies serves to demonstrate that transitions to dairy production have occurred throughout the Andes over the past four decades in varying permutations, and that the story of Pimampiro is part of a broader geography of similar transitions over this period. Chapter 3 addresses the reasons for and organization of dairy itself, and Chapter 4 the role of migration. Chapter 5 demonstrates that the dairy economy intersects not only with regional economic processes but also with regional or landscape-level environmental processes. The next section explains how dairy on the agricultural frontier intersects both with city and forest.

Agricultural frontiers and human-bear interactions

The expansion of dairy production and associated meat production in “marginal milksheds” (Aubron and Cochet 2009) intersects with forest and wildlife dynamics on the agricultural frontier. The agricultural frontier (frontera agrícola) is both a conceptual term for the space where field or pasture meets forest, as well as a legal boundary. For thousands of years, culture and biogeophysical characteristics have shaped the agricultural frontier, with grazing and fire influencing tree lines at high altitudes. Most recently, production pressures have pushed the agricultural frontier even farther up into forested mountainsides (Sarmiento 2002). In recent years, the combination of Ecuador’s 1981 Forestry Law, the 1999 Environmental Law, and the 2004 Biodiversity Law, in conjunction with increased government stability and law enforcement, have enforced this boundary between field or pasture and forest. At present, timber extraction is illegal in any place without prior permission and always illegal beyond the agricultural frontier boundary. Hunting is also currently forbidden, and so human activity on

3 Though this study does touch on both migration and gender, it in no way accounts for differences between mestizo and indigenous gendered divisions of labor (Hamilton 1998). Also, the bulk of existing studies focus on indigenous populations (e.g. Ferraro 2006; Keese 1998) whereas this study documents transitions in a primarily mestizo region.
the “other side” of the agricultural frontier has diminished in the past decade. This study is inspired by what happens when bears cross this conceptual and legal boundary to the “human side” of this frontier.

**Forests on the agricultural frontier**

Concerns about tropical deforestation often drive research about cattle in the Andes (e.g. Wunder 1996; Wunder 2000) and elsewhere in Latin America, especially in the Amazon (e.g. Hecht 1985; Coomes et al. 2008; Pacheco and Poccard-Chapuis 2012); much of this research specifically concerns beef cattle. Jokisch and Lair (2002), for example, explained that concern about cattle and forest cover gave significance to their study on remittances in the southern Ecuadorian Andes. Himley’s (2009, 839) study of conservation initiatives in the same watershed demonstrates how dairy-based livelihoods intersect with deforestation. Residents did not comply with restrictions on forest clearing because they needed “to feed their children.” Himley (2009, 839) quotes one farmer responding to a question about noncompliance: “But [if we do not cut forest] how are we going to live? We have to extend ourselves further up. If not, where will our poor cattle go?”

4 In this study, concerns about space, land tenure, and the future of the forest certainly play a role; however, some people living in Pimampiro suggest that much of the mountain will turn back into forest as people move out (see Chapter 4).

Though this study does not explicitly address or seek to confirm or challenge forest transition scholarship, it is important to acknowledge that migration has been a major theme in this literature. For example, whereas Rudel et al. (2009) found that although population continues to have a statistically significant effect on forest cover despite the diminishing strength of the previously strong relationship, Redo, Aide, and Clark (2012) contend that population and other demographic variables are not good predictors of land change and that precipitation plays a larger role than previously acknowledged. The role of population and migration in land use and forest transitions is widely contested (Lambin et al. 2001; Rudel et al. 2009; Grau and Aide 2008) and critical geographers in particular critique dominant

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4 Though Himley does not highlight it, the organization he worked with (Fundación Cordillera Tropical) also addresses Andean bear conservation.
forest transition theories (Mansfield, Munroe, and McSweeney 2010). Regardless of the drivers of forest transitions, the scientific community agrees on the importance of forests for their ecosystem services (however problematic the term may be) and their role in mitigating climate change (Nabuurs et al. 2007). Amidst all the doom and gloom, some areas in Latin America are experiencing forest recovery, albeit often “invisible,” that is, undetected by outside monitoring groups (e.g. FAO) or in large-scale or low-resolution studies. Such recovery often intersects with the “new rural” landscapes outlined above, or landscapes not defined by the production of agricultural commodities (Hecht 2010). “Invisible” forest recovery may play a role in bear activity (Chapter 3). This study does not specifically engage with the forest transition literature. However, it does provide context about the nuances of social and economic organization on the agricultural frontier and individuals’ reasons for their land-use shifts, complementing quantitative analyses.

**Human-bear conflict on the agricultural frontier**

On the agricultural frontier in the Ecuadorian Andes, humans and Andean bears have come into “conflict” especially with respect to bears eating corn and cattle. Andean bears live in the Andes from Venezuela to Bolivia and have a wide altitudinal range from 200 to 4,750 meters above sea level. No reliable estimates exist for their numbers and densities (Garshelis 2011). The species overlapped with dense human populations in the Andes for thousands of years, but recent threats have made them vulnerable to extinction (Goldstein et al. 2008; García-Rangel 2012), including habitat loss and fragmentation, poaching, and the lack of knowledge about their distribution and status (Goldstein et al. 2008). These three elements are interrelated in some cases, as habitat loss and fragmentation isolate bears and push them against the agricultural frontier, where interactions between bears and crops and livestock provoke retribution poaching.

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5 Throughout this thesis I use terms such as human-wildlife interactions or human-cattle-bear relations, though “conflict” is the prevalent term throughout the literature.
A recent review by Shaenandhoa García-Rangel (2012, 108) aggregates the limited knowledge about Andean bears; despite research since the 1970s, “the species continues to be one of the least-known bears, and most of the information available is classified as ‘grey’ literature.” However, diet is “one of the most extensively studied and better understood aspects of Andean bear ecology.” Andean bears are omnivorous and opportunistic and eat seasonally, mainly eating fruits and leaves (frugivorous/folivorous) with bromeliads and palm trees as staple food sources. Despite a mostly vegetarian diet they are in the carnivore order (*Carnivora*), likely eat mountain tapirs (Castellanos 2011b), and also “feed on domestic animals and occasionally raid crops” (García-Rangel 2012, 96-97). Bears usually raid crops or livestock in isolated fields or those next to forest cover, away from human settlements. García-Rangel (2012, 109) asserts that controversies surrounding the issue “could be holding back attempts to tackle the impact that such consumption has had on conservation efforts,” and closes her review recommending more research on multiple fronts, including livestock consumption.

Studies of Andean bear attacks on cattle are relatively new, though incidents have been reported as early as the middle of the 16th century. Reports of people hunting bears exist from the end of the 18th century, though no reasons were given, and in the 19th and 20th centuries, people accused bears of attacking their cattle and hunted them. In the 1970s, as oil-related development and extension of the agricultural frontier encroached on bear habitat, conflicts between humans and bears increased. The first confirmed report of contemporary bear attacks on cattle occurred in 1995 in a biological reserve on the western flank of the Andes near Quito. Since then, various isolated clusters of incidents have occurred on the eastern flank of the Andes in the Consanga and Oyacachi watersheds in Napo province on the southern edge of the Cayambe-Coca Reserve, in the high Andean grasslands (*páramo*) of Carchi province, on the western slopes of the Andes in Pichincha province, and in the Chaco region also in Napo province (see Figure 1) (Castellanos 2003; Castellanos, Laguna, and Clifford 2011; Flores et al. 2005). Since November 2009, an increased and unusual number of attacks on livestock were recorded in the northern Andes, with the cumulative number of attacks ranging from 87 as of 2011 (Castellanos, Laguna,
and Clifford 2011) to 250 as of 2013 (Bland 2013). This study contributes to understanding the social science dimension of this unusual set of human-wildlife interactions.

**Contributions to geography**

Geography as a discipline draws on many literatures to address broad concerns about nature-society relations, and one might say that a landscape-level or regional approach requires a similarly wide-ranging approach to the scholarly literature. This section points out the specific ways in which this study intersects with and contributes to discussions within the discipline.

**Human-wildlife interactions in geography**

Human-wildlife interactions have garnered attention in the geographical scholarship, where scholars have in particular challenged the “human-wildlife conflict” framing, such as in the human-bear conflict literature described above and similar literature throughout conservation biology (Peterson et al. 2010). In their study of the Maasai people in Tanzania and Kenya and lions, Mara Goldman, Joana Roque De Pinho, and Jennifer Perry (2010) show that the human-wildlife conflict perspective ignores the nuance and complexity of their relationships. Ethnographic research and interviews revealed a range of feelings and opinions about lions, about which many people held positive and negative views simultaneously, both fearing lions and also finding them fascinating. In terms of lions attacking cattle, though the people interviewed resented the lions for livestock losses, they also discussed the attacks as natural behavior and respected lions for killing only what they can eat. Likewise, this study seeks to complement conservation science approaches with an ethnographic lens, as these authors recommend.

Feminist geographers also have challenged the dualisms present in so many analyses of human-animal relations. Jody Emel (1998), for example, shows that in the case of wolf eradication in the US, a long history of wolves portrayed as “other” and evil in Europe and then the US contributed to mass killing of wolves. In the case of conflict between livestock owners and wolves in the 19th century, standards of masculinity continued to promote hunting even after the economic threat was eliminated. She
quotes environmental writer Barry Lopez, who asked: “[w]e are forced to a larger question: when a man cocked a rifle and aimed at a wolf’s head, what was he trying to kill? And other questions. Why didn’t we quit, why did we go on killing long after the need was gone?” (Lopez 1978, 138 quoted in Emel 1998, 112). This study touches on how antipathy toward the bears in the study area may stand in for larger concerns about livelihoods and the cultural purpose they serve (Chapter 4) and also anger and disappointment at the lack of government attention and failure to address the bear issue in a timely way (Chapter 5).

**Studies of livestock economies**

This study also contributes to the nascent geographical literature on livestock, which has “received relatively little scholarly attention” in the discipline especially when compared with crop agriculture and forestry (Sayre 2009a). A recent issue of *Geoforum* (Sayre 2009b) sought to fill this gap, and the six original research articles present geographical scholarship on livestock around the world, with one case from New Zealand (Haggerty, Campbell, and Morris 2009), two from West Africa (Bassett 2009; Turner 2009), and three from Latin America. The three from Latin America all address livestock expansion into lowland forests, in Colombia from 1850-1950 (Van Ausdal 2009), Guatemala from the colonial period to the present (Grandia 2009), and the Brazilian Amazon from the 1970s to the present (Walker et al. 2009). Taken together, these papers raise questions about the varied “logics” of raising cattle, and whether and how profitability or other additional “hidden logics” such as access to land or prestige value influence cattle ranching development (Bobrow-Strain 2009). For example, the “initial scholarly ‘boom’” in the early 1980s of research on cattle in Latin America focused on the “hamburger connection,” or the connection between US fast food chains and beef exports from Central America and rainforest deforestation (Grandia 2009, 721). Shawn Van Ausdal (2009), however, challenges the application of this analysis to all cases and demonstrates that in Colombia, the expansion of pasture

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6 Contemporary geographical literature on livestock since Sayre’s statement includes Yeh and Gaerrang’s (2011) study of pastoralism, access, and neoliberal processes in Tibet, and Pacheco and Poccard-Chapuis’ (2012) study of the development of cattle ranching in the Brazilian Amazon.
between 1850 and 1950 occurred not only as a result of alternative logics such as land-based political power, but most of all with the chief goal of profit. This research contributes to this conversation on the logics of raising cattle and strikes a balance, illustrating the intersection of the economic logic and a cultural logic. In this case study, steady income from dairy (economic logic) provides a viable livelihood for smallholders committed to the countryside (cultural logic). Chapter 3 primarily details the economic logic, and Chapter 4 delves into the cultural logic.

**Political ecology**

Above I describe two specific empirical domains to which this study contributes: human-wildlife conflict and studies of livestock economies. This section describes how this study fits into the larger strand of geographical scholarship in political ecology. Political ecology as a subdiscipline in geography explores how power and privilege shape nature-society relations (Robbins 2011, 14) and has a long history of addressing human land use and livelihood pursuits and their interactions with the (so-called) natural world. Though the subdiscipline is wide-ranging and sweeping, political ecology research shares a set of common assumptions and modes of explanation, namely that politics (power) influences environmental conditions and the unequal distribution of resources and risks. In Paul Robbins’ (2011, 22) typology of five theses political ecology explores, this research most squarely falls into the categories of “conservation and control” and “environmental subjects and identity.” Scholarship addressing conservation and control often demonstrates how conservation efforts often have perverse effects, as this study suggests in its examination of farmers’ anger toward the bears and government protecting them (Chapter 3). Research on environmental subjects and identity examines political identities and social struggles, as this study does in investigating how relationships with state institutions and with rural outmigration influence human-bear-cattle relations (Chapter 3, Chapter 4). Additionally, recent scholarship linking political ecology to science and technology studies (STS) examines the production, circulation, and consumption of environmental knowledge. In their landmark collection *Knowing Nature*, Mara Goldman, Paul Nadasdy, and Matt Turner (2011) illustrate how scientists and policy makers...
conceive of and address environmental knowledge and its complexities. This study accounts for the situatedness or positioning of environmental knowledge (Chapter 2).

Second, not to acknowledge the methodological debt this study owes to insights from political ecology would be irresponsible. Given that political ecology no longer denotes a specific and circumscribed approach or subdiscipline (at least according to Robbins), many of its contributions have also diffused into all critical nature-society studies. For example, this study takes into account the “interplay of social practices (agency) and political-economic conditions (structure)” that Karl Zimmerer (1991, 458) discusses in his paper on the persistence of smallholder agriculture in Peru in the 1980s. Rather than isolating causes for agrarian change (in this case conversion of montane bogs into crop fields), regional political ecology approaches recognize how multiple conditions such as social relations (agency), market demand (structure), and environmental conditions intersect to influence land use. Likewise, this study acknowledges all of the reasons rural residents stated for transitioning from growing crops to raising cattle (Chapter 3) and gives particular attention not only to structures such as climate and markets but also to migration and the agency of pursuing a preferred livelihood in the countryside (Chapter 4).

In addition, throughout the course of conducting this research, I kept in mind the concept of the “open framework of the household” (Zimmerer 2004, 796). Zimmerer (2004) reviewed how cultural and political ecologists approached the household as a unit of analysis with different levels of emphasis. Whereas cultural ecologists placed continued or added emphasis on household-level analysis, political ecology and development studies eschewed the approach given critiques originating in the mid-1990s, many of them from feminist development economists who demonstrated the diversity of contributions and practices within households as well as scholars of migration, who showed how household composition often changes (see also Razavi 2009). This study touches on many of the themes in Zimmerer’s (2004, 802) review (e.g. the agricultural impact of migration processes) and adopts this “open-framework perspective of the multifaceted household.” In this study, I did not collect survey-style
responses at the household level but instead interviewed multiple members of many households, whether together or separately (interview methods are further explained in Chapter 2). I also considered households to be porous in that extended relations assisted certain households in pursuing their livelihoods whereas lack of family or people to work in other cases hindered livelihood possibilities. As such, individual choices, preferences, and stories influence household and community land use and in turn shape human-wildlife relations. Chapter 3 explains the nature of household and community land use in the study region, and Chapter 4 delves into how household members’ preferences play a role.

Finally, in identifying and adopting an explicitly feminist approach to research, this study explores how feminist perspectives can be more present in political ecology especially when gender is not the focus of analysis. Rebecca Elmhirst (2011) notes that explicitly identifying as feminist in gender and environment scholarship often is disadvantageous for the reception of the research. She also notes that some studies may be considered feminist political ecology but not identified as such. For example, this study links to critical animal studies conducted by feminist scholars (Emel 1998; Collard 2012; Sundberg 2011). Most importantly, insights from feminist scholarship and nature-society geographers like Juanita Sundberg (2003; 2005), Andrea Nightingale (2003), and Farhana Sultana (2007; 2011) inform the methodological approach in this study, detailed in Chapter 2.
Chapter 2: Feminist Methodology and Methods

Practicing situated knowledges as a *tesista* (thesis-writer)

This thesis demonstrates how a feminist approach to research can inform scholarship on livelihoods and conservation. As feminist praxis, this project takes the *how* (methodology) of conducting research to be as important as the *what* (topic). I conducted this study in the midst of developing my own feminist approach as a beginning researcher in geography. The first part of this chapter discusses what it means to approach research with an understanding of situated knowledges, to situate oneself, and to practice reflexivity. The second part details the study’s methods.

**Situated knowledges**

The situated knowledges thesis contends that all knowledge is partial. In her landmark essay, “Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective,” Donna Haraway (1988, 579) proposes that instead of getting lost in the relativist critique of knowledge, feminists have a responsibility both to recognize that all knowledge is of a specific place, time, and context, and also to produce “faithful accounts of a ‘real’ world.”

The situated knowledges approach challenges claims to objectivity and, instead, asserts that all knowledge is partial and based on the perspectives, priorities and privileges of those generating it. As Alison Wylie (2003, 31) helpfully states, “[S]ocial location systematically shapes and limits what we know, including tacit, experiential knowledge as well as explicit understanding, what we take knowledge to be as well as specific epistemic content.”

This includes multiple types of knowledges, from tacit and experiential knowledge such as knowing how to perform a particular gendered task like making and hosting a meal, to an explicit understanding of how and why certain groups of people came to be making meals (women, servants). Haraway’s emphasis on

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7 The situated knowledges thesis continues to have purchase throughout feminist research scholarship, despite its origins in feminist standpoint theory (Harding 1986; Harding 2004), which continues to be a source of debate in the scholarship (Howard and Allen 1997; Crasnow 2009; Intemann 2010). This chapter does not delve into that intellectual history.
“faithful accounts of the world” addresses the concern that in the social constructionist dismantling of science-as-truth, potentially useful knowledge could be dismissed. She argues that feminists and other researchers have a responsibility not to suggest that all knowledge is equally unreliable, since scholarship and knowledge production inform society. Rather, methodology, training and other forms of expertise, in dialogue with local knowledge and other ways of knowing, convene to create knowledge that is partial and situated. In short, there is no single expert or objective account of the world. As Haraway explains, “[P]artiality and not universality is the condition of being heard to make rational knowledge claims” and “only the god trick is forbidden” (1988, 589).

The “god trick,” one of the most resonant phrases from Haraway’s essay, is shorthand for how conventional mainstream Enlightenment science presumes to eliminate all bias. The “god trick” or “view from nowhere,” for Haraway, is the illusion that science can reveal everything, and without bias. Rather, a view from somewhere – a somewhere that is identified, critiqued, and reflected upon – is the only valid basis for reaching an objective account, an account which acknowledges its partiality as the basis for producing and comparing knowledge of the view from that partial perspective. For Haraway (1988, 586), this partial perspective is the “promise of objectivity”:

a scientific knower seeks the subject position not of identity, but of objectivity; that is, partial connection. There is no way to ‘be’ simultaneously in all, or wholly in any, of the privileged (subjugated) positions structured by gender, race, nation, and class. And that is a short list of critical positions. The search for such a ‘full’ and total position is the search for the fetishized perfect subject of oppositional history, sometimes appearing in feminist theory as the essentialized Third World Woman.

In referring to the “essentialized Third World Woman,” Haraway draws on postcolonial feminist scholar Chandra Talpade Mohanty’s (1984) essay “Under Western Eyes: Feminist Scholarship and Colonial Discourses.” Haraway’s point is that anything other than acknowledging the partial perspective feeds into a typology, a stereotype, and does violence especially in the case of reinforcing stereotypes of women in Third World contexts. Mohanty’s essay raises the question not only of situated knowing but also who has the privilege to be a situated knower, who is in the position of being “known,” rather than a “knower,” and how these differences are created.
Who can be a situated knower?

Mohanty’s groundbreaking essay, “Under Western Eyes,” critiques research that presumes to build solidarity among “white Western” and “Third World” feminists and by extension, exposes the challenges of all transnational and transcultural research and collaboration. In her essay, she reveals how particular analytic approaches create categories such as the “Third World woman” in a violent act of appropriation and codification. She examines one book series, Women in the Third World (Zed Press), to demonstrate how many white Western feminists were culpable, however unintentionally, of practicing the “god trick” when it came to producing knowledge about feminists and women in other places. Mohanty’s critique of two “antiglobalization pedagogies,” or ways of teaching about globalization and its effects, also applies to research approaches and knowledge production. The feminist-as-tourist model creates “monolithic images” of Third World women in contrast to Euro-American women who are “vital, changing, complex, and central subjects” – occupying their evolving standpoints and partial perspectives. In this approach, non-Western women are considered other. In contrast, the feminist-as-explorer model considers women in the Third World as elsewhere (my interpretation), such that their issues are distinct, and fails to recognize the relations among people and places. Mohanty proposes a third model, “co-implication/solidarity,” which is neither “add and stir” (tourist), nor “‘separate but equal’ (or different)” (explorer). Instead, the solidarity perspective attends both to context-specific differences as well as to connections among people from different backgrounds (Mohanty 2003, 519-522). Most dangerous in the context of geography graduate education is the “feminist-as-explorer” model, so often the outcome of a short excursion “to the field” as imposed by constraints on resources and institutional and career expectations. Mohanty’s perceptive account of knowledge production raises urgent questions about the situated role of knowledge producers, especially when researchers travel “to the field” (Sharp and Dowler 2011, 151).

Indeed, in conducting fieldwork, many feminist geographers have sought to create anti-hierarchical relationships with their subjects and thereby challenge power dynamics embedded in longer
histories of racism and colonialism. They have acknowledged the extent to which the discipline must confront postcolonial critiques given its own origins in colonial exploration. The “field” was once privileged as a place of “stout boots and hairy chests” for education and training in geography, though decades of critique have now transformed such ideas. Even the existence of a field at all, for example, has been thoroughly critiqued, and is now understood as constituted through practice and discourse “rather than being a pre-existent and stable place awaiting discovery by the field researcher” (Sharp and Dowler 2011, 146-147). Thus, in their efforts to account for the way they themselves are implicated in the historical practices of the discipline, feminist geographers are heeding Mohanty’s warning against the “god trick” of revealing knowledge about a pre-existing reality (or pre-existing field). Moreover, “the fear of appropriating the voice of others has led some researchers to question their abilities to say anything about communities of which they are not a member” (Sharp and Dowler 2011, 151). Farhana Sultana (2007, 375) cautions that if this anxiety leads to withdrawing altogether from fieldwork, the result would be “that fewer scholars are engaged in research that can be politically and materially useful for the poor in the Global South.” Instead, she and others advocate that participating in knowledge production, especially about “other” places, requires dialogue about the politics and practices of such scholarship.

The dialogue Juanita Sundberg (2003; 2005) has begun about fieldwork in Latin America in particular brings feminist and postcolonial critiques to bear on questions of critical awareness about North American and European geographic research in the region. Responses to a survey on politics of theory and method from thirty-seven researchers working in Latin America revealed challenges and politics of fieldwork such as the importance of race and gender in research relationships (Sundberg 2003). However, such challenges are usually invisible in reports and articles (newer exceptions include Billo and Hiemstra 2012 and Crossa 2012). Sundberg (2005) recommends making these politics visible by recognizing situated knowledges in geographical knowledge produced in and/or about Latin America. For example, in her research, she found that gender seemed less important than her status as a US citizen when working with NGOs, whereas gender discrimination from extension agents in a rural community was so pervasive
that she elected to hire an assistant to complete the interviews. Both gender and race follow a researcher even if she wishes to leave them behind; doing the “god trick” is impossible. Geographical location also matters; according to Sundberg (2005, 22), “Arguably, the most important factor shaping the context in which scholars operate is the US government’s shifting interest in individual Latin American countries.” This rings true with my own experience in Ecuador, given how perceptions of me and where I come from were often linked to the US’ stringent visa requirements and the current resentment, or ambivalence at best, the Ecuadorian government fosters about the US. On the other hand, the previous presence of well-liked Peace Corps volunteers in the communities where I worked had a much greater impact than the media on how people received my presence and opportunities for fostering positive relationships.

Sundberg also highlights the importance of writing up research, quoting Gillian Rose (1997) who discusses how to produce situated knowledges that do position oneself and account for partial perspectives, without presuming to fully comprehend the entire web of power relations. Rose’s (1997) essay more specifically interrogates the practice of reflexivity, which numerous feminist and/or qualitative scholars invoke as their way of situating their knowledge. Most basically, reflexivity is both “self-critical action” researchers take to understand the intersection of their selves and the knowledge they produce, as well as a communal process that attends to the structures affected knowledge production (Hesse-Biber and Piatelli 2006). Reflexivity, broadly speaking, involves an awareness of the practice and politics of knowledge production and the role of the researcher, and includes a number of reflective practices such as writing memos and participating in discussions with participants.

**Practicing situated knowing**

Theorists of feminist epistemology mention *reflexivity* as one way to achieve the situated, partial perspective and offer faithful accounts of the world. For Haraway, reflexivity is a tool for confronting power and its deployment, that is, how feminists and those they work for, with, and against are implicated in webs of privilege and oppression:
Feminists have stakes in a successor science project that offers a more adequate, richer, better account of a world, in order to live in it well and in critical, reflexive relation to our own as well as others’ practices of domination and the unequal parts of privilege and oppression that make up all positions. (579, my emphasis).

Haraway views reflexivity not only as an epistemological practice but also as the practice of a person or feminist living responsibly in the world. As Rose (1997, 308) so aptly puts it, reflexivity is one of many “situating technologies” that researchers develop in order to practice partial, situated science.

Yet, conceptions about and definitions of reflexivity vary both across and within disciplines, and many contrasting and complementary reflexive practices exist among today’s researchers, accompanied by a range of typologies. For example, confessional or introspective reflexivity interrogates the researcher’s own position and examines the researcher’s relationships with her subjects and reality. Theoretical or epistemological reflexivity, on the other hand, focuses not on the researcher’s identity and relationships but on the entire knowledge production process and the discipline in which she is working.8

The range of approaches to the practice of reflexivity reveals how each practice is connected to larger epistemological and discipline-oriented traditions, such that different practices are more appropriately suited to different projects (Foley 2002).

For example, Rose (1997) critiques the confessional, or introspective reflexivity so predominant in feminist standpoint accounts; she writes that reflexivity as it was and continues to be practiced in feminist geography requires more than most researchers are capable of: a complete knowledge of self and context. Rose (1997, 311) critiques this approach, which she calls “transparent reflexivity,” as being “little different from the god trick Haraway – and many feminist geographers – have critiqued so thoroughly.” Transparent reflexivity assumes that agency and power are knowable and that the researcher can communicate her position, despite the “impossibility” of knowing “fully both self and context.” Instead, Rose offers the idea of “constitutive negotiation” in which a researcher is situated “not by what she knows, but by what she uncertainly performs.” This opens space for research relationships and processes characterized by coimplication/solidarity, as Mohanty proposes.

8 For more on reflexivity and also intertextual and deconstructive reflexivity, see Foley 2002.
My own field experience has reinforced my appreciation for Rose’s caution. Likewise, I explored both elements of transparent reflexivity (which I found impossible to achieve) and also epistemological reflexivity. Here I focus more on power dynamics as they directly manifested themselves, though in my memos, I reflected on the influence of my own background and how I came to be involved in this project. Keeping in mind that the “central concern for the reflexive writer is deconstructing power – who has it, how it is used, and for what purposes” (Hesse-Biber and Piatelli 2006, 507) I offer examples from my own research of three manifestations of the power dynamic of fieldwork: identities of the researcher and researched, the power exerted through the research process, and “post-site” writing and representation (Wolf 1996).

In terms of the identities of the researcher and researched, I found that power came from unexpected places. I often perceived being a woman to be useful and give me greater access to both men and women than I might have had otherwise. In a way, the gender I performed, as a curious woman who also peels potatoes, gave me access (and power, in terms of gathering information) I had not expected. I also was surprised to find that my dependence on the people in the communities where I lived and interviewed people made me appear nonthreatening, since gaining access to transportation in the area, which involved informal routes and walks alone in the dark, put me in a position of vulnerability. This felt very real to me but also had practical implications and a psychoanalyst might ask if it was just

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9 My research memos and reflections both while “in the field” and during the writing up process factored into how I present the material in this thesis, and the focus on situating the bear “problem” in the larger context rather than approaching this human-wildlife issue with a laser-like focus. Initially, I had assumed that the bears would be my focus because my entrée into the region was through one of the Andean Bear Foundation’s two biologists. My committee encouraged me to consider how the researcher’s focus may influence the importance respondents ascribe to a certain issue. In this study, attention to context especially in terms of the regional economy (Chapter 3) and migration (Chapter 4) reveals that though Andean bears present a new and unusual concern threat to livelihoods, they are not necessarily at the forefront of people’s minds when considering “agriculture and livestock in the region,” which is how I usually positioned my research interests. In my own thinking, I was aware that the bear issue shaped the research, even when I did not raise the issue directly. My own position is that conservation is both important and complicated, and despite my efforts to portray myself as a neutral and impartial observer, my social location as a foreigner likely signaled my conservation ethos. My own situated knowledge involved growing up in a culture of Earth Day, to which I subscribed enthusiastically as a child, as well as more recent experiences such as volunteering with the Andean Bear Foundation in summer 2010, combined with reading political ecology scholarship as a graduate student. Through regular reflection (personal reflexivity), I strived to recognize the ways in which my background influenced my perceptions of the needs of both bears and people.
performance; this reinforces Rose’s critique of transparent reflexivity. Likewise, Elizabeth Chacko (2004, 60), a geographer writing openly about the details of “positionality and praxis” in her research in rural India, explains that “tacit acknowledgment that villagers possessed superior knowledge in areas where I had little was of immense help in breaking the ice and developing relationships with local people in the field. It also helped invert power relations.” Similarly, I often felt that day-to-day interactions reflected fluid power dynamics between my informants and me.

The research dynamic, however, shifted this vulnerability, and being a *tesista* (thesis writer) made me self-conscious when people wanted to know why they should participate in my study. As Lynn Staeheli and Victoria Lawson (1995, 332) write, “Western researchers are in a position of power by virtue of their ability to name the categories, control information about the research agenda, define interventions and come and go as research scientists.” While I always explained that I was writing a thesis for my master’s degree, I also highlighted my partnership with an Ecuadorian bear biologist, and my desire to participate in community life. Wanting to get to know people and their context was welcome and familiar given most people’s positive experiences with the recent Peace Corps volunteers living in the region. Chacko (2004, 60) took a similar approach though also more explicitly emphasized her potential to help. She “told them I was working towards an advanced degree which would allow me to teach at a university, and that I hoped the local NGOs and government would use my findings to improve the quality of service they provided to the villagers.” Her essay does not explain whether those hopes came to fruition. I was not consistent in my own presentation of how I thought my research would contribute positively to people’s lives. Given my philosophy about how change happens (slowly, and with many actions), I alternated between describing the hopeful possibilities of the research to bring more government attention to people’s concerns (on good days) and emphatically declaring that I was not sure it would do much (why should the Ministry of Environment listen to me), but that I hoped my work would make helpful contributions to their communities. In this case, introspective reflexivity helped me stay honest about the
role of my research, but it also only carried me so far in addressing the power dynamics inherent to “collecting” data.

In collecting data, I was in charge of naming categories, as Staeheli and Lawson (1995, 332) note, and “control[ling] information about the research agenda,” since the semi-structured nature of my interviews meant I had certain points to address in each interview. I tried to counter this dynamic by letting respondents take on the role of the interviewer as well. One man in his early 30s regularly asked me about technology, job opportunities, and potato production and ranching in the US. His curiosity about agricultural practices in the US and his regrets about his limited educational opportunities both threw into relief the implicit power dynamics and inequality (we are about the same age) and also highlighted one of the major themes in Chapter 4, how limits to education encourage people to remain in the countryside. In almost all of my interactions, “the gaze was returned,” as Chacko (2004, 60) puts it. I still fell short of my communitarian obligations of reciprocity. Although I strived for reciprocal conversations, discussing life and culture, I could have given more in terms of my computer skills, providing internet instruction or successfully helping the women’s finance group balance its Excel sheet (I tried and despaired). On the other hand, I routinely had to distinguish my role as a researcher from that as a Peace Corps volunteer and so was reluctant to begin any major projects given the time frame.

In the process of reflection, analysis, writing and follow-up, issues of rigor, reflexivity, and representation come to the fore. Questions of researcher ethics and responsibility became more salient as much of the “data” are now static rather than co-produced as they were during the interview moment. In considering the epistemological context of the research, I asked myself: “How would this project have been different had I pursued it at another institution?” and the answer is “Very.” The critical focus on the production of knowledge as well as the knowledge itself in the departments of Geography and Women’s Studies at Penn State have compelled me to consider such questions. When I imagine my work in a different context (e.g. practitioner) I can imagine being forced to tell a pat story with Cause A leading to Effect B. This thesis presents findings from a situated perspective and, as Rose (1997, 315) suggests, I
write uncertainties rather than the “revelations of transparent reflexivity” into this research “in order to reject the god trick.” These uncertainties frame the findings and yet, simultaneously demonstrate their value. For example, I was not able to obtain quantitative data on cattle numbers in previous years or on bear populations, and I did not gather data about the specificities of household budgets. Such uncertainties preclude drawing certain types of conclusions, especially causal relationships. However, uncertainties also have value. For example, participants reported changes in rainfall and increased climate variability (Chapter 3). Triangulating these perceptions or “confirming” these changes with meteorological data presents challenges, not least of which is gathering data specific to the region. These findings relate the level of uncertainty about the specific effects of climate change in local places, and how people respond to those effects. They relate the challenges people face in pursuing livelihoods with partial data and ambiguous predictions, from their situated perspectives. Another way in which I strive to write reflexively is to use the voices of participants as much as possible, seeking to strike a balance between ethnographic “realist” texts that perform the “god trick” and the other extreme, “self-absorbed” confessional texts (Hesse-Biber and Piatelli 2006, 507). One such example when these voices came out was in an unexpected evening of taking a “god’s-eye view” of the world with some of the people who also might be considered my research subjects.

**Situated knowing together and revising the “god trick”**

One research interaction near the end of my time in the field highlights the ideas of the “god trick,” situated knowledges, the first world researcher, extraction, reciprocity, and the practice of actually gathering data. The North American or European human geographer “has been imagined as ‘elevated above the rest of the population,’ occupying ‘a position from which he could survey the world with a detachment and clarity that was denied to those closer to the ground (whose vision was supposed to be necessarily limited by their involvement in the mundane tasks of ordinary life” (Barnes and Gregory 1997, 15, quoted in Sundberg 2005, 24). One way in which geographers especially might assume a view from nowhere, though really it is a view from above, is in viewing satellite imagery. As Andrea
Nightingale (2003, 81) puts it: “Aerial photos are in some sense the quintessential Cartesian view from ‘nowhere.’”

Through a serendipitous contact, I obtained a high-resolution satellite photo of the study area, which my collaborator and I discovered could be used to identify GPS points of pastures where incidents of bear attacks on cattle occurred. We were not familiar with the locations of pastures we had not visited, and sat down with two men who had visited all of the pastures in the region as part of a mandatory cattle vaccination campaign. From “above,” we were able to identify landholdings. In exploring the landscape from this vantage point, the conversation turned to discussions of paths used for timber extraction, which were thin lines I would not have otherwise recognized. The knowledge that these men were able to produce and share given the technology of the satellite photo that situated them with a view from above in turn illuminated our understanding as a group of the spatial dynamics of interactions among people, cattle, and bears. Yet it also was an exercise of power, in which we analyzed people’s property, information many owners might have been reluctant to share. Satellite photography is here to stay, however, and such god-like viewpoints are routinely used in geographic scholarship. Since these technologies will continue to be deployed, I felt that sharing the information and the software was a way of democratizing the power relations inherent to accessing them. I transferred a copy of the open-source photo viewer onto the computer of one of these men and during the next week, they in turn shared their learning with family and friends.

Learning together and continually being reflexive and listening to feedback has been essential to the project. For example, on my first day in the study area, a relative of one of my host families was visiting from Quito, where she has lived for the past fifty-four years since moving there at age 18. My interpretation was that at this point she was both an insider and an outsider in the community, and a welcome translator for me, both linguistically because she spoke slow and clear “city” Spanish, and culturally because she shared most of my dietary preferences (which was helpful as my stomach adjusted to the local cuisine). She emphatically suggested that my study be “about why people leave.” I had
originally proposed a migration-focused study, and helpful conversations with my advisor and committee suggested that I might be reading too deeply into something about which I had little prior knowledge, so I traveled with more broad, open-ended questions. Returning from the field to interpret and to write up, I ended up finding out that in many ways my study had become about what she had suggested, although rather about why and how people stay. Following Chapter 3, which outlines the transition, Chapter 4 delves into why people stay. Before turning to these chapters, I detail my site selection and methods: interviews, observation and immersion, and collection of additional primary data.

**Methods**

**Qualitative place-based approach**

This study employed a qualitative method of social inquiry to investigate the contemporary transition to raising cattle in the northern Ecuadorian Andes and how bears have come to represent a threat in this landscape. This study is primarily based on interviews conducted with the goals of describing a process and developing a “holistic description” of change in a place and people’s perceptions of that change (Weiss 1994, 10). A qualitative approach was most appropriate for three reasons. First, little information existed, especially in the published literature, about this region or transition. As such, an open-ended, somewhat exploratory approach was warranted in order to avoid misdirecting the research with inappropriate hypotheses or distorting the lived experiences of people participating in this transition. Second, this study sought to provide insights about the cultural dynamics at play in the transition, and qualitative data best capture these dynamics by prioritizing the stories and perceptions of people living in the region. This is in keeping with feminist approaches that critique “top-down” or “god’s-eye-view” research and instead value asking open-ended questions to make space for increased co-production of knowledge. Finally, a qualitative interview study, rather than mixed methods, was also the most appropriate choice for reasons of feasibility in terms of researcher time, expertise, and resources. The remainder of this section describes the study site and context, and specific methods employed.
Site selection and community descriptions

The study parish was selected for its high concentration of Andean bear attacks on cattle among the affected parishes along the eastern range of the Andes. Two people working with small NGOs, the Andean Bear Foundation and Fundación Semilla Ambiental, assisted me with access in terms of initial contacts and living arrangements. They also oriented me to the region, put me in touch with a recent Peace Corps volunteer for additional information, and provided data on the incidence of bear attacks in each community. In addition, they connected me with families in each of the three communities where I spent most of my time and who hosted me.

In totality, I spent a little over seven weeks living in the parish. I began in the community of San Pedro, where three of the twenty households had experienced bear attacks on cattle. In this community, I conducted interviews in every household except one. My learning there inspired me to seek additional perspectives from other towns in the parish in order to check and challenge my initial findings. For this reason, I also commuted on foot to the community of El Carmen for several day trips to conduct interviews, and then moved across the parish to La Paz to live there and conduct further interviews. In addition, I interviewed residents in neighboring communities when the opportunity arose. Each of the three focus communities has distinct characteristics despite their commonalities as rural, agricultural communities of primarily mestizo residents. The most important distinguishing characteristics relate to location and accessibility, which have affected their models of dairy production, as detailed in Chapter 3.

San Pedro is a community of about seventy people in twenty households and of the three, is the most inaccessible from Pimampiro and from other communities. For this reason, most people make their own cheese at home (Chapter 3) and members of this community most highlighted outmigration (Chapter 4). Not only is San Pedro an hour-long journey by car from Pimampiro, but the bridge in poor repair and low concentration of milk producers have discouraged the two milk trucks in the parish from including the community on their rounds. At the time of this study, one person owned a truck and commuted to Pimampiro and Ibarra, the provincial capital, once or twice a week and occasionally more often.
Community members kept track of this person’s schedule and traveled in this truck. Alternatively, people also hired pickup-truck taxis (camionetas) or hiked on a footpath to another community (45 minutes) where many more personal vehicles and taxis passed. Several young men also owned motorcycles or dirt bikes for travel. In the past, the family I stayed with had owned a truck and then elected to sell it as everyone asking for rides made their son unavailable to work and regularly milk the cows. Nearly everyone in San Pedro raises cattle, and some people also grow crops or raise other animals such as pigs, sheep, chickens, and guinea pigs. I initially chose San Pedro, or rather it was chosen for me by my primary contacts, because of the opportunity to live there.

El Carmen is a community of about 130 people in thirty-five to forty households and is immediately across the river from the parish seat. El Carmen’s more central location in the parish and accessibility to Pimampiro has made it easier for local cheese buyers and sellers to meet regularly (Chapter 3) and though outmigration is noticeable, the town has more younger- and middle-aged people, some of whom are building successful cattle-based livelihoods and pursuing other strategies as well (Chapter 4). From Pimampiro, travel to El Carmen is about a half-hour on mostly stone-paved roads. At least two pickup-truck-taxi drivers lived there at the time of the study, and a number of other households owned trucks or motorcycles. Most people raise cattle. A number of people also pursue other livelihoods such as working in construction, delivering gas tanks, and working in a government-sponsored internet center (infocentro). I chose El Carmen as the second community because it is accessible by foot from San Pedro and members of this community had also experienced bear attacks, including one person who was eager to help me, provide me with information, and connect me with others.

La Paz is a community of about 150 people in forty to fifty households and is on the other side of a ridge from San Pedro and El Carmen. La Paz is the most accessible from Pimampiro by car and also has the most relatively flat land of the three communities. For historical and contemporary reasons, the community is home to two artisanal cheese factories and a small hacienda owned by a family based in the provincial capital, and the roads are high quality enough that a milk tank truck can reach it. From
Pimampiro, travel time is about forty-five minutes on mostly stone-paved roads. At least one formal pickup-truck taxi driver lived there at the time of the study, and another truck also went to and from Pimampiro every weekday for a household member’s job in the municipal government and took additional passengers. During the academic year, a bus also serviced the parish. Many people raise cattle, as well as some crops, and a handful of women work in the two cheese factories and the hacienda on the edge of town. I chose this as the third community because it is home to the two artisanal cheese factories in the canton and people sell their milk rather than produce cheese, four households had experienced bear attacks, and also there was an appropriate place for me to live.

**Data collection**

**Interviews**

Semi-structured interviews with people living in the study parish comprise the bulk of the data informing this thesis. I recruited participants in the three communities described above through a combination of snowball sampling and going door-to-door (convenience sampling), and sought a sample of maximum variation with a range of people and experiences in terms of gender, age, life stage, livelihood pursuits, and experiences with bears. I also often interviewed more than one member of a household and purposefully did not seek to interview the “head of household” (see also p. 27). In many cases I interviewed both the male and female “heads” of household separately. In general I approached people directly to set up an appointment, and in some cases they suggested that we conduct the interview on the spot (see Figure 3). I introduced myself as a student researcher “living with host family X” and explained that I was interested in agriculture [crops] and livestock, purposefully leaving the topic open-ended. On occasion, I

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10 In my interview protocol, I purposefully did not position myself as interested in bears nor the research as about the bear problem. With the majority of the people I interviewed, I presented my focus as “agriculture and livestock in the region, and how it has changed over time.” Often I also explained that I was working with a biologist from Carchi (province to the north) seeking to understand changes in the forest, and that my research was complementary. In only a few instances, I presented myself as interested in the bear issue; for example, my conservation-oriented contacts introduced me to my hosts in each of the three communities, and once I persuaded an important informant
explained that I was trying to understand more about cattle-based livelihoods in the context of bear-cattle dynamics but generally tried not to lead with this. I was pleasantly surprised at how many people were willing to speak with me.

**Figure 3. Interviewing a woman in her pasture.**

Photo by Andrés Laguna.

Participants always chose the location for the interview, and almost all interviews were conducted either in people’s homes or yards, with the exception of a few on walks, near playing fields, or in vehicles in transit. Interviews also became an opportunity for observation, and I generally paid attention to the specifics of the surroundings (Oberhauser 1997; Elwood and Martin 2000). However, I also strived not to make assumptions about wealth or poverty without hearing directly from people about how they perceived their financial status. Interactions in homes also influenced power dynamics in terms of norms of hospitality and reciprocity, and following the first week I brought rolls or cookies to offer given that many people served me warm milk and sometimes lunch.
I followed an open-ended interview guide (Appendix A), which I vetted with my longtime Spanish teacher and friend in Quito. Interviews usually addressed the profile of the household structure and then how people make a living and how that has changed over the course of their lifetimes. From there, they turned to concerns about making a living. Bears were addressed near the end of the interview unless bears were the explicit reason for meeting (the case with a few people) or the interviewee brought them up independently as a threat to livelihoods. Over time I stopped following the interview guide and treated interviews as structured conversations with a number of points I wanted to be sure to address. I recorded all formal interviews with a digital voice recorder (DVR), with verbal permission from participants. In some cases, a series of informal conversations led to permission to use the DVR at a later point. The study was exempt from IRB review for presenting minimal to no risk to participants (see Appendix B).

Interviews often morphed into conversations and most participants also asked me questions about my family, background, religion, and experiences in the US. On occasion people asked me questions that made me uncomfortable, such as about my own plans to start a family. I treated this as a welcome part of the process and a means for lessening the unequal power dynamics of “extractive research” with an additional dynamic of exchange. Interviews were chosen as the primary data source because they make it possible to capture the voices of people and their lived experiences, allow for unexpected perspectives or information to enter the study, and encourage follow-up questions. However, disadvantages existed, given the challenges of conducting interviews in a non-native language, navigating cultural dynamics, and the limited time living in the study area. I supplemented the majority of interviews with fieldnotes and reflective memos; this process is further detailed below.

Interviews were also conducted with people working for the Ministry of Environment (MAE), the Ministry of Agriculture, Livestock, Aquaculture, and Fisheries (MAGAP), and the current and previous local sheriffs (teniente político), usually in their offices. Table 1 details the number and distribution of interviews. All interviews took place in June and July 2012. In the text, all names of people and
communities have been changed. However, the communities would be easily identifiable for anyone familiar with the cantón Pimampiro. When essential to the argument, I have specified that a person is from a community closer or farther away from town. Otherwise I have removed that level of identification in order to avoid cases in which someone might easily be identified by others who know this small region well, that is, “deductive disclosure” (Kaiser 2009). For this reason, I also strive to provide thick, rich description while simultaneously choosing identifying details (e.g. age, community, family structure, personality) selectively. In order to reduce the number of footnotes, interviews are not individually cited in the text.

**Table 1. Recorded interviews and their use in the study.**

This table relates the number of people interviewed. Some people were interviewed in pairs, and others were interviewed multiple times. In parentheses (i.e. (#)) are those included as data in this thesis. Interviews were selected on the basis of relevance to the study. Any interview with different or unusual perspectives from the principal findings was also included.

<table>
<thead>
<tr>
<th>Focus communities</th>
<th>Total</th>
<th>Men</th>
<th>Women</th>
<th>Interviewees who had lost cattle to bears</th>
</tr>
</thead>
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<tr>
<td>San Pedro</td>
<td>25</td>
<td>14 (13)</td>
<td>11 (11)</td>
<td>3 (3)</td>
</tr>
<tr>
<td>La Paz</td>
<td>35</td>
<td>17a (11)</td>
<td>18 (10)</td>
<td>3 (3)</td>
</tr>
<tr>
<td>El Carmen</td>
<td>18</td>
<td>12 (5)</td>
<td>6 (0)</td>
<td>7 (3)</td>
</tr>
<tr>
<td>Additional interviews</td>
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<td>4 (0)</td>
<td>1 (0)</td>
<td>5 (0)</td>
</tr>
<tr>
<td>Interviews with government and NGO workers</td>
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<td>3 (1)</td>
<td>2 (0)</td>
<td>n/a</td>
</tr>
<tr>
<td>Totals</td>
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<td>50</td>
<td>38</td>
<td>18</td>
</tr>
<tr>
<td>Included in this study</td>
<td>51</td>
<td>30</td>
<td>21</td>
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</tr>
</tbody>
</table>

a Includes two cheese factory owners  
b Interviews with people from other communities were not included in the dataset because they were conducted in a limited time frame and under different circumstances than the majority of the interviews.

**Observation and immersion**

Observation and immersion also inform this thesis. By virtue of living with families in two communities, I experienced daily life and also had numerous informal conversations with my host...
families. In these homes, I also had the opportunity to observe cheese production as a process occurring over many days, the routines of provisioning the home, the logistics of transportation and access from the perspective of these households, the role of the media (television, radio), and the fabric of daily life. Moreover, living with families in the communities meant that I learned about various workshops and meetings. For instance, I attended workshops conducted by the Ministry of Agriculture and Livestock (MAGAP) and also by the Red Cross (Cruz Roja). One MAGAP workshop, for example, gave me a sense of the challenges people faced raising cattle and the information and assistance the government was able to provide. These meetings helped provide additional context for potential future trajectories in the region as extension agents discussed plans for government-sponsored crop insurance, for example.

**Additional data collection**

Finally, I took advantage of all opportunities to collect relevant data. Such data include a handwritten census of the fifteen communities in the parish obtained from the parish government, a satellite photo obtained from the municipal government, data on cattle ownership obtained through vaccination records, and GPS points of specific communities and pastures, especially those with bear incidents, obtained with the collaborating biologist. When in town, I read the local newspaper, but this did not yield much relevant information. These data supplement the interview and observation data and when used, are footnoted throughout the text.

**Data analysis**

Reflection and analysis took place concurrently with data collection as well as in the year following fieldwork. On most nights, I wrote extensively about the salient points I learned from interviews, my reflections, questions, and interpretations, and logical next steps in an open-ended study (Emerson, Fretz, and Shaw 1995). In some cases, I would take an entire day away from data collection to recoup and catch up on fieldnotes. I also frequently returned to my research questions to determine whether the interviews and data collection were offering insights about the questions.
The following year I selectively transcribed the interviews to focus on the three dominant themes that emerged: the transition, outmigration, and concerns about bears, which roughly correspond to Chapters 3, 4, and 5 (Saldaña 2011). This means that I listened to the interviews and noted the topics or loosely transcribed the content for every section of the interview. In some cases, this would mean noting “we are discussing my siblings for ten minutes,” given the extent to which participants also asked me questions. I then more carefully transcribed the sections most relevant to the research questions and coded the interviews for the three dominant themes mentioned above, and their subcategories, creating a simple taxonomy (Saldaña 2013, 175).

**Ensuring credibility**

This study – in its conception, execution, and write-up – is grounded in the feminist theoretical approach that knowledge is situated and partial and that there is no objectivity. As a corollary, *findings* are more accurately described as *interpretations* and are uncertain. Yet, interpretations have validity and credibility when they are considered well-researched and well-founded (e.g. in the case of scientific peer-review) and also to have verisimilitude or truthfulness. Decades of advances in both qualitative and feminist research have led to varying constructions about how to ensure credibility, that is, assure ‘consumers’ of knowledge that the knowledge ‘producers’ are presenting findings characterized by validity and trustworthiness. The intention of this study is not to draw sweeping generalizations but rather to explore the nature of livelihood decisions with respect to the cattle economy, and how bears fit into that picture. Therefore, rather than generalizability or reliability, this study strives for credibility; Creswell (2006, 209) recommends that qualitative researchers employ at least two validation strategies. First, prolonged engagement (Creswell 2006, 207) and two months living in the study site allowed for continuing interviews to the point of theoretical saturation (Glaser 1965, 444). This is limited in this study due to it being a thesis and not dissertation-length project. However, living in the study community and daily conversations with my host families contributed to my ability to check my understanding of the interviews and contextualize them.
Second, in addition to prolonged engagement, *member-checking*, or soliciting feedback from study participants about the researcher’s interpretation, can assist with presenting interpretations that most accurately represent the (partial, situated) knowledges of respondents. This may take the form of follow-up interviews or meetings, or also a “terminal, formal testing of the final case report with a representative sample of stakeholders” (Lincoln and Guba 1986, 77). I will return to the study area in summer 2013 and plan to conduct follow-up interviews and host group discussions. I will arrive with an oral summary that explains the interpretations I made and my guiding question will be, “What do you think of this interpretation?” If need be, I will follow up with additional probing questions. When possible, I will seek follow-up meetings with people prominently featured in this write-up (e.g. Hugo, Griselda, and Samuel, p. 73-75) to ask them about my interpretation and their feedback on how I have represented them. I also plan to investigate through interviews and observation changes that have taken place in the past year, with particular attention to the themes addressed in this thesis. Although this process will not lend credibility to this specific iteration of the study, I plan to include insights gleaned from this in any possible publications.
Chapter 3: Rewards and Risks of Cattle-Based Livelihoods

This chapter draws on interview data to describe the shift to increased reliance on cattle-based livelihoods, the organization of the dairy economy, and the landscape of risks threatening these livelihoods. Concerns about variable climate, soil fertility, market volatility and input prices, and rural outmigration have made growing crops an increasingly insecure livelihood and stimulated an increased focus on cattle, primarily for dairy production. People participate in one of two models: either selling milk to artisanal cheese factories or producing cheese in the home. Yet, a number of new livelihood challenges emerge, including concerns about land and grass, cattle vulnerability on steep slopes, and the threat of bear attacks on cattle. Despite the challenges, however, cattle-based livelihoods have a logic of economic viability, especially when compared with growing crops.

Toward a new reliance on cattle

A dramatic shift

In my interviews with community residents, most respondents reported that over the past two decades, the landscape shifted dramatically from crop fields to pastures for cattle. Even people who continued to grow crops in addition to raising cattle described a shift in which “now the whole world has cattle” and “people have more than double [the cattle] they did ten years ago.” One person living in the parish who also worked for the 2012 mandatory vaccination campaign against foot and mouth disease substantiated these statements: “In this parish there are 3,096 head of cattle. In the next parish over, 2,007. And is it different from years past? Of course. Every year there are more cattle. More, more, more.” He continued, “It’s because people don’t plant anything. Before people planted corn, potatoes. Now, because people lose their crops to lots of rain, it’s easier to have animals.” Observation of the landscape matches this description of a pasture-dominated landscape (Figure 4).

All data in this chapter are from personal interviews conducted in June and July 2012, unless otherwise noted. For more detail on the interviews and methods, see Chapter 2.
Figure 4. Pasture-dominated landscapes.

These photographs show the mountainsides in two different communities in the study region. Photos by author.
According to my interviews, the most significant shifts to pasturing took place over the past ten to fifteen years, “little by little,” though some households in the region had always had one cow or oxen to work, and a select few had pursued cattle-based livelihoods since the 1980s. People varied in their description of the chronology; some said “five to ten years,” others “ten years,” and others “since 2000.” The few residents who had pursued cattle-based livelihoods since before the parish-wide shift confirmed this chronology. Diego, for instance, had been raising cattle since the late 1980s but also was planting corn, beans, potatoes, wheat, barley, and red onions until about 2000. Interviews with the few young adults remaining confirmed this timeline. Marco, 19, remembers planting corn, barley, peas, and broad beans, but “now, nothing, because you lose everything.” Likewise, Enrique, 18, remembers planting barley and wheat in his lifetime, and that things changed “little by little, not just at once, but little by little” starting when he was about 6 years old. Dozens of interviews yielded theoretical saturation on this point: little by little since around 2000, crops gave way to cattle-based livelihoods.

The amount of land devoted to staple crops such as corn, wheat, barley, potatoes, broad beans, as well as peas, carrots, beans, parsnips, and red onions decreased, though a handful of people continued to grow a small amount for the household, grew different crops, or continued with small niches they had carved out previously. Much of this cropping depends on location in terms of climatic conditions and proximity to town. For example, some households with access to flatter land at warmer lower altitudes have built greenhouses for tomatoes. Other commodity crops include granadillas (tropical fruit), peaches, and tree tomatoes. Families with longstanding traditions of growing blackberries for sale continue to do so. In some instances, people continue to grow potatoes to sell or for subsistence, though in much smaller quantities than in the past. Though Gabriel grows potatoes to sell, he mostly relies on dairy income; he said, “I also do agriculture [grow crops], but not like before.” In rarer cases, enterprising households had begun to raise pigs or pursued additional sources of off-farm income such as migrating temporarily for work in construction, petroleum or flowers. Although some diversity in livelihood strategies exists both

12 Diego was the exception rather than the rule. In the early 1990s, he said he had about 80 head of cattle, whereas now he has about 30.
among and within households, cattle-based livelihoods dominate the landscape and are the most important source of financial security for many households.

Many people now rely on these cattle-based livelihoods because growing crops is not secure, and the lack of security has worsened in the past decade. For example, Beatriz said, “In agriculture [growing crops], sometimes the rain comes, sometimes it freezes over, then there’s summer and things flood and everything is tiny, tiny.” When I asked if this was common, she said, “This year was the worst. If we didn’t have milk, then we would have been without [resources].” Milk from dairy cows provides security in weathering the routine ups and downs of growing crops, especially during bad years. As Oscar put it, “You can’t depend on the harvest.” Three factors in particular have affected people’s ability to depend on the harvest: climate; decreasing yields, inputs, and markets; and rural outmigration. In turn, these challenges have prompted increased reliance on cattle.\(^{13}\)

**Climate**

Increased seasonal unpredictability and changes in rainfall patterns were the chief reasons people cited for the shift away from crops and toward cattle. In the past, the “winter” months of June, July, and August had three months of heavy rain. The remainder of the year, or summer, was dry. However, this pattern did not hold steady over the past decade. In an interview with one community president, I asked: “And in your opinion, because you are a community leader, what are the most important concerns (preocupaciones) for the people here?” She replied, “Here, the biggest concern for us is that now you can’t plant because of the winter. Before, it would rain for months. Now, it comes one month, with some days of rain, some days of sun, and in this way, the plants die (se acaba).” She reported the change starting about ten years ago and said, “Now we can’t plant anything.” Many people repeated Beatriz and

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\(^{13}\) This section addresses the chief reasons for the shift from growing crops to raising cattle and does not focus on the “how” of the transition. In part, this transition was exponential and self-sustaining because cattle reproduce themselves with little effort. For some families, access to credit facilitated raising cattle, and in the case of the few farmers who began raising cattle in the 1980s, government and NGO programs also played a role. In many cases, people had little access to capital and credit rather than income from other sources allowed them to begin raising cattle. This study did not fully address these mechanisms. Most people invested very little in their cattle operations and only in rare cases did people fertilize their pastures or provide their cattle supplemental feed.
Silvia’s concerns of too much rain at some times, and too little at other times, in patterns that were much more unpredictable than in the past. Ana concurred, “The weather was better before. In the months of June and July it rained. Now it rains the whole year, not hard, but it freezes the field.” The unpredictability and changes in rainfall with conditions different than in years past has made it hard to plant and harvest successfully.

The timing of the changes was not reported as consistently as the statements that change had occurred. Estimates ranged from two or three years to eight or ten years. Bearing in mind situated knowledges (Chapter 2) is especially pertinent when considering weather, climate variability, and climate change because memories, mental models, and datasets vary from person to person. Perceptions and descriptions easily vary based on daily life and “expertise” (e.g. farmer, scientist), age, experience in a place, and specific location, especially in an environment with so many microclimates (Study site, Chapter 1) (Roncoli 2006; Roncoli, Crane, and Orlove 2009). To gain a better sense of the chronology, I found it useful to consider the experiences of those with a short lifetime, such as teenagers and young adults more readily able to distinguish between periods of time without relying on memories of specific years or signposts such as “before or after dollarization (2000),” or “during the presidency of so-and-so.”

For example, Enrique, age 18, said that he had noticed changes in the climate in his lifetime, primarily more rain. “In the past (antiguamente),” he said, “there were seasons of rain and of summer. Now you don’t know when it will be rainy or summer. Now you don’t know if it’s the time of rain or of summer,” repeating for emphasis. Concerns about climate change over the past ten years in the high Andes is increasingly well-supported in the literature (Verner 2010; Sarmiento 2008; Postigo, Young, and Crews 2008; Eakin 2006; Valdivia et al. 2010; McDowell and Hess 2012; Zimmerer 2010; Urrutia and Vuille 2009; Perry, Seimon, and Kelly 2013).14

14 Climate change research is notoriously fraught with issues of detection (is any change happening) and attribution (is that change due to human-caused changes in the global system). In the study area, as in many other mountainous regions, the lack of weather stations to capture the variety makes detection using “scientific” measures challenging. Moreover, even descriptions of “winter” and “summer” vary within the province as these are imprecise terms.
Most people did not explicitly attribute these changes in seasons and rainfall to climate change. This study was not designed to examine climate change, but because the majority of people focused on climatic changes as a driver of their decision-making about livelihood strategies, I began to ask people why they thought these changes were taking place. Most responded with a “don’t know” or “not sure” answer. A few people did cite “global warming” (el calentamiento global) or “climate change” (cambio climático). Oscar credited local deforestation for the changes in seasons and “global warming.” When I probed for the origins of his thinking, he explained that in the past few months he had learned about these processes at a workshop in Quito to become a local forest patrolperson. Enrique, still in high school, also credited climate change based on what he learned at school. In some cases, people turned to religion-based explanations; one person linked the current changes to the story of Noah’s flood and said, “As it is said, for the actions of one, everyone pays.” Regardless of the reasons for these changes, changes in seasonality and rainfall have prompted shifts in livelihood practices.

Production, inputs, and markets

Decreases in yields, simultaneous increases in costs of agricultural inputs, and corresponding changes in markets also prompted the shift away from growing crops and toward cattle. Multiple people said “the land doesn’t produce like it did before” and growing crops was no longer worthwhile. Simultaneously, skyrocketing seed, fertilizer, and pesticide costs compounded the problem of decreasingly yields and made it challenging both to invest in crops and recoup those investments. Ester, in relating the importance of chemicals in growing crops successfully, said: “Now I’m used to cattle. Planting…there’s just no way, I tell you. The plants freeze (se lancha) and everything needs chemicals. And if there’s no money, there aren’t any chemicals, and then you lose it all.” She went on to explain that “before” (decades ago), fumigation was necessary usually only twice in the lifetime of the plant, but now people usually fumigate twenty times; her estimate suggests a ten-fold increase in agrochemical use merely in terms of frequency of application (I did not ask anyone about quantity purchased or applied
The need for more agrochemicals combined with the over 200% increase in input costs following the dollarization of the Ecuadorean Sucre in 2000 (Sherwood et al. 2005) has made the past decade much different from the previous and has discouraged growing crops.

The increase in agricultural input costs parallels larger changes in the market at all levels, both in terms of volatility and increases in absolute prices. Lack of a “good market” and middlemen who take advantage of farmers continue to be concerns, as do the gluts of crops that come from wider national markets. An inability to predict prices puts extra pressure on the investment in crops. Whereas “in planting, you invest 80% of what you will earn,” according to Julian, “with milk, almost everything is profit.” Only one farmer made an explicit connection between dollarization and the transition to cattle, and rarely did anyone even raise the subject without my asking a specific question related to dollarization.\(^{16}\) Diego, a widower in his early 60s, said:

Most people who had [cattle] had one dairy cow and one other, and they planted barley, all of it, wheat, corn, everything. However afterwards, with dollarization, it was all over... Before, you could sell [a quintal, or ~100 pounds] for 100 sucres, but a worker cost 5 sucres at that time. Work was worthwhile. But with dollarization, a quintal of wheat became six dollars, and there wasn’t even enough money for one worker because one worker cost five dollars [a day]. We all stopped planting. Same for potatoes... for this reason the whole world has stopped planting. I was the first person to start with cattle, but now everyone has them. Before it was just a few, but now everyone has them.

When I asked Diego why he thought no one else had mentioned the role of dollarization, he said, “because they don’t realize, maybe because they’ve already forgotten.” When I asked, “Seriously?” he said, “Because 12 years have already passed.” Little research exists on the effects of dollarization in Ecuador on farmers and households though macroeconomic analyses abound (Taylor Nelms, email to author, 10/13/2012; Henry An, email to author, 6/3/2013). Regardless of dollarization’s specific impact, frustration with price volatility and increases contributed to farmers’ shifting from crops to cattle.

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\(^{15}\) In the case of tree tomatoes, even agrochemical inputs were not enough to prevent a fungal disease known as “ojo de pollo” (chicken eye) that can cause losses of up to 80%. (INIAP n.d.)

\(^{16}\) In situating myself as a researcher seeking to begin from the voices and stories of the farmers themselves, I sought not to inadvertently push the interviews to fit a particular chain of explanation, e.g. dollarization leads to transition. This is, however, a fruitful area for further research (Chapter 5).
Rural outmigration

In addition to concerns about climate, yields, inputs, and markets, labor shortages related to outmigration also discouraged growing crops. When “all the young people are leaving and the old people are dying,” there is no one to “work well (trabajar bonito),” said Eduardo, a man in his mid-50s with land and the capacity to hire others. Samuel, in his early 30s, described the challenge of rounding up enough people at peak planting and harvesting times: “you have to find people to work, with eight days lead time, and there aren’t a lot of people.” The next chapter delves further into the issue of rural outmigration and discusses the nuances of this shift in terms of those who have chosen to remain in the region and the role this trend plays in the transition to and maintenance of cattle-based livelihoods.

A new reliance on cattle

The decreasing viability of growing crops and subsequent shift to incorporating cattle into livelihood strategies has prompted increasing reliance on cattle. Cattle-based livelihoods offer security: “the cow is what sustains us,” whether people say “we maintain ourselves from the milk” or “you sell cattle when you need something,” such as school supplies or clothes for children (see also p. 16). Even for people who also continue to grow crops, having cattle is important because when growing crops, “based on the rain, you might lose it. Cattle, whether it’s raining or summer, they’re there.” For a few households, however, cattle still do not offer adequate financial resources; to suggest otherwise would do injustice to the struggles of some households to make ends meet. For households with children, especially, meeting the weekly food budget can be a challenge, especially when the cows produce very little.17 For example, obtaining the $50 a week for food for a household of six is challenging “when the cows are dry and there is no milk.” Access to land contributes to the wide range of relative wealth and poverty among small scale dairy farmers. Whereas the above-mentioned household had less land and

17 Though dairy remains the foundation of the current economy for what it does offer, the cattle in this region produce little milk, according to owners and the extension officer I interviewed. According to him, lack of grass, unfertilized pastures, poor care, and the breed itself contribute. Dairy science has long considered the production output of Latin American criollo cattle meager compared with other breeds such as Holsteins or Jerseys.
therefore less access to pasture, another household had access to more inherited land, had four times as many head of cattle, and lives comfortably in a two-story cement house. In general, though, many people now view cattle as the most viable livelihood strategy.

**Organization of the dairy economy**

The dairy economy is the foundation for cattle-based livelihoods because dairy provides a steady income and the largest share of revenue for many households. Raising cattle for meat also plays a role, and the extent to which one or the other matters more depends on the household. For example, when I asked Marco which is more important, he said, “Equal. Fifty-fifty. The milk because we can have a weekly income. Every Sunday we sell cheese. And then on top of that, we can sell a cow.” Then, though, he joked, “maybe only every five years,” because the cattle grow relatively slowly given the species and availability of quality pasture. To the same question, Walter answered, “In milk, you make a lot… $400 monthly, just in milk [50 liters/day]. Calves take more time. For example, in a year one will grow to become $150.” Usually, raising cattle for dairy was a better investment, and the extension officer I interviewed encouraged people to sell male cattle as quickly as possible to make room for milk-producing cows on their pastures. The data from the 2012 vaccination campaign confirmed the role of dairy: cattle owners reported their primary reason for having cattle and most people self-identified as producing either for dairy or for both dairy and meat, and very few for meat only. The economic logic of raising cattle, then, not only includes wealth storage and a self-reproducing investment (see also p. 16), but also a relatively steadier income through dairy sales compared with crops.

**Two models of dairy production**

Smallholding households raising cattle for dairy operate within one of two business models. In the first model, people sell their milk to one of the two artisanal cheese factories located in the parish’s largest town with fifty families. The factories’ daily milk trucks service half the communities in the

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18 Forty-six percent reported milk, another 46% mixed, and the remaining 8% meat.
parish, given the road conditions and distances. One operation has existed for twenty-five years and currently processes about 900 liters of milk (~$300) a day into cheese and yogurt sold in markets in Quito, the national capital five hours away. The other, twenty years old, processes 400-500 liters of milk (~$136-170) a day and sells cheese in Ibarra, the provincial capital two hours away. Both factories pay the dairy farmers every two weeks.\(^{19}\)

In the second model, people make their own artisanal cheese at home and sell it in the county seat of Pimampiro or to local middlemen (comerciantes) once a week.\(^{20}\) Cheese made in factories and homes share some qualities (fresh cheese with a round shape and soft texture) but vary with respect to density and weight, saltiness, and taste, reflecting the milk input and specificities of processing. Making a pound of cheese takes about six liters of milk plus a small amount of rennet and salt. Cheese sells from anywhere between $1 and $2 per round depending on the season. Prices rise during holidays and especially Easter week, and fall during vacation times when the urban student population returns home. Since dairy farmers would make more money and save time selling their milk to the factories, cheese serves as a storage mechanism rather than as a means for adding value (see also p. 16).\(^{21}\) Indeed, the majority of people who make their own cheese do so because the milk trucks do not service their community. The owners of the cheese factories said they have decided not to send their trucks to the farther communities because the extra travel time is not worth the quantity and quality of milk available, reflecting how the spatial organization of the dairy economy influences household time budgeting (King 2011, Chapter 1). For example, Ana said “if there were better roads, we would sell the milk and not lose so much time making cheese.” Of those who make cheese at home because the milk trucks do not service their town, only a few cited taking pride in their cheese-making operations as their reason for producing

\(^{19}\) Understanding the cheese factories’ supply chains (milk truck routes, payment structures) provides a sense of the dairy economy as a primary driver of currency circulation. At the time of this research, both cheese factories paid 34 cents per liter of unpasteurized milk. For comparison, Nestle paid the one hacienda in the area 47 cents per liter for its pasteurized milk. The cheese factories also returned the whey to farmers after the cheese-making process, which helped farmers feed their pigs.

\(^{20}\) Some but not all households have refrigerators, and even those that do often do not refrigerate their cheese. Temperatures indoors are generally cool, especially at night.

\(^{21}\) If sold directly to one of the cheese factories, the six liters it takes to make cheese would bring in $2.04, whereas most rounds of cheese sell for $1.50-2.00 and involve labor.
cheese themselves. Silvio, for instance, explained the great pride he takes in creating high-quality cheese and the attentiveness to cleanliness at all stages of the process that makes his cheese special. His positive relationships with buyers enable him to reap greater profits from making the value-added product himself.

In both cases, the farmers rely on urban consumers whether directly (selling cheese in town) or indirectly (selling milk to factories selling cheese in the provincial and national capitals). At present, artisanal cheese from this region is generally well-regarded by urban consumers, but policy and marketing decisions on the regional or national level could affect the viability of these dairy-based livelihoods dependent on continued urban consumption (Aubron and Cochet 2009). Chapter 4 further considers these rural-urban linkages.

**Participation in the market economy**

Dairy farmers are increasingly embedded in larger market relationships because they depend directly on urban consumers and also purchase rather than grow the bulk of their food. In the past, residents produced grains and other crops for the market and sustenance, buying only “fat, salt, and sugar” to supplement what they produced at home. Households transitioned to buying the majority of their food and the ways people described this shift reflect their discomfort with the change. For example, Mateo’s voice grew louder as he told me:

> Before, you worked to eat. Now you have to buy everything... you have to eat during the week and then it is used up and then you have to go back [to town to buy more]. Before you didn’t buy potatoes, or wheat, or barley. Now you have to buy everything. To make tortillas, you have to buy flour. Before, no one bought things, and now you buy everything.

Following these statements, he left abruptly to chop wood while I continued the conversation with his wife. My interpretation of his explanation is that the increased susceptibility to price fluctuations as both producers and consumers is frustrating for him and others. Both a sense that “now everything is for the money” and concerns about reduced nutrition were pervasive; one mother expressed concern about her daughter only eating junk food because she commutes to school in town, and another man lamented that his grandparents “ate better” than he did. Both men and women describe how people did not eat rice
in the past, but now that they do not grow vegetables or whole grains like barley, rice is the default option. Produce purchased in the market also often has more chemicals. Dedicating land and other resources to cattle rather than crops for both subsistence and market has created increased market integration, which brings new risks to livelihoods.

**Threats to livelihoods**

In addition to the challenges that arise with increasing participation in the market economy, other threats to livelihoods have emerged with the dairy economy. Climate continues to present challenges, as do cattle-specific issues such as cold, infection, and dangers such as falling. Andean bears have also entered into the risk landscape with the recent spate of attacks on cattle (see Chapter 1).

**Climate**

Climate, the chief concern in terms of growing crops, continues to be a concern when raising cattle. Rather than seasonal unpredictability or rainfall variability, people discussed the quality of the pastures and the cold. For example, whereas cattle are not as easily wiped out from one heavy rainstorm, the cold continues to be an issue, and people name pneumonia as a frequent concern. On the other hand, people reported that because the region is relatively cold, cattle are not as prone to tropical diseases. Lack of rain dries out pastures, and floods also create issues with having sufficient grass.

**Vulnerable cattle**

Not only are cattle vulnerable to cold, but also to fighting, falling, rolling, and dying, especially given the steep terrain. One person told me that she lost two head of cattle in one year to falling because they were tied up and were not able to right themselves again afterwards; now her household does not own any cattle. Such dangers affect households differentially based on the steepness of the terrain and whether they have access to fencing or need to tie their cattle. When I asked, “What are the risks to cattle

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22 I asked almost everyone about robberies and they are not a concern in this region.
or difficulties raising cattle?” in the majority of interviews, these were the first issues raised in tandem with concerns about pasture. Quantifying the incidence of cattle falls proved challenging. Many people said cattle would fall “every so often,” but were reluctant to specify a precise rate. It is difficult, then, to compare the rate of deaths from falling to the rate of deaths from bear predation. However, based on the challenges in gathering data on bear attacks, described in the next paragraph, I elected not to push people too hard, fearing that they might be tempted to make a best guess – substituting false certainty for a more truthful uncertainty.

The bear threat

Andean bear attacks on cattle also present a threat to cattle-based livelihoods (see Chapter 1). When the topic of bear attacks arose in interviews, the combination of the novelty and frustration at lack of government attention often stimulated more passionate discussion than concerns about climate and physical vulnerability, which people often referred to nonchalantly though deaths due to pneumonia or falling are more frequent. Since late 2009, residents along the eastern range of the Andes in Carchi, Sucumbios, and Imbabura provinces began to report bear attacks on cattle. It is likely that one “problem bear” and later several specific individual bears were and are the only ones attacking cattle. It is possible that attacks were occurring before then, as one person I interviewed speculated, but that people were not aware it was happening. (In many instances the bear will eventually drag the carcass into the forest and return to an undisturbed carcass regularly to finish eating it.) Though the presence of bears was not

23 Presenting the bear “problem” in this study comes with an inherent contradiction; in explaining how the issue is situated among many threats also involves acknowledging and highlighting its novelty and presenting at least an overview of the most salient findings involves granting the issue its due space.

24 An accurate number of attacks, whether they resulted in injury or death, and the value of the losses are not available and relating such numbers would suggest a false sense of certainty (what Harding calls “weak objectivity,” see Harding 1993). Due to lack of funds and personnel, neither the Ministry of Environment nor the Andean Bear Foundation were able to have a sustained and systematic presence in the region, and the data that existed about incidents of bear predation on cattle, though helpful, were not fully complete. When my collaborator and I tried to add dates retroactively to the dataset, a number of people were not able to remember when the incidents had happened; in one instance we asked, “before or after the new year” and even that marker was insufficient. Calculating losses to make an estimate of individual or total losses is also tricky, though any loss would at minimum be about $150.
described as new, bears coming “so far down,” and especially eating meat, was described as new and could be occurring for a wide variety of reasons.

**Habitat loss and forest recovery**

The simplest explanation is that the bears do not have enough food due to habitat loss. “We’ve taken over their habitat,” said one woman in her early 30s who had recently moved back from the city to live with her parents. However, understanding the spatial and temporal dimensions of habitat loss is more complicated. Another person speculated that deforestation on the eastern side of the ridge closer to the rainforest (El Oriente) region of the country in Sucumbíos province was pushing the bears westward. It is outside the scope of this study to evaluate this landscape-level analysis, but at the very least it acknowledges the extensive range of the bears, which can cover up to 60 square miles (Castellanos 2011a).

Although everyone acknowledged the deforestation that had taken place over the last century, people consistently reported that in the past ten years, there has been little timber extraction for two chief reasons: not only has enforcement against illegal extraction heightened, but also the valuable wood is now deeper in the forest and at times not worth the effort and costs to transport, especially clandestinely. In tandem with the little timber extraction that does occur, secondary forest recovery is also taking place (I was not able to measure either of these). A number of people discussed the phenomenon of households moving “down the mountain,” forests regenerating, and also the prospect of “everything turning back into forest” (see also Chapter 4). During a walking interview, I visited an abandoned house that was located near a pasture surrounded by secondary forest and the site of a bear attack. The family had moved almost two decades ago after the interviewee’s brother, now 19, was born, and in that time the area has been completely recolonized with trees. This “invisible” forest recovery may contribute to the issue (see 25 Nearer to the end of my stay, as I gained more trust and comfort, I began to learn more about the timber extraction that does continue to take place on a small scale. For large-scale landowners as well, especially absentee landlords (see Chapter 4), payments through the nascent SocioBosque program – a national program that would provide payments in exchange for agreements to leave forest intact – may also have discouraged forest activity. I was not able to gain a good sense of the extent to which the program is functioning.
Chapter 1), since forest recovery adjacent to pastures may provide a comfortable place from which bears can attack cattle and also a place for them to drag the carcasses (see Figure 5). These pastures tend to be farther away from communities, and in some cases (but not all) the bull calves are only checked on once or twice a week. This could potentially be an explanation for why bears have become a problem in the past few years and not in the past two decades, as one person puzzled: “We bought our land thirty, twenty years ago. We had cattle. They began to eat about two years ago. So it is not from working on the mountain [in areas we have cleared].”\textsuperscript{26}

**Figure 5. Cattle in pasture abutting forest.**

Photo by author.

People also raised the hypothesis that with less timber extraction and no hunting, the bears “aren’t scared,” especially since people are making much less noise with chainsaws. One person said, “Before, people were sawing [wood], but now they [the government] asks that we don’t saw, and so the bears can

\textsuperscript{26} Another important area of ongoing research is whether these secondary forests provide sufficient food resources for bear populations. The spatial and temporal dimensions of bear activity in the context of forest dynamics are being studied by Andrés Laguna of the Andean Bear Foundation, and certainly warrant further research.
comfortably come down here, because no one is making noise.” Others stressed not only the lack of human activity, but also personified the bears, joking that they know they are now protected and have free reign: “I think because now it is forbidden to kill the animals, they come down because no one will bother them,” or “Seems like they are coming because now they know they are protected, and no one will kill them. Now that they know we won’t touch them, they come to eat!” That the bears are protected by the government and killing a bear carries a hefty fine affects how people perceive the responsibility of the government.

A few people also brought up the idea that the bears had always eaten from the fields and pastures, but that the losses had changed. The same man in his early 60s who reflected on the significance of dollarization, and who, incidentally, has been even more impacted by bear attacks than most, said that “before, there was corn for [the bears] to eat,” and thinks that no one realized given the relatively lower value of the corn. In this sense, livestock’s function as wealth storage has potentially had the perverse effect of making a single bear incident more of a threat than it would be for crops. Another woman, in her 50s, related what her father had told her: “My father says that when people planted a lot of corn (maíz), the bears ate corn cobs (choclo). Now there is no food for them.” The documentation of Andean bears eating corn elsewhere in the province and throughout the Andes (Castellanos 2011a) also suggests that this hypothesis warrants further consideration. Though one conception of the issue might be that the bears and cattle are competing for resources, the current phenomenon of bear attacks on cattle can also be understood as a product of shifts in land use in terms of patches of deforestation and recovery and the “human food” made available to bears. Other explanations for the recent development of bear attacks on cattle abounded throughout the region, ranging from a bear escaping from a circus or a zoo to a bear developing a taste for meat as a result of biologists using meat in their traps. Many people said they did not really understand why this would start now, and most recognized that not all bears attack cattle.
**Distribution of threat**

Regardless of the reasons for the recent occurrences of bear attacks on cattle, they are a threat to these livelihoods, and risks are unevenly distributed. First, whether a household loses cattle to a bear depends on pasture location and caretaking practices. Bear predation on cattle occurred in pastures abutting forest and at a distance from communities, whereas it was not a direct concern for people with their cattle “downhill.” For some people, bears became a concern only when they needed to use their “uphill” rather than “downhill” pastures (these pastures could be as much as an hour’s walk apart). Only two people said that they made a decision to move their cattle to pastures farther away from the agricultural frontier. Most people, when I asked if they considered moving their cattle, said, “But there’s nowhere to put them.” Furthermore, though some people with their cattle in distant pastures milked them daily, many people left their male cattle for longer stretches of time when they were in distant and less easily accessible pastures. So, the risks are unevenly distributed spatially and most salient for people with cattle in the most marginal pastures, which are much more accessible to bears than to people.

Second, the threats to livelihoods are also unevenly distributed based on a household’s relative wealth or poverty, that is, the impact of losing cattle on household wellbeing depends on the household’s total cattle holdings, other livelihood strategies, and the household’s basic expenditures. For example, a household with thirteen head of cattle and five family members including an ill parent suffered much more from the loss of cattle than a household of one person with thirty head of cattle. As previously mentioned, however, none of these households are living in absolute wealth and all are seeking to improve their material conditions.

**Perceptions of threat**

Across my informants, perceptions of bears as a threat varied, as did levels of concern and anger, given the uneven distribution of risk (spatial) and of threats to livelihood (impact on household’s ability to meet its needs). This research did not explicitly seek to answer questions about environmental perceptions or delve into how personality influences responses to bears attacking cattle, whether
belonging to them or their neighbors. In communities as small as these, neither a quantitative nor qualitative (nor mixed-methods) study could, with any confidence, make connections between responses to the bear threat and any other factor – e.g. age, education, household earnings – except whether the person had directly experienced a cattle loss. I found that with such a small number of people, personality seemed to play a large role in how people responded. For example, a person who expressed anger about a number of issues (e.g. poverty, the government) also expressed anger about the bears; another who expressed resignation also expressed resignation about his now lonely life as a widower; a third who had what I would describe as a “can-do” attitude about building a business expressed a willingness to address the issue with the Ministry of the Environment and Andean Bear Foundation (though later frustration at inaction led him to take more independent action); and a fourth person who had a relaxed disposition and thirst for knowledge was eager to learn more about bear behavior. Of course, all of these perceptions are mediated from my own interactions with these individuals.

One surprising element that shaped perceptions of bears and fueled both anger and understanding was a short video of a bear eating a cow in front of a camera trap. The camera was placed near a carcass that had been dragged into a nearby forested area and does not document the attack, only the consumption. This video was part of a longer DVD about tree planting, forest conservation, and other projects related to a Peace Corps volunteer’s work in the region. He distributed the DVD and multiple people mentioned it, “Have you seen…?” For those who may have been largely unaware or unaffected, the video brought the reality closer to home. The novelty of the bear threat and excitement also possibly fueled additional interest in this issue as compared with more mundane threats such as climate and steep slopes, as described above. Moreover, people generally viewed the bears as the purview of the government and the problem as resulting from new government policies.

The government’s responsibility

Indeed, the bear threat particularly stands out not because of the number of cattle it claims but because of the uncertainty and novelty and, most importantly, because the government has a
responsibility to manage the bears. People were especially adamant that the government was shirking its responsibilities. One person said, “The government just forbids killing the bear, but doesn’t do anything.” The lack of attention frustrated people, and not a single person expressed positive feelings about the Ministry of Environment (MAE). One person called them “the environment people,” who say “that they want to get the bear, and then pay the people to whom it’s done damage. But that’s all talk and nothing more.” The MAE “didn’t believe us at first,” Silvio said. He was one of the few to distinguish between the MAE, a government agency, and the Andean Bear Foundation (ABF), a small foundation. He made the distinction that it wasn’t the “obligation” of the ABF to help in any way but that they wanted “to study the bear and trap it,” whereas the MAE “had no interest.” But because little progress had been made at the time of this study, “everyone here wants to kill it [the ‘problem’ bear].” Many who did not deliberately want to kill the bear expressed sympathy for those who did, and said they would feel the same if it affected them. However, everyone with whom I spoke knew the rules, and killing bears was usually spoken of in hypothetical terms and jokingly. Only in one instance did I hear a story of a bear hunt. The person who related this story said that they were unsuccessful because the group split into two and the unarmed half of the group was the one that encountered the bear. The lack of responsiveness of the province-level official was epitomized in no one having his phone number or an effective means of contacting him. The local sheriff, to whom people would report a range of issues including environmental concerns about timber or wildlife, did not even have a way to contact him.

Yet, the government is not considered a perpetual enemy in present-day Ecuador, and most of the people living in this rural parish spoke favorably of the current administration and its increased social programs. The other agency with which I most interacted, the Ministry of Agriculture, Livestock, Aquaculture, and Fisheries (MAGAP), was mostly well-received. Those who attended the workshops on topics such as treating mastitis (inflammation of the udders) and injecting cattle expressed appreciation for the MAGAP workshops. Others lamented that they often could not attend because the workshops were during the day when they were otherwise occupied. Likewise, my own interactions with MAGAP
were positive. As my time in the study area ended, the two institutions had begun to work together to address the bear issue in the parish adjacent to the study parish. Addressing the bear issue by focusing on cattle placement and management practices through MAGAP may be one sensible way to move forward (see Chapter 5).

**The economic logic of dairy production**

This chapter described the shift toward increasing reliance on cattle for dairy production, and the related economic rewards – the economic logic – as well as threats to these cattle-based livelihoods. The importance and pervasiveness of the new dairy economy and consequent reliance on cattle for livelihoods has made any threat to those livelihoods, including bears, a focus of attention. Next, Chapter 4 discusses the cultural role of these rural livelihoods.
Chapter 4: Commitment to the Countryside

The role of migration plays a key role in the shift to cattle-based livelihoods, and the relationship between two populations living on the agricultural frontier: people remaining in the countryside following five decades of rural outmigration, and Andean bears. This chapter draws on interview data to describe perceptions of rural outmigration in the region and the people who have chosen to remain for a combination of reasons related to preferring the countryside and structural elements such as caregiving obligations, education, and access to land. Dairy production allows those who remain “committed to the countryside” to pursue viable livelihoods. Moreover, not only does dairy “guarantee the material basis” of their livelihoods, it also allows them “to build something of their own” (Bebbington 2000, 500; see also Chapter 1) – this is the cultural logic of dairy production.

Rural outmigration

Outmigration and depopulation loom large, like climate, as a primary facet of life in rural Pimampiro. These themes entered most interviews early and often, and understandably so, given the number and percentage of people who have left the region. Examples abound of families in which only one or two of six, eight, or ten children have stayed in the area. Smaller family sizes also compound the sentiment that “there are no people” and in that sense as well, “now it’s all cattle.” Migration takes on many permutations, divided here into four types for heuristic purposes. First, some people leave permanently for national and international destinations, primarily the provincial and national capitals, Spain, and the US. Parents and family members report a variety of jobs including domestic employment, construction, and working in small businesses. The second group leaves for a long period without specific plans to return. Lucas, for example, migrated to Spain and brought his family there for ten years before moving back to Ecuador to settle in the provincial capital. He continues to hold land in his home community and grazes his cattle there, making the two hour trip once a week to check on them. Other people leave for a shorter period and with the intention of returning home. For instance, Humberto
traveled to Spain for a year to work in building construction, and Ismael to elsewhere in Ecuador for a few months to work on road construction. Finally, some people migrate regularly, for shorter periods (out-circulation or seasonal migration). For example, Rafael often leaves for a week or two to work in flower plantations elsewhere in the province. Overall, the sense is that people leave “to make money” or because they prefer the “easy” city lifestyle. They also leave because other people are leaving, meaning that there are fewer people with whom to work or start families.

“**There are no people**”

The number of people who wanted to discuss outmigration and especially their children and why they left the area highlighted the extent to which migration was on the forefront of people’s minds. For example, one woman asked me whether I was from Spain, and then directed the conversation immediately to her daughter who migrated to Spain and then Italy. Her other six children live elsewhere in Ecuador. Older people especially described the depopulation as abandonment and causing a noticeable lack of people to work. A man in his 90s took me on a verbal tour of the neighboring houses: “We planted corn, potatoes. But now there is no one to work. From Don Renato, three left for Quito. From Dora, too, all [10] of them left for Quito. From over there, from Leonardo, to Quito. There’s almost nobody. Over there, where Gabriel lives, the older ones also left. There is almost no one to work.” Both recently and long-ago abandoned houses are present (see Figure 6). Another telling example of the salience of this issue occurred the first day I arrived in the study region. A close relative one of my host families was visiting from Quito, and as described in Chapter 2 (p. 38), she was adamant that the study should be about “why people leave.” Her statement made me wonder, since she herself had left, if the question should not be “why people stay.” Though I chose to continue with a focus on the overall shift to raising cattle and how bears fit into the picture, her remarks were prescient, given the extent to which rural outmigration and non-migration play a role in the new livestock economy.

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27 Despite the significance of migration, remittances are not a significant feature of the economy.
Figure 6. Abandoned houses in the study region.

Houses have been abandoned both recently (top: a neighbor said the family had left the house permanently) and years ago (bottom). Photos by author.
Not a new story

Rural outmigration is not a new story in the rural Ecuadorian Andes, where outmigration has been an ongoing process since the middle of the 20th century (see Chapter 1). The visiting relative, now 72, had left the area in 1958 at age 18. Many people in their mid-50s and mid-60s were the only ones of their siblings who had remained. In some cases land was a factor; Frida, in her late 40s, was the only sibling who stayed. Her six siblings left because “here, they couldn’t work. And they were bored. The money is there [in the city]. The stores, the food, to eat, to enjoy oneself. And they didn’t have anything, not even land,” and another woman concurred, “It’s that there has never been work for young people.” There are two seemingly contradictory stories – that there is no work, and so no one to work – that are really both sides of the same issue, or a self-fulfilling cycle related to the types of work different people seek and the minimum number of people needed to work at peak times in planting and harvesting crops. People interested in pursuing an education also left if they or their parents had the funds. Structural factors like land and education have influenced and continue to contribute both to people’s reasons to leave and to their reasons to stay, as do reasons of preference. The next section relates the reasons people have remained in the countryside.

Remaining in the countryside

This study focuses on the people who have stayed or maintain ties with this rural place by continuing to hold land and cattle. I call this being committed to the countryside, whether the commitments are framed as primarily voluntary (preferences) or primarily involuntary (structures), though reasons of preference and structure intersect and reinforce each other. The following section details the roles of preference and structure as two sets of reasons for remaining in the countryside, separating them only for organizational purposes, and also describes the commuters and absentee landlords committed to the countryside without living there permanently. Finally, it relates how people
describe potential futures. These details provide evidence that cattle-based livelihoods are not only economically viable but also culturally meaningful.

Preferences

Some dairy producers emphasize that they choose to live in the countryside because they prefer not needing to pay rent, being their own bosses, and living in a place with rural “values” that is calm (tranquila) and away from pollution and health hazards. For example, Hugo, in his early 30s, explained that he does “not like being an employee, having someone order me about what I have to do, and then have to wait a month to be paid, and live renting, and with just enough money for [bus] tickets to get from here to there.” He and his wife, 8-year-old son, and sister-in-law live comfortably in a well-kept two-story house, relying on the earnings from their artisanal cheese. Hugo has access to land and maintains 60 head of cattle, with 15 producing about 90-100 liters of milk a day. Hugo and his family also do not pay rent, like many urban families. In creating a successful small dairy operation in the place he prefers to live, Hugo has a livelihood that meets his family’s material needs and preferences.

For Griselda, also in her 30s, living in the country with its neighborly values and closeness to the land is important to her. Eager to talk, she explained the transition and her motives for staying in one sweeping statement:

There were people who left, because they worked in agriculture, and now there aren’t any. With this weather you can’t plant, and so some people left, and other people worked raising cattle. Of course, this region had ranching, but very little. It was more agricultural, and people planted barley, and potatoes, but now you have to buy them. It’s very difficult for us, because before we planted and we had what we needed to eat, but now… It’s been very difficult, life here, it’s been a total change for the people here. Imagine that everything you saw before has changed. Before, people planted, corn, potatoes, peas, tree tomatoes, and this region also was a region where there were the most tree tomatoes produced. But now the weather changed, and the young people have left. They finish primary school and they leave. I think, it’s been a big change, but I wouldn’t want to exchange this tranquility, this environment for the city…The city is very difficult. Imagine, here, we still have the custom, if I don’t have something, my neighbor has it, and my neighbor loans or gives it to me. But in the city, if you don’t have money, you don’t have anything.
Griselda offered this breathless narrative within five minutes of my explanation of my project to document and better understand the transition to cattle in this region. She emphasized that despite concerns about climate and outmigration, she continues to choose the countryside for the quiet and lifestyle as well as the opportunity to live in the way that she prefers, even if she is cash poor. Griselda also emphasized her connection to the land: “I very much like flowers, and agriculture, and to be in touch with the earth.” At the time of the interview, she was in the middle of a three-year position with the municipal government, to which she commutes daily from her community. Without the time to devote herself fully to agriculture, she plans to begin a flower garden next to her house that she can cultivate outside of her nine-to-five municipal job.

In terms of livelihood strategies, Griselda and her husband have twenty-two head of cattle to supplement her income from the municipality and also recently built a greenhouse, highlighting their intent to remain in the country. Within the year prior to this research, Griselda and her husband entered a business partnership with their daughter and son-in-law to grow greenhouse tomatoes. Her daughter and son-in-law, whom I did not have the opportunity to interview, had briefly moved to the provincial capital but found the lifestyle unworkable, and when they returned, her son-in-law proposed building a greenhouse on their land. The family is optimistic about the returns and anticipates repaying their loan within the year. This extended household, as a whole, expressed continued commitment to the countryside given their preferences.

Samuel, also in his 30s, shares similar sentiments. He said: “I like the countryside. I don’t like the city. There you have to buy everything, you have to go out to buy milk, cheese, and here you don’t buy eggs, and you can kill a chicken. There everything is bought, and so you work just to eat, there’s no progress.” Later in the interview he returned to the finances of urban life: “With $200 a month, you have to pay rent, food, school. If you drink coffee, you won’t have lunch.” Over our three interviews, he also highlighted the pollution in the city. Samuel supports a family of four raising cattle on land he borrows in
exchange for being the caretaker. For him, cattle and dairy production are essential to maintaining his household’s livelihood.

Hugo, Griselda, and Samuel each live in a different one of the three focus communities, and despite the differences in infrastructure, explicitly stated their preferences for the countryside. Each also represents a different cattle-based livelihood strategy. Hugo’s household relies on a successful cheese-making operation, making the most of his access to family land and the joy he finds in raising livestock. He also benefits from living in a community relatively accessible to the county seat, though it is not on the route of the cheese factory trucks. Griselda’s household has pursued a more diversified strategy and relies on cattle as insurance and supplementary income, also making the most of a relatively flat plot of land they own that is suitable for a greenhouse as well as access to the county seat for Griselda’s day job. Samuel’s household relies more heavily on cattle as well as a handful of crops and, given the household’s lack of assets, is in a more precarious situation. Taken together, these three people in their 30s provide examples of younger people who intend to remain in the countryside for the coming decades of their working lives.

Members of the older generation also expressed their preferences for the lifestyle in the countryside. Mateo, in his early 60s, stressed, “Here life is more calm. In the country, there is less pollution, in the city, there is the pollution from the cars, the noise, here it’s peaceful, and you wake up at the time you want. In the city, you have to wake up quickly, at six in the morning, abruptly.” For Mateo, waking up for himself, since cattle require daily labor without weekends off, is important, rather than waking up for a boss. Other older people had left and chosen to return. Diego, also in his early 60s, had moved to the eastern region in the 1970s and returned because he did not like the hot climate and also said that in this area, “the people are good” with few dangers and robberies.

Reasons of preference sometimes supported or were expressed in synergy with more structural factors, such as education, land, and perceptions about opportunities elsewhere. One example of this occurred in my interview with Lara:
Catherine: Why did you decide to stay?
Lara: I don’t want to go elsewhere because it’s not mine.
Catherine: You prefer the countryside?
Lara: Of course.
Catherine: Well, there are many reasons to prefer the countryside. What are your reasons?
Lara: It’s because I don’t have anything there that is mine, and I’m not used to it… and because I don’t have anything, where would I go? Here it’s mine.

I find this excerpt illuminating because Isabel includes structural concerns in terms of what she owns and the opportunities that may exist elsewhere in describing her preference for the countryside. Lara, in her 30s, is a widow and raising an elementary-school age child. The “mine” that she described is a hectare or so of land and no cattle and only smaller animals. The intersection of reasons of preference and structure demonstrates situated knowledges and how people’s different social locations, experiences, and personalities contribute to how they explain their commitment to the countryside.

**Structures**

Residents also remain in the country for structural reasons such as caring responsibilities, lack of educational credentials and diminished employment opportunities, and the lower costs of living compared to urban areas. Many who remain do so because of their caregiving obligations, and examples exist from each generation. For instance, Justino, in his late 20s, cares for his mother and sister, who has a disability. Telmo, in his late 30s, cares for his elderly father and aunt. His father said, “The people left because in the city, they work and earn money. They leave to earn money.” When asked why Telmo didn’t leave, he said, “He didn’t leave because he didn’t want to abandon us.” Telmo, in turn, couched his reason in preference: “I don’t want to go to the city. I frankly don’t like the city.” Like Hugo and Mateo, he also expressed that he did not want to have a boss and that he only went to primary school. Eduardo, in his late 40s, cares for his aunt with a disability, and Laura, in her 50s, cares for her aging parents; she said, “Because [of my siblings] I’ve stayed, now I’m in charge, and now I have to take care of them.”

Education also plays a role, either in limiting an individual’s opportunities or motivating a family’s choices. Most people with whom I spoke had only completed primary school, and those who had
completed high school often expressed that they did not enjoy school. Some of those who had only completed primary school wished that they had had more opportunities, especially the women who were passed over in favor of their brothers’ educations. Lacking a diploma or *título* meant that job opportunities were more limited elsewhere. Ana, for example, expressed a preference to be in the city but said that this would not make sense because she “has only finished primary school.” Ana had migrated for ten years from the age of 13 to 23 to work in the flower plantations before returning to the parish to get married. Griselda, mentioned above, who avowed her love of the countryside, also lamented her lack of education and its impact on her work with the municipal government. When people discussed what they might actually do in the city, they highlighted that the jobs would need to be those that do not require an education, such as selling produce or working in construction. Educating their own children also factors into some parents’ decisions to remain in the countryside given the expenses (e.g. buses, food) in the city. Moreover, many people who did migrate did so explicitly to pursue an education or training. For example, Tomás left in the late 1980s to study in Quito and from there migrated to Spain, where he now hosts a radio show and manages a trucking business. Nelson moved to the provincial capital to pursue training for truck driving and regularly returns to the land and animals he shares with his siblings. Young people whose parents have resources to send their children to university do so, whereas other young people said that their households do not have the resources even for them to finish high school. Such variation emphasizes the extent to which inequality has developed in the countryside; not only are threats unequally distributed, but also opportunities are as well.

**Commuters and absentee landlords**

A third, but much smaller, category of people with ties to the countryside and raising cattle there also exists: commuters and absentee landlords who choose to maintain their ties with the region through their investments, while living elsewhere, usually in the county seat or provincial capital. For them, raising cattle either in partnership with relatives or with hired help has the benefit of bringing in additional income with little additional investment given the low cost of labor and the potential to
exchange land for labor. Lucas and Nelson, for example, live in the provincial capital and return to their rural parish regularly. Both experienced bear attacks on their cattle, perhaps as a consequence of leaving the responsibility to others or leaving the cattle unattended. Both attachments to the country lifestyle and economic incentives motivate continuing these ties, and similar patterns occur throughout the Ecuadorian Andes (e.g. Jokisch 2002, Chapter 1). In some cases, the landholdings of absentee landlords allow others to remain in the country. For example, Néstor and his family migrated from the guerilla zone of southern Colombia to live with more security, caring for 40 head of cattle for the landlord, who lives in the provincial capital. Samuel chose to return after several years working in a flower plantation and is caretaker on the property of a lawyer who moved to the county seat since her husband died. Samuel grazes his cattle for free on her land and supports his family of four with this arrangement.

An uncertain future

The future of this parish where “there are no people” is uncertain, both in terms of individual plans to remain or leave and also of how the parish as a whole may transform. Depopulation frames people’s perceptions of the region’s future. When I asked Beatriz, “In your opinion, what will be the future of this community and this region?” she said, “In the future, there won’t be any people, and it will be empty. All of the young people have moved to the capital. So, who will live here? They’ve made their lives there and they won’t come back here again.” This study focuses on those who have stayed and in many cases, intend to stay; these are the people who will continue to pursue livelihoods on the agricultural frontier and possibly interact with bears in the process.

However, a number of people currently in the countryside also intend to leave, and their departures may influence the future of these communities. For example, husband and wife Eduardo and Ester, whom I interviewed separately, each told me about their plans to leave. Eduardo, in his early 50s, explained that he does not plan to retire in the country but remains at the moment due to social security structures: “It will eventually be time to leave…for an older person there isn’t any work.” Once they have saved up enough funds and have reached the retirement age to collect social security, he intends to move
to the provincial capital, a more “comfortable” area where the cold would not hurt his wife’s knees. Ester also mentioned her knee pain as a primary concern but was not as optimistic about their prospects; when I asked her about where they would go, she said, “Wherever I could, to sell things in a market, look for work that I could do. But who would give me work? Nobody. I’m already old. So I would have to look for work like selling habas (broad beans) that I bought, selling choclos (corn).” At present all of their grown children have left the area. Their household is the most poised of those in this community for a successful transition and yet their departure also might represent a loss for their neighbors because they currently own the only truck in the community, which serves as a key link to town.

Some parents did not focus on their own possibilities of moving but on encouraging their school-age children to do so. For example, Ana wants to leave because of the cold and also due to knee pain, though her husband Mateo does not want to. They direct the household income to their children. Speaking about their future, Mateo couched his predictions in their children’s potential preferences: “People are leaving little by little. If for them they want a profession, they’ll leave, and if not, they’ll stay, as a campesino. Some like to study, and others prefer to stay in the country.” Likewise, Samuel wants to educate his children to pursue a profession because “life is hard in the country, and also people fight about the inheritances.” As parents continue to encourage their children to migrate, the population will likely continue to stagnate or decrease. Young adults also expressed plans to leave especially to pursue educational opportunities. Enrique, 18, wants to move to the city and become a chef when he finishes high school, and Pascal, 21, intends to go to university for computer programming once he saves up enough money working at the new parish’s internet center, an example of increased government social spending. Some people expressed that they will be forced to leave as well. For example, Marco, 19, had not originally planned to leave but found that agriculture had gotten so difficult that he would prefer to move to Quito where most of his friends are, though raising cattle still provides hope; he said, “The most difficult is agriculture [growing crops], and ranching is only a little better.” Likewise, Telmo, 38, plans to
leave “eventually” because “everybody is leaving” and he thinks that “everything will turn back to being mountain.”

Forest recovery

Telmo’s sentiments relate one prediction residents have about outmigration on the future of the parish as a whole: that previously forested areas will recover. When I asked Eduardo, who plans to leave (above) about the parish’s future, he said that “the place will be abandoned” and “all the young people are leaving and the old people are dying, and it will be mountain again. There are no people to work well (trabajar bonito).” Like Eduardo, Samuel predicts that this outmigration will make the mountain increasingly empty. He described how in the past few years, Gabriel and his family moved from higher up on the mountain to a house on the road that had been vacated. His own parents had done the same about two decades ago, moving from an abandoned house he showed me when his brother was born 19 years ago, as mentioned in Chapter 3). However, which fields, pastures, and other land areas would transform into forests or grasslands, and in which ways, is open to question based on issues such as altitude (Lippok et al. 2013). Even so, such recovery possibly could present “an opportunity to expand current protected areas and to promote habitat connectivity” (Sánchez-Cuervo et al. 2012, 1), not an outlandish possibility given that Pimampiro’s rural parishes abut the extensive Cayambe-Coca Ecological Reserve (see Figure 1). Additionally, continued outmigration may exacerbate already-developing unequal distributions of wealth and opportunities in the area. Whereas some households are able to consolidate landholdings or begin new ventures such as raising pigs or growing greenhouse tomatoes, landless or land-poor households are faced with fewer and fewer opportunities to work for a day wage.

The cultural logic of dairy production

This chapter highlighted multiple perspectives of residents to describe how people remain in this parish for both reasons of structure and preference. I drew on these varied situated knowledges to make a larger interpretation: that a cohort of people “committed to the countryside” exists. Despite any
continuing outmigration trends – trends with a decades-long history – the area is unlikely to depopulate completely, though populations of humans, cattle, and bears may shift. For those committed to the countryside, cattle-based livelihoods not only provide economic rewards but also rewards in cultural terms for the lifestyle and opportunity to make a “meaningful living” (p. 9) in the mountains. Though raising cattle is not part of the cultural patrimony of the region and rather represents a practical choice given varied constraints and opportunities, dairy production does allow people to remain in this rural space. And so, for many, cattle raising and milk production represent viable alternatives to outmigration.
Chapter 5: Conclusions

This chapter returns to the initial research questions: (1) How has raising cattle become a form of livelihood in the northern Ecuadorian Andes, and (2) How have the indigenous Andean bears come to represent a threat in this landscape? The confluence of the contemporary challenges of making a living in rural spaces, the risks of the cattle economy, encroachment on bear habitat, and frustration with government policies have created the context in which bears have become a “problem.” By juxtaposing informants and interweaving the scholarship on these issues, this study strives to present a “faithful account of a ‘real’ world” (Haraway 1988, 579; Chapter 2) and simultaneously to demonstrate that no one single objective “scientific” story exists. Rather, this research suggests how the threat of bears is socially constructed and produced by a variety of decisions regarding livelihoods. Such livelihoods in part display characteristics of the new rurality and also contribute to bears being perceived as a threat. The various positions and situated knowledges of rural dairy producers and residents also have implications for policy, and many opportunities exist for further research.

Livelihoods in the new rurality

Raising cattle has become a popular form of livelihood in the study area in the northern Ecuadorian Andes over the past two decades, as growing crops became less reliable and dairy production offered more security (Question 1). The challenges of making a living led to a new organization around dairy and also new threats. The development of cattle-based livelihoods in this region and the economic organization of Pimampiro have created a place with characteristics of the new rurality. The rural parishes of Pimampiro exhibit the four major transformations that characterize “new rural” spaces (Kay 2008, Chapter 1) to varying degrees. Rural-urban interactions are essential to the economic viability of dairy-based livelihoods, and without urban demand, there would be no market for cheese. Migration is an important feature shaping land use and also people’s perceptions of the region and its future. Kay (2008, 936) writes that flight from the countryside is “hardly a strong foundation on which to build a new
rurality,” which links to the concern many of the people I interviewed expressed about there being “no people to work.” The outflux of what the livelihoods approach names “human capital” in its assets pentagon has in part influenced the transition from growing crops to raising cattle (Chapter 3).

*Flexibilization and feminization of rural work* also exists. Both men and women care for dairy cattle, which presents a flexible option for a household in which one person may have another job or travel for work. Finally, to a lesser extent, *rural non-farm activities* do occur. Griselda, featured in Chapter 4, has a three-year contract with the municipal government that is in part due to increased emphasis on both rural and female representation. Her income and, moreover, learning and experience from this job, will likely influence the future of her household and community. However, rural non-farm activities are neither common nor pervasive and the dominant feature remains on-farm activities. That livelihoods in rural Pimampiro are land-based or *on-farm* activities, such as raising or growing commodity crops, means that this rural area is not entirely emblematic of the non-agricultural “new rurality.”

### Remaining in the countryside

The regional dairy economy based on urban demand (*rural-urban interactions*) and related to labor shifts (*migration*) has encouraged many people to pursue *on-farm* cattle-based livelihoods in favor of crops. Dairy production in particular has provided people a way to remain in the countryside (Chapter 4) and in many ways this study became about non-migration through the co-production of knowledge. As I learned about people and their lives, livelihoods, families, and households, questions of identity in the countryside and migration routinely came to the fore. Open-ended questions and an opportunity for the “gaze to be returned,” as outlined in the discussion of feminist approaches to fieldwork (Chapter 2), revealed the commitment to the countryside of the people I interviewed. Older parents in their 60s emphasizing their children’s departure and the changing nature of work in the countryside, younger people in their 30s eager to tell their stories of leaving and returning to build a life of their choice, and frequent questions for me about my background highlighted how a strong sense of place and identity of making a living on the land influence livelihood choices and the current focus on dairy production.
Presently, for many people, dairy and migration are two competing alternatives. As Oscar commented, “There aren’t alternatives here [to raising cattle]. Living next to town, you can have a store. If I don’t have cattle, if this [the bear problem] gets bigger, then I will have to go live next to the city and open a store.” However, attention situated knowledges reveals that alternatives to raising cattle exist depending on someone’s position. For some, positions mediated by characteristics such as access to land, education, or family structure, may set up a false choice between cattle and migration. Others may view cattle as one of many diversified strategies that allow them to remain in the countryside, as with Griselda and her municipal job and greenhouse in addition to cattle. The preceding chapters demonstrated how cattle-based livelihoods serve both economic and cultural purposes in the rural Ecuadorian Andes. Yet other alternatives without foundations in land-based production do exist.28

**Alternative rural livelihoods**

Another set of alternatives, tourism and payments for ecosystem services, are much more emblematic of the new rurality because they take place in rural spaces but are not agrarian. First, both residents and one person running a small NGO loosely involved in the area have discussed tourism as an alternative means of livelihood. A number of people in La Paz shared with me their ideas for tourism projects, and some intended to collaborate within the community whereas others did not. One person proposed capturing the “problem” bear, housing it in a large enclosure, and organizing an ecotourism venture based on the bear, but related that the group was not able to secure support in terms of political will or money even to attempt the venture. (The proposal is not as outlandish as one might think, given that its main proponent worked for several years in a zoo in Spain, and Andean bears live in captivity in

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28 Alternative land-based livelihoods in addition to staple crops and cattle include commodity crops (e.g. greenhouse tomatoes, peaches, tree tomatoes), which provide livelihood opportunities for those with access to the appropriate type of land and capital. Livestock other than cattle and more appropriate to mountainous regions were rarely present or mentioned. In my time in the study area I met only one person who raised sheep and heard of only one other person who raised goats. The profit margins with smaller animals were much smaller, meaning that they were less useful in terms of participating in the market economy. Others described the two people with sheep and goats as doing it because they liked those animals, but that most people prefer not to raise them. In addition to commodity crops and smaller livestock, a third land-based option would be improving cultivation (e.g. improved soil management and seeds) and market policies (e.g. import restrictions) for staple crops.
much smaller spaces such as the Smithsonian National Zoo.) In El Carmen, a group was setting up regular meetings and pushing political officials to promise a road-building project over the mountains on the eastern range to the rainforest region. Their proposal emphasized ecotourism though the person running a conservation-focused NGO expressed that it was a guise for obtaining more land in the high Andean grasslands. Yet the experience of other ecotourism projects in the neighboring parish and throughout the Ecuadorian Andes suggests that though such projects are possible, they may not yield the levels of tourists and income desired. A tourism-based economy is one possible alternative both to cattle and to migration but would take a significant amount of planning, investment, and cooperation, whereas pursuing dairy production is much more autonomous.

Second, payments for ecosystem services, or payments by the state or another institution to individuals for conserving land or water resources, would be another alternative to land-based production. Programs such as the national initiative SocioBosque compensate people with forest landholdings for leaving primary forest intact (de Koning et al. 2011) and a decentralized, NGO-led local initiative in Pimampiro compensated people for protection of upper watershed forest and grassland (Wunder and Albán 2008). These programs may offer people with extended landholdings additional revenue streams but the amounts of money are far less than the potential earnings from dairy. The extent to which programs such as these are effective even in their current form is outside the scope of this study, though on one occasion I observed a meeting in another parish in which people expressed dissatisfaction with not receiving their payments in a timely manner.

**Situating the bear threat**

The indigenous Andean bears have come to represent a threat in this landscape with the introduction of cattle-based livelihoods and, moreover, frustration with government conservation policies and inattention to this issue (Question 2). As illustrated in Chapter 3, bears are one of many threats to cattle-based livelihoods and livelihoods in general. Unlike inadequate pasture, limited access to forage,
and vulnerabilities to steep mountain slopes, bears are identifiable and easily blamed. Moreover, people can hold an identifiable institution, the Ministry of Environment, responsible. Yet the risk of bears to livelihoods was not a “problem” until recently, most likely due to the new and increased presence of cattle in the region and in pastures abutting primary and secondary forest. Varied ideas about how and why bears became a concern in the past several years abound, and without sustained ecological research it is both difficult and irresponsible to make assumptions about the processes at work in terms of population shifts and food access in the large albeit fragmented forest habitat along the eastern range of the northern Ecuadorian Andes. Regardless, the very presence of cattle – a capital investment placed in a vulnerable position and often left for days without attention – has specifically introduced and mediated the current issue. Rather than “human-bear conflict,” the term “human-cattle-bear relations” more aptly describes the situation in which cattle are the crux of the “problem,” since the shift to cattle-based livelihoods sits at the center of the issue. This research focused primarily on people and their cattle and found with confidence that the populations of cattle have grown significantly in the study region over the past two decades. In terms of understanding the full set of relations and the “bear threat,” much knowledge remains uncertain.

**Uncertain knowledges**

How and why a few bears, called “problem individuals” in conservation biology, became a threat in the past several years is a question not only of social and economic change in terms of shifting livelihoods to dairy production (Chapter 3) in the context of migration and rural livelihood persistence (Chapter 4), but also of ecological processes. Considering situated knowledges and writing uncertainty into the text (Rose 1997, 318-319) allow for acknowledging both the social construction of the bear “problem” and its ecological dimensions. The introduction of cattle and persistence of rural livelihoods in indigenous Andean bear habitat created the issue. Landscape-level ecological processes of simultaneous forest loss and recovery – not only in the study area and rural Pimampiro but also in the nearby ecological reserve and the Amazonian region on the other side of the mountain range – also contribute to the occurrence of incidents (why here, why now).
Understanding human-cattle-bear relations in terms of populations and land use is also challenging. On the one hand, both the Ecuadorian national census and all of the people I interviewed confirmed that human populations have largely held steady or decreased in the rural zone of cantón Pimampiro. All people interviewed including rural residents and government officials also confirmed that cattle populations have grown substantially, prompting replacement of crop fields with pasture as well as development of new pasture, though the extent of new pasture development remains unmeasured. Yet bear populations may have decreased, increased, and/or shifted geographically. Accurately measuring Andean bear population numbers, densities, and characteristics is notoriously difficult (Garshelis 2011, see also Chapter 1), especially in a place where biological research receives little funding. Even where conservation research is better funded and a greater number of scientific “experts” exist, scientific uncertainty influences debates over conservation policy, as Lisa Campbell (2011) demonstrates in her study of marine turtle conservation in the US. The uncertainty about bear populations and bear behavior continues to put the bears – rather than the cattle or cattle-based livelihoods – at considerable risk.

Regardless of population changes and shifts, continued habitat loss and fragmentation, poaching, and lack of knowledge continue to threaten the long-term survival of the species.

On the other hand, claiming that the dearth of data contributes to a lack of knowledge and therefore uncertainty is an easy statement to make, and creates easy suggestions for further research as well as “if only” claims that suggest the possibility of certainty. For example, one might say, “If only there were data on bear populations, or the forest in the past, or accurate longitudinal records of cattle ownership and pasture expansion, we would be more certain.” This would be an example of the “information deficit model” that regards scientific knowledge as separate from society (J. D. Brown and Damery 2009, 88). However, the situated knowledges thesis calls into question the idea that there is a single certainty or objectivity, and also the idea of a “we” that can be “more certain.” Data collected using different methods, about the same phenomenon, may yield internally consistent results that do not triangulate – not because neither is correct but because each method is situated and partial (Nightingale
This study, for example, makes claims about rural residents’ commitment to the countryside from the situated and partial perspective of those residents themselves. It does not address the perspectives of residents who left permanently, nor does it incorporate remotely sensed data as Nightingale (2003) did in her mixed methods study of community forestry in Nepal. Comparing insights from interviews and remote sensing, she shows that each is situated and partial (86). In addition, even if “perfect” or “comprehensive” information were obtained using mixed methods, the information would likely still be contested in terms of its importance. For example, even obtaining reliable quantitative data for the number of bears or household incomes does not address how many bears might be considered adequate to sustain a “healthy” population, or what income is sufficient for a household. More data, in the absence of respectful collaboration among policymakers and residents and full consideration of the Andean bears, likely would not lead to a sustainable resolution.

This uncertainty reveals insight into how feminist approaches to knowledge and political ecology intersect. Just as a regional political ecology approach takes into account how multiple interacting factors related both to structure and agency affect human-environment interactions (p. 26), the feminist critique of science warns against a single “objectivity.” Instead of presenting a story with Cause A leading to Effect B, this thesis writes both uncertainty and situatedness into the text (p. 36). Both structural factors, such as the preexisting mountainous terrain or national monetary policy, and those perceived to be more about agency, such as preference and commitment to the countryside, are multiple “causes” with a network of interlocking “effects” such as shifting livelihoods and threats both to cattle and bears in this context. Because in many ways the bears are personified – as people express indignation about a bear not eating every piece of a cow it killed, for example – they are attributed agency and become easier to blame, unlike the mountainous terrain. The Ministry of Environment and its employees charged with enforcing environmental protections and who exhibit identifiable human agency are even less likely to elicit sympathy than the bears.
Uncertainty not only permeates understandings of Andean bear populations and behavior, which receive little research funding and attention. In this landscape, little data collection and research exist in terms of gathering weather data and measuring climate change across diverse microclimates or understanding or attempting to isolate the impacts of adopting the dollar (dollarization) on the rural economy. Such uncertainty about wildlife, climate, and markets shapes how people perceive and approach their livelihood pursuits. Recognizing the situated knowledges and perspectives that emerge in this context of ambiguity and insecurity may help people and institutions more appropriately plan policies and interventions.

**Situated perceptions**

Not only do uncertainties exist, but perceptions of the bear issue specifically are situated and dependent on the *position* of an individual. Whether someone highlights bears as threats or even perceives them as important in the landscape and in their livelihood pursuits depends on whether they have been affected by the presence of the bears and the level of absolute and relative damage experienced, their access to knowledge about the issue, and also their personality (p. 65-66). Cattle mediate human-bear relations, as described above, and moreover, the specific role cattle play in a household’s livelihood strategy in terms of importance, the number of cattle a household has and the effects of losing one head, and the geographic location of the cattle also mediate perceptions of the bear threat. The definition of the problem and other “situational factors” influence how uncertainty and risk are perceived (J. D. Brown and Damery 2009, 86). The particular positions and situated knowledges of each household or community affect the extent to which bears are perceived as a threat to the ease of economically and culturally viable cattle-based livelihoods. Moreover, in my interviews, many people did not even raise the bears as an issue when I asked about risks or threats to cattle or other concerns or worries. Yet the handful of respondents who did raise the issue often expressed very strong feelings of anger or outrage, and it is my interpretation that these people and their outrage could gain more traction in their communities if the incidents continue without any attention or intervention from the government.
Policy implications

The people I interviewed expressed two primary policy suggestions: that the government pay attention, and that education and outreach continue and grow. Feeling unrecognized and unheard by the Ministry of Environment (MAE) was a recurring complaint, and regular and honest communication could lead to improved relations, which in turn may help rural residents and government officials work together to mitigate the “bear problem” and also may address other concerns rural residents have about conservation laws and their livelihood pursuits. People also regularly expressed their desire to learn and attend workshops by the Ministry of Agriculture, Livestock, Aquaculture, and Fisheries (MAGAP), though many lamented that the times of the workshops were not convenient. Linking agricultural extension related to cattle and crops, environmental education and awareness, and other education and services would likely be an effective way to disseminate information, clear up any misconceptions about wildlife and wildlife management, and provide people with the information they are seeking. MAGAP may be well-poised to offer people strategies focused on cattle (rather than bear) management.

It is also my hope that presenting the perspective, or situated knowledges, of people raising cattle on the agricultural frontier will help those designing or implementing macro-level policies, such as officials from the national office of the MAE, to consider not only the economic but also the cultural functions of such livelihoods. Not only will any national-level programs or policies need to take into account the uncertain biological and ecological “facts” of the case, but also the ways in which continued outmigration and land-use change may operate in one time frame, whereas changes in forest dynamics may occur in another time frame. Also, any large scale programs designed to support people leaving these rural spaces in favor of nature conservation (as discussed in Grau and Aide 2008) will likely not be effective since many of those remaining purposefully seek to stay in rural areas. Environmental and social knowledge from the perspective of people making a living on the agricultural frontier demonstrates not only how the “quality” of the knowledge but also its mediation and consumption can have varied meanings for different social groups (Eden 1998, 430). This study presents a situated position in the spirit
of democratizing knowledge without falling into the relativist trap, as Sally Eden (1998, 429) warns in her review of the geographical scholarship on the environment and uncertainty:

But, if we are unhappy with the dominance of rationalistic and contributions and the scientization of environmental debate which precludes and deprivileges nonscientific viewpoints, what can we advocate in their place? We encounter the relativist trap: if ‘expert’ forms of knowledge (i.e., scientific) are no longer automatically privileged in environmental debates, are all forms of knowledge then valid? How are we to discriminate and what will count as legitimate in this free-for-all?”

Haraway and the feminist theory of situated knowledges have much to offer political ecology in terms of the possibilities and pitfalls of democratizing environmental knowledges. It is not relativist knowledge that is sought, but “faithful accounts of a ‘real’ world.” (p. 28-29).

**Further research**

Many opportunities exist for further research both in terms of this locally specific case and also of the larger literature on agrarian transitions and human-wildlife relations. Here I mention four of many possibilities. First, an extended, in-depth study of the bears involved and the larger ecological changes along the agricultural frontier and in the forest would greatly add to the explanatory power of how contemporary human-cattle-bear relations have developed. Extended biological and ecological research requires significantly more resources than a short qualitative study such as this one. A second opportunity is further research into the role of dollarization on agrarian change in Ecuador and on the lives and livelihoods of rural producers. Third, this study focused on a primarily mestizo parish. Research in a primarily indigenous community might reveal similar or an entirely different set of shifts and relations and is an avenue for further study. Finally, more extended research on climate variability in the Andes, the extent to which it corresponds with global climate change projections, and farmer adaptation and land-use change would contribute to the growing body of literature on climate change adaptation and continue to untangle how adaptation plays out in the Andes.
Complexity on the agricultural frontier

The case of human-cattle-bear interactions in the Ecuadorian Andes underscores the social and ecological complexities surrounding human-wildlife “conflict” around the world. This study also demonstrates the value of taking a regional lens that incorporates both rural-urban interactions (“away” from the agricultural frontier) and rural-forest interactions (“toward/across” the agricultural frontier). One afternoon in which I took a break from scheduled interviews to cook with Adriana, my host in La Paz, and her friend Maria, emphasized the extent to which culture, nature, and evolving foodways and livelihood pursuits intersect to create specific moments in time. Maria taught us how to make her version of sweet corn envueltos (wraps, tamales). Making wraps over the course of an afternoon two friends planned in order to spend time together illustrated evolving ways of making food and provisioning households, and changing knowledge bases. The women split the costs of the corn, which they bought in town as participants in the urban market economy. Both of their households have revenue streams from household dairy production as well as from wage labor at the only hacienda in the region, and neither continues to grow crops such as corn.  

Maria also led the walk into the forest to collect the bijao and vicundo leaves we used to make the wraps. Vicundos, or bromeliads, are one of the primary plant foods for Andean bears. To me this represents how, in small and large ways, people overlap with bears both in the forest, collecting forest products more rarely than ever before and in pastures, as Maria’s household lost three head of cattle to a bear. The urban (corn bought in the market) and the forest (bromeliad leaves) connect in the wrap as well. This accidental ‘ethnographic moment’ also highlights the value of qualitative and place-based research. The knowledge reveals neither a pre-existing field nor a pre-existing and static reality. It reveals a partial moment rather than a “god trick” view. It is my hope that place-based insights and attention to people’s daily lives and livelihoods will encourage the people and institutions involved to account for the full landscape and its context when considering how best to harmonize relationships among humans, cattle, and bears on the agricultural frontier.

29 The hacienda has only five employees, two of whom live in these two households.
Appendix A: Interview Guide

Sample semi-structured interview protocol, revised 6/3/2012

Las entrevistas serán administradas en un lugar conveniente para el/la participante, ya sea en casa, mientras trabajando o caminando, o en un lugar publico. Las entrevistas serán planificados por una hora (aproximadamente) y podrían continuar por más tiempo (según sea necesario) o menos (debido a la logística). Segunda y tercera entrevistas serán solicitadas cuando sea apropiado.

*Interviews will be conducted in a place convenient for the participant, whether at home, while working or walking, or in a public place. Interviews will be planned for an hour (approximately) and may continue for more time (as needed) or less (depending on logistics). Second and third interviews will be requested when appropriate.*

Perfil general de la familia *General family profile*
- [Ask: De dónde es usted? *Where are you from?* – this solicits a story]
- ¿Todos trabajan aquí? Trabajan en otros lugares? *Does everyone work here? Work in other places?*

Ganarse la vida *Making a living*
- ¿Cuáles han sido las actividades que usted ha hecho para ganarse la vida? *What have been the activities that you have done to make a living?*
- ¿Hace cuanto tiempo empezó a hacer [actividad]? *When did you start [activity]?*
- ¿Siempre ha hecho lo mismo? *Have you always done the same thing?*

Reflexiones sobre la decisión, e.j. *Reflections on decision making*
- ¿Por qué decidió hacer este trabajo? *Why did you decide to do this work?*
- Ha sido una buena decisión? Por qué/no? *Has it been a good decision? Why/why not?*
- ¿Qué cosas implica a hacer este trabajo? *What is involved in doing this [work]?*
- ¿Qué personas hacen este trabajo? *What people do this work?*

Riesgos *Risks*
- ¿Cuáles han sido los riesgos de mantener este trabajo? *What are the risks in maintaining this work?*

Osos (presentar al final/cuando la entrevistado/a lo plantea) *Bears (present at the end/when the person brings them up)*
- ¿Ha habido algún problema con los osos en esta zona? *Have there been issues with bears in this region?*
- ¿Por qué cree que está pasando? *Why do you think this is happening?*

¿Hay algo más que le gustaría decir? Un tema sobre lo que no hemos hablado? *Is there anything else you would like to say? A topic that we haven’t talked about?*

GRACIAS *THANK YOU*
Appendix B: IRB Letter

Date: April 25, 2012

From: The Office for Research Protections - FWA#: FWA00001534
       Stephanie L. Krout, Compliance Coordinator

To: Catherine E. Jampel

Re: Determination of Exemption

IRB Protocol ID: 39887

Follow-up Date: April 22, 2017

Title of Protocol: How bears become "problems": Understanding human-bear-cattle relations in the northern Ecuadorian Andes

The Office for Research Protections (ORP) has received and reviewed the above referenced eSubmission application. It has been determined that your research is exempt from IRB initial and ongoing review, as currently described in the application. You may begin your research. The category within the federal regulations under which your research is exempt is:

45 CFR 46.101(b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Given that the IRB is not involved in the initial and ongoing review of this research, it is the investigator's responsibility to review IRB Policy III “Exempt Review Process and Determination” which outlines:

- What it means to be exempt and how determinations are made
- What changes to the research protocol are and are not required to be reported to the ORP
- Ongoing actions post-exemption determination including addressing problems and complaints, reporting closed research to the ORP and research audits
- What occurs at the time of follow-up

Please do not hesitate to contact the Office for Research Protections (ORP) if you have any questions or concerns. Thank you for your continued efforts in protecting human participants in research.

This correspondence should be maintained with your research records.


