**Becoming a “Place of Origin”:
The Conceptual and Political Conundrums
of *In Situ* Conservation**

by

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Faculty of Graduate Studies and Research
in partial fulfillment of
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ABSTRACT

This thesis analyses and critiques the *in situ* potato conservation program, implemented in Cochabamba, Bolivia, which is part of a broader initiative seeking to protect the extremely rich and valuable Andean root and tuber diversity cultivated, mostly by small-scale, impoverished farmers, in the region. Using a post-structural, post-colonial and feminist political ecology approach, and drawing on “field” research and the analysis of the program’s discourse, the thesis argues that, although this program is deemed successful, it is also deeply problematic. This is because it perpetuates colonial relations between the proponents of *in situ* conservation and the societies put in the position of “stewards of biodiversity”, and because the ways in which it conceptualizes nature, society, and place embody the contradiction of modern environmentalism, which continually tries to separate nature and society while perpetually reproducing hybrids configured according to Western scientific worldviews.

The designation of a conservation site, described and enacted in the terms of the program’s culturally and historically specific discourse is seen as a “symbolic conquest” (Escobar, 1996) of the place, its people and its potatoes. This conquest provides the stage for the discourse and, through this, for the reconstitution of the place. The representations of the local society as “traditional”, “stewards of diversity”, and potential entrepreneurs, and of the site’s nature, as the origin of an inordinate diversity threatened by genetic erosion, enable a series of practices that encourage farmers to see themselves as the discourse does, and to fashion their valley into a “place of origin”. The study shows however, that the farmers in the conservation site do not completely conform. Rather,

they conduct their affairs in ways that diverge from the program's discourse. Similarly, questions are raised regarding the representation of the landscape, and the provenance and movement of genetic diversity within and beyond the conservation site.

The study argues that *in situ* conservation is as political as other conservation initiatives have been demonstrated to be, and that the conceptual foundations and discursive formations on which it is based must be re-evaluated, in order to provide for more socially just and ecologically sustainable conservation scenarios.

PREFACE

My first exposure to landrace conservation was as a research assistant at the International Development Research Centre (IDRC) in Ottawa. There, recently graduated from a Masters degree in political science and environmental studies, I was keen to learn about the political issues that surrounded seeds and their conservation. Several of my colleagues were working on intellectual property, and farmers' rights issues, and were key in initiating the Crucible Group, which brought stakeholders together to deliberate on these issues. Although not working directly on genetic conservation, I was inspired by the many discussions with them about seeds and landraces.

Subsequently, I was offered an opportunity to work on issues of participatory research and gender analysis (PRGA) for agricultural research, with a program that aimed at mainstreaming the use of these approaches within the centres of the Consultative Group on International Agricultural Research (CGIAR). Within this program, I worked specifically on issues of participatory plant breeding and worked closely with breeders, geneticists, and biotechnologists who wished to apply these approaches in their work with farmers.

As I delved into the research, I was drawn by the idea of "expert farmers" who, in participatory breeding projects, often became the breeders' principal contacts and allies in the field. During my many trips with breeders to their field sites, I was intrigued by these farmers' knowledge of, and dedication to, diversity. I was also intrigued, however, by the paucity of detail, context and problematization of who these farmers were, how they worked, what they thought, what their relationships were with other members of their

communities and why they worked with “us”... These questions led me to develop research on/with “farmer-breeders”, and farmer processes of experimentation. Eventually they led me to commence my doctoral studies.

I chose to conduct my “field” research in Bolivia with the Foundation for the Promotion and Research of Andean Products (PROINPA), because, of the many participatory breeding projects with which I came into contact during my work with the CGIAR System-wide (PRGA) Program, their projects seemed, to me, to be exemplary in terms of their recognition of farmers’ knowledges and skills, and in terms of the quality of farmers’ participation. It is ironic given this background that I have been quite critical of this institution’s *in situ* conservation approach. I consider this to be more an indication of the work that needs to be done to re-evaluate the discourses of *in situ* conservation, than a reflection of PROINPA’s staff’s professional or scientific caliber, or of their intentions. I hope that my critique will be constructive both to them, and to the many scientists implementing similar programs in other places.

The process of planning, implementing and writing this study has been an immensely challenging one and I have many people to thank for their contributions. In Bolivia, I want to thank firstly the many farmers, both in Llallagua and in Candelaria, who gave me their time, and were patient and generous enough, given their busy and demanding livelihoods, to engage with my interviews and questions. Many welcomed me into their homes, and to their fields cheerfully, and they candidly shared their stories and opinions. I also thank the people of *Sivingani* and *Walkeri* of the *Ayllu Chullpas*, for *not* welcoming my research in their communities. The struggle in which we were engaged for five months was an extraordinary learning experience for me, and greatly influenced the

direction of my research. I hope that I have served their interests more by leaving Llallagua, than I would have by staying.

I also want to thank the nongovernmental organization (and its *técnicos*) with which I was briefly linked in Llallagua, and which I have purposely left unnamed throughout the thesis. While I have been critical of the “development” approaches that their work is a part of, I recognize the great challenges of and the dedication necessary to work in the biophysical, social, economic, and political context in which they work.

My research assistants Richard García (in Llallagua) and Ygor Camacho (in Candelaria) were invaluable to me. My work would have been impossible without them.

I also want to thank PROINPA and its staff for allowing me to conduct my research in ‘their’ areas, for giving me access to their documents, and for their help in getting the approval of the Candelaria farmers with whom I worked. In particular, I want to thank the Candelaria “field-staff” who were of so much help, and who shared their “field-house” with me: Juan Almanza, Eloina, Magaly Rodrigues, and Rhimer Gonzales. I also wish to thank the staff in the Cochabamba office who were also helpful to me in different ways: Ximena Cadima, Franz Terrazas, Willman García, José Zeballos, Maria Luisa Ugarte, Edson Gandarillas and Julio Gabriel.

At Carleton, I owe sincere gratitude to my co-supervisors, Dr. Fiona Mackenzie and Dr. Kenneth Torrance, who have been extremely supportive. Their unwavering belief that I could write a thesis based on data collected in a very complicated “field-experience” in Bolivia was very encouraging, and their insightful comments on, and detailed editing of my work have been invaluable to me. Coming to this area of research with no background in critical theory meant that the “learning curve” was very steep. I

owe a special thanks to Dr. Fiona Mackenzie, for introducing me to political ecology, and to many of the concepts that I use in this thesis, and for her patience. In the thesis, I have tried to use a language and writing style that makes the theory accessible to the scientists, practitioners, and decision makers whom I hope to inform. This requires at times a “simplification” of sorts, for which I am solely responsible. In this respect, I am grateful to Dr. Kenneth Torrance for helping, and encouraging, me to maintain this style. I would also like to thank him for his tireless attention to detail, including, but not only, when it came to working on my graphs and figures. Thanks also to Leslie MacDonald-Hicks for her advice, even long after my ethics clearance, on research ethics and intellectual property.

This thesis would not have been possible without the support of numerous of my friends and colleagues, and of my family. I thank Patricia Duque for being there in so many ways, every step of the way, and for never faltering, even when I did. I also thank Veronica (“Mongui”) Vargas for her exceptionally generous spirit, and for her friendship and care; for taking me, a perfect stranger, into her beautiful family in Bolivia, and for always showing a keen interest in the latest developments in the “field”. To my own family: Janine, Antoine, Chantal, Rita, Layla, each of you contributed so much in your own special ways. Silvia Caicedo and Chris Richter, were countless times my home away from home. Our many conversations, their endless encouragement and continuous provocations were not in vain. Joachim Voss and Villia Jefremovas were also countless times my home away from home, and a source of encouragement. France-Lise Colin, Abra Adamo, Parastu Mirabzadeh (another of my homes), and Karen McAllister, thank you, and best of luck.

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I owe a special thanks to Capoeira, to Equipe Capoeira Brasileira, Peninha, Ajaná, and Pirata for teaching me, and for helping to maintain my mental and physical health over a long writing period.

Last but definitely not least, I thank the International Development Research Centre (IDRC) for their generous funding of my “field” research through their International Development Research Award program. A special thanks to Jean-Claude Dumais for his understanding and flexibility regarding changes in my research schedule, budget, and research direction midway through the fieldwork. I also thank the Social Sciences and Humanities Research Council (SSHRC) for their generous support through the Doctoral Research Fellowship program.

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Chapter I.

INTRODUCTION

When the United Nations published its 1951 report on technical assistance to Bolivia stating that this country was “a beggar sitting on a throne of gold” (United Nations, 1951: 2 cited in Healy, 2002: 17), it was not referring only, or specifically, to the tremendous richness of potato diversity cultivated by the mostly indigenous population of this country’s rural areas. It might as well have though. Bolivia’s potato diversity, numbering in the thousands of varieties, is not only remarkable for its tubers of all shapes, colours and sizes, most of which have never been seen, or imagined, by the majority of European and North American potato consumers. Bolivia’s potato diversity is a part of the broader diversity found throughout the Andes that, in the words of one agricultural expert, “offers effective solutions to just about any problem, whether surviving drought or controlling pests, that we have encountered in North America” (Rob Thurston quoted in Healy, 2002: 3). This quote is a reminder of the vital role that this diversity has in ensuring the continued cultivation of potatoes in many parts of the world where they have become a basic foodstuff. Genes from Andean potato collections are heavily relied upon in breeding programs that strive to overcome the principal production problems and limitations facing potato farmers today, and in the future.

To Bolivian and Andean potato farmers, diversity has a much deeper significance. For them, the thousands of potato varieties are the inheritance left to them by their parents, grandparents and great-grandparents. Landraces are an intricate part of nature,

with which humans have a relationship of mutual nurturing, and continuous dialogue (Apffel-Marglin, 1997; Gonzales, 2000). They are an important part of who they are, of their culture and cosmovisions, and of their ways of life.

In spite of the importance of potato genetic diversity to the world, and to Andean potato farmers, local potato varieties (along with other Andean “traditional” grain and food crops) were virtually ignored for the first decades of foreign agricultural development assistance to Bolivia. The rejection, and attempted erasure of indigenous cultures and ways of life, was normal practice in Bolivia where, since independence, successive governments attempted to forge a single *mestizo* national identity (Zoomers, 2006: 1024). The dismissal of indigenous agriculture as antiquated, unproductive, irrational and messy was part of this. It was further entrenched after 1952 when the revolutionary government, backed by extraordinary cash flows of foreign aid from the United States, sought to modernize the countryside and make it productive.

The modernizing push aggressively promoted “Green Revolution” style agriculture in the inter-Andean valleys and in the tropical lowlands (coupled with extensive deforestation and the establishment of cattle ranching operations and sugar, cotton and rice plantations). It was part of a broader rural development initiative that also brought sheep and exotic forages to the highlands, and promoted the migration, on a mass scale, of highland Aymara people to the lowlands (Healy, 2002). Although this agricultural development initiative was implemented by the revolutionary government, which sought to redress the injustices and marginalization of rural and indigenous people, it had a “strong western-centric and anti-indigenous cultural bias” (*ibid.*: p. 14) to it. The

revolutionary government had, in the words of Javier Hurtado, “an unrealistic and inappropriate image of peasants in blue overalls driving tractors within the new social and economic order they were setting out to construct. They wanted the indigenous to stop wearing ponchos and turn their backs forever on traditional agriculture” (quoted in Healy 2002: 14).

U.S. agricultural development assistance to Bolivia during the decades following the revolution was based on a technical report prepared by the State Department’s Bohan Commission and strongly influenced by both anti-indigenous attitudes of the Bolivian elites, and by modernization theory and neo-classical economics in vogue in the U.S. and much of the Western world at the time. “According to a former U.S. aid official in Bolivia, Lawrence Heliman, the Bohan Report became a kind of in-house bible for the U.S. embassy and aid officials during the following decades” (Healy, 2002: 20 citing Heilman, 1982). The recommendations in the report became a blueprint for US development funding. The 1951 U.N. report (cited in my initial paragraph above) circulated the same set of underlying beliefs about the “primitiveness” and inappropriateness of indigenous and “traditional” agriculture, crops, attitudes and worldviews for rural development, and the conviction that modern agriculture was the solution, that were evident in the Bohan Report.

Much has transpired since the Bolivian revolution and the initial modernizing push of the 1950s. Although many still believe that the future of Bolivia lies in its eastern lowlands, the ecological disaster caused by the agricultural model transposed from the mid-western U.S. to Bolivia’s tropical rainforests is not denied (World Bank, 1993 cited

in Healy, 2002: 22); neither is the soil erosion caused by the trampling and grazing of thousands of sheep on native grasses in the valleys and highlands. Similarly, the high incidence of pests and diseases in the valleys is generally accepted to be due in large part to the overexploitation of soils cultivated with highly productive “improved” potato varieties, petrochemicals and farm machinery. The infusion of high yielding varieties, chemical fertilizers and modern machinery increased potato production in many parts of Bolivia throughout the 1950s and 60s. However yields began to decline in the 1970s.

Successive national governments, even in the relatively prosperous 1970s when high commodity prices brought more wealth to Bolivia, have kept prices of agricultural products (including potatoes) persistently low. Meanwhile, the agricultural inputs on which many potato farmers increasingly depended became more costly. The economic crisis of the 1980s, and the “new economic policy” implemented by the Estenssoro government in an attempt to tame the economic, social and political chaos brewing in the country by 1985, aggravated the situation, hitting the rural sectors particularly hard (Sanabria, 1993; Postero, 2005). These policies, inspired by neo-liberal, free-market principles accentuated the already precarious situation of the rural sector. Meanwhile, the privatization of land initiated during the 1952 agrarian reform, coupled with the continued hereditary subdivision of landholdings, has produced a highly unequal and ecologically unsustainable land holding situation among rural dwellers. Many young people today abandon or sell their land inheritances and migrate to the cities or to the tropics in search of a better life (Urioste, 2003).

Today, numerous programs and projects exist to re-institute and to preserve “traditional” agriculture in Bolivia and elsewhere in the Andes because the range of practices characteristic of “traditional” agriculture are now thought to be better suited to local environmental conditions and hence more ecologically sustainable. They are also thought to be associated with the maintenance of crop and genetic diversity. *In situ* conservation, which aims to conserve diversity while allowing it to evolve in the biophysical and social contexts in which it emerged, has been in vogue for more than a decade now. It has been particularly promising for crops such as the potato, which, because of its vegetative mode of reproduction, cannot easily be conserved as seed like beans, maize, wheat, and other of the world’s major crops.

What has not changed since the early days of foreign agricultural development assistance to Bolivia is the maintenance and reproduction of, and the reliance on, a set of discourses, couched in Western and technocratic worldviews, and reproduced by development and (now also) environmental institutions, about the problems faced by farmers in the Global South, about the situations of their environments, and about how these issues should be remedied. These discourses endow these institutions with the authority, the capacity, and the duty to “help” rural people manage natural resources more sustainably and improve their wellbeing. In so doing however, they (also) reconstitute both the natures and the societies that they engage (Gregory, 2001). This is an exercise of power that is hidden because it operates through discourses such as “environment” and “development” that are accepted as scientific, apolitical, and benevolent. While the discourses of modernization theory and neo-classical economics

embodied in the Bohan report and in the U.N. report on technical assistance to Bolivia prevailed in the 1950s and the following decades, today another set of discourses, closely related to these predecessors but substantially modified, prevails.

This thesis analyses and critiques a genetic diversity conservation program conducted by the Foundation for the Promotion and Research of Andean Products (PROINPA) in Colomi, a municipality in the inter-Andean valleys to the northeast of the city of Cochabamba in Bolivia (Figure 1). The program aims to conserve the diversity of potato varieties found in the area through one of the most prominent approaches used for this purpose today: *in situ* conservation. For this, the foundation has designated Candelaria, a district of Colomi, an “agrobiodiversity microcenter” and over a period of more than ten years has implemented a number of different conservation activities in the area. Among these are the identification and support of so called “farmer conservationists”, the creation of a “native” potato producers’ association to commercialize potato landraces, the establishment of a “community” gene bank, the viral cleaning of potato seed, and the organization of an annual biodiversity fair. These and many other activities work to encourage farmers to maintain their “native” potato landraces, and to fashion their valley into a center of diversity.

Although *in situ* conservation targets mostly cultivated diversity¹, it has important commonalities with efforts to conserve “wild” flora and fauna. One of these is that *in situ* conservation advocates the establishment of nature reserves or territories. Nature reserves that exclude humans from presumed “natural” areas have come under severe criticism over the past decade for their restriction of access to human populations who depend on,

¹ As well as the wild and weedy relatives of landraces (Maxted et al. 1997)

Figure 1 Map of Bolivia showing research locations
Base map source: United Nations, 2004

and thus have had a major role in forming, these places and the natural resources within them. A more recent modality of conservation areas is what Zimmerer (2000) calls “nature/culture hybrids”, in which people are allowed to remain, and ideally, participate. This has come as “traditional” and “indigenous” resource management, including agriculture, have been recognized as sustainable, ecologically sound, and important to the maintenance of biodiversity. While the evident issues of access that plagued the older forms of nature reserves seem to be, at least to some extent, resolved, this new modality raises questions regarding the power relations that constitute conservation spaces. As these areas are established, their modes of use by local people become the subjects of governance and improvement programs of conservation institutions, backed by governments and international funds, and their knowledges.

The argument of the thesis is that although PROINPA’s *in situ* conservation program has been successful by its proponents’ standards, the terms of its implementation are problematic because they perpetuate colonial relations between *in situ* proponents and their world views, and the societies and knowledges that are put in the position of “stewards of biodiversity”. I show that the *in situ* conservation program is made possible through a series of “cognitive failures and discursive displacements” (Braun, 2002: 8), which work to *make* Candelaria a “place or origin” of the potato varieties of conservation interest, while obscuring and making irrelevant other possible ways of understanding and approaching the issues at hand, and in so doing, hiding the politics behind the program’s achievements. Meanwhile, *in situ* conservation perpetuates the contradictions of “modern” environmentalism, which ceaselessly tries to separate nature from society

(Latour, 1993), while at every move reproducing hybrids configured according to Western worldviews. Importantly, the construction of Candelaria as “place of origin” is not only the work of discourse. The thesis shows the importance of Candelaria’s biophysical attributes in the establishment of a form of “genetic reserve” in the area.

Although PROINPA’s discourse, and “ordering” of Candelaria’s social and biophysical world, is one of power, it is contested and negotiated. Local people and natures defy the institution’s “enframing” (Gregory, 2001: 98) of their world. *In situ* conservation then must be seen as much more than a technical and managerial intervention. It is also deeply cultural, historical, and political.

This argument is informed by several contributions from post-structuralist, post-colonial, and feminist theories, to which the works of Michael Foucault are key. At the heart of these contributions is the problematization of common understandings of power, knowledge and identity. Foucault explained that all identities are relational. That is, that no-body and nothing can *be* in a vacuum. Rather, we (including people, discourses and things) are all constituted by our relationships with others (also including people, discourse and things), relationships in which power differentials are key. We, in turn, also play a part in the constitution of others, such that no identity is autonomous but is always rather an effect of a range of relations. While early post-structuralist and post-colonial thinkers gave prominence to the relationships between people and discourses, more recent thinkers, led by Science Studies scholars such as Latour (1987, 1993), Callon (1986) and Law (1987, 1992), have included ‘things’ such as Nature, technologies, and

their mixtures (or ‘quasi’-objects) in their analyses. This has given rise to Actor Network Theory, which posits, in sum, that everything happens within networks of relations.

Foucault’s (1980) ideas on knowledge are very closely linked to his rethinking of identity. He explains that knowledge cannot be disembodied from those who produce it. Any interpretation of reality is merely the observer’s interpretation mired by his or her identity and relations. There is always then more than one interpretation. The apparent truth, singularity, and universality of certain explanations are the temporary outcome of a continuous struggle among knowledges and interpretations, an effect of the power relation between them. The silencing of others is not only discursive however. Through this silencing, particular ways of addressing problems are legitimated and thus knowledge and power are practiced, and materialized in bodies and spaces. Thus power and knowledge are intricately intertwined with one another, with identity, and with the bodies and spaces in which they are materialised. These ideas form the theoretical base of the thesis and are expounded in greater detail in the theory chapter.

The empirical base of the thesis comes from seven months of field research in two different sites in Bolivia, and from a discourse analysis of key documents that form part of PROINPA’s literature. The first field site was in the Llallagua area, in the north of the Province of Potosí (Figure 1). The second was in Candelaria, Colomi, in the Province of Cochabamba, to the northeast of the city of Cochabamba. While the data from the fieldwork are mostly drawn from a series of interviews that I conducted with farmers in

the latter field site, my experience in Llalagua also provides important insights to the arguments made in the thesis.

After a discussion of the main theoretical underpinnings of the thesis, and of the methodological approach, Chapter IV explains the emergence of *in situ* conservation as part of an evolving network of actors that addresses issues of agricultural development and environmental conservation. Following Escobar (1998), I call it the [agro]-biodiversity network. Through an analysis of PROINPA's mandate, institutional ties and (parts of) its literature, I show that this foundation was created by, and remains intricately linked to, the prevalent actors and worldviews of a particular perspective, or position in this network. This position, also occupied by the world's largest and most influential environment and development organizations, circulates and acts on a particular explanation of threats to diversity (mostly scientific and technical in nature) and on a matching set of responses including *in situ* and *ex situ* conservation, appropriate management, economic use (and commercialization) of resources, and scientific research. As such, the foundation's discourse is not universal and self evident, although it appears to be by virtue of its scientific and technical slant. It is socially, historically and culturally "situated". I end this chapter by explaining how Candelaria, a district of Colomi, was selected and established as a "microcenter of diversity" under PROINPA's trusteeship, and thus came to form part of the same position in the agrobiodiversity network.

The following two chapters address some of the "cognitive failures and discursive displacements" (Braun, 2002: 8) that operate in PROINPA's work in Candelaria. Chapter V discusses the representation of the local people as "traditional". This representation

allows PROINPA to establish its pilot site in this location, and to implement two strategies, the support of “farmer conservationists” and the commercialization of landraces, in accordance with its perceptions of the local people’s natures and needs. Through a discussion of these three elements, and of how local people conform to them, the chapter draws attention to issues that are conspicuously underemphasized in the foundation’s discourse but that evidently play an important role in the conservation and/or the abandonment of diversity in Candelaria. Key among these are the overexploitation of soils in the area, the scarcity of land, unfavourable agricultural policies, and migration to the tropics.

Chapter VI discusses PROINPA’s representation of Candelaria’s nature, which focuses on the multitude of growing conditions available in the area due to the large altitudinal range that it covers. This representation is crucial to PROINPA’s selection of Candelaria as a pilot site for its *in situ* conservation program. In turn, it is also the rationale PROINPA gives for local people’s maintenance of diversity, and as such, it enables the envisioning of this place as a “microcenter of diversity” or as a “place of origin” of this diversity, a place threatened by genetic erosion and in need of conservation. These representational practices (along with those that claim to describe the local people) are part and parcel of the *in situ* conservation discourse that PROINPA enacts in Candelaria. They are the means through which PROINPA exercises power over the place’s nature and people.

These foundations of PROINPA’s conservation program are challenged in the thesis, on the grounds that the landscape is made up by much more than the topography,

that the diversity in this area does not seem to be only from this area, and (relatedly) on the grounds that there is no conclusive evidence of genetic erosion in the area. The arguments made in both Chapters V and VI, call for a re-evaluation of the conceptual foundations and discursive formations on which *in situ* conservation is based.

Although I critique PROINPA's *in situ* conservation program, I do not wish to condemn PROINPA or its scientists of any purposeful or deceitful wrongdoing. As Li (2007) so effectively explains in the introduction of her book *The Will to Improve*:

...I do not argue that improvement is merely a tactic to maintain the dominance of particular classes, or to assert control by the global North over the South – an interpretation common to dependency theory and its variants. Rather than assume a hidden agenda, I take seriously the proposition that the will to improve can be taken at its word.... There are indeed hybrids, in which improvement schemes serve to enrich a ruling group or secure their control over people and territory. There are instances of bad faith. There are sound reasons to be sceptical of some of the claims made in the name of improvement. But for several centuries trustees have endeavoured to secure the welfare of populations and carried out programs that cannot be explained except in these terms. (Li, 2007: 9).

My critique is rather targeted at the discourse and practice of *in situ* conservation, which PROINPA implements. My aim is to show that the discursive displacements that allow this approach to conservation to take root do not create the conditions and the relationships that are necessary for the protection of biological diversity and the enhanced well being of the local people. On the contrary, they perpetuate current and past power relations between local people and those who have placed themselves, or who have been placed by others, in a position of trusteeship toward local people. I propose, that in order to begin to recognize and address these issues, it is important to re-evaluate the way we

think about nature, society and their relationship. By exposing these issues, my work, rather than condemning, hopes to take a first step in this important direction.

Chapter II.

THEORETICAL BACKGROUND

Introduction

Most *in situ* conservation projects are targeted for, and implemented in or near, centers of crop diversity, where it is thought that the diversity of the crops in question originated, were domesticated and evolved (in the hands of human populations, and in response to gradual changes in biophysical conditions). Many of these centers of diversity, among them the Andes, are within the Global South where poverty, marginalization, and exploitation persist, and where environmental degradation continually challenges those who depend on natural resources for their livelihoods. Thus, genetic erosion, and its converse, *in situ* and *ex situ* conservation are, among other areas of inquiry, such as soil degradation, deforestation, loss of biodiversity, and water scarcity, closely tied to the broader questions of “environment” and “development”.

Post-structural, post-colonial and feminist political ecologies¹ have provided important insights to these areas of inquiry (Bryant, 2001, Escobar, 1996, Rocheleau, 1996, Watts, 2000). Unlike the most commonly applied technocratic discourses in which these areas of inquiry had most often been situated, political ecology includes the social, cultural and political dimensions of situations. It substantially broadens and deepens the scope of inquiry thereby sharpening comprehension and analysis of the complexity of society-nature interactions. In using this approach and theoretical background for this

¹ Political ecology is by no means a monolithic or a homogenous approach. It is rather characterized by substantial internal differences, debate, and evolution. My use of this term from here on will refer to the post-structural, post-colonial and feminist political ecology that I outline in this chapter.

study, I suggest that political ecology offers important, and often overlooked, insights to the study of the conservation of agricultural biodiversity.

Political ecology highlights the uneven power relations at play in the generation and propagation of knowledges and discourses that inform institutional and state practices vis-à-vis nature and human societies (Bryant, 2001; Escobar, 1996; Watts, 2000). In the briefest of terms, and recognizing that these approaches often overlap and/or contribute in important ways to one another, underlying post-colonial theory is the notion that colonial relations did not disappear once colonized areas achieved independence; rather, these relationships continue into the so-called “postcolonial present” (Gregory, 2001). Post-structuralism contributes the emphasis on power relations, on contingency, and on the “bottomless” nature of identity. Feminist contributions center on the idea that the position from where one interacts with and experiences the world matters, as do the experiences of people positioned differently with respect to gender, class, race, or age (Rocheleau, 1996). In addition, both poststructuralist and feminist theories contribute the idea of *performativity*, that identities must be performed time and again, in order to be maintained (Butler, 1990). What brings the many strands of political ecology together is their questioning of the power relations enacted in the forms that the relations among societies and within societies and nature take. Political ecology emphasizes that in analyzing issues in a more integral manner, opportunities arise for the creation of more ecologically sound and socially just realities. The messages to be drawn from this approach are that the issues/problems that we normally treat as “environment” and “development” are far more complex than had previously been imagined, and that to

understand and begin to address them adequately requires us to learn to think differently about key concepts such as power, knowledge, governance, identity, nature and society, (Braun, 2002: 10).

The purpose of this chapter is to explain how these key concepts are theorized within the political ecology approach that I use, and to show how the use of this approach can lead to a substantially different reading of “environment” and “development” issues, particularly agro-biodiversity conservation issues, than those that have been rendered through the use of other approaches.

The chapter begins with a brief explanation of Foucault’s ideas on power and power/knowledge. This is followed by a discussion of the role of partial knowledges in governance, and the need to interrogate the discourses that inform and legitimate environmental and development interventions such as *in situ* conservation. Two lines of questioning emerge: the elucidation of the situated nature of these discourses, that they emerge from specific cultural, historic, political, economic, institutional contexts and thus are not universal; and secondly, that they leave out parts or aspects of their subjects of inquiry that they do not see or that their world views fail to make visible, and that they often rely on essentialisations of people, natures, and places.

The second part of the chapter looks at the question of relational identity. It explains identity as a perpetually unfinished process of becoming, which is always open to challenge. I explain the post-structuralist project of breaking down binary thinking, and the emergence of Actor Network Theory (ANT) as an alternative. Based on several aspects of Foucault’s work, and extending it beyond, Actor Network Theory has

particular importance for the understanding of the relationship between society and nature, and for the conceptualisation of space and place.

Power

Post-structural political ecologies often use a relational conceptualization of power that draws on Foucault's early analyses of disciplinary power (1979), and on his later ideas about the "government of the self" (1979). Foucault's (and his many followers') ideas of power diverge from more orthodox accounts, in which power is seen as a one way relationship, a zero-sum game, between those who have power - the "powerful"- and those who do not - the "powerless" (Sharp et al., 2000). Power in these orthodox views is the cause of one entity's (a person or group) ability to coerce, control, manipulate, exploit, or dominate another. Power is located in dominating actors, whose identities are already fixed, or pre-constituted, prior to their engagement with others.

There are attractive aspects of this orthodox model of power; namely, the fact that those resisting the effects of power can readily identify their enemy and its political aims, and that a relatively simple, if daunting, map of power to be inverted or overthrown can be drawn (Hinchliffe, 2000: 220). As Hinchliffe argues however, there are also weaknesses to this notion of power. Key among them are the assumption of fixed identities and the apparent invincibility of the powerful as they amass "power" at the expense of weaker groups who seem to lack any agency. These shortcomings have led many scholars to adopt Foucault's relational view of power.

Foucault explained power not as something that certain groups possessed and could use against others, but as a relationship that always occurs between two or more groups. Hence the term “power relation” is often used instead of simply “power”. Power in this view is not located in the state, or in institutions or people. It is everywhere, in the relationships between all sectors and all levels of society (Sharp et al. 2000). It is manifest as the effects of these relations.

Foucault’s *Discipline and Punish* (1979), from which many scholars derive his views of power, deals with the transition in the ways that power was exercised in the early 1600s until the twentieth century. What intrigued Foucault was how brute force gave way to a much more effective and more pervasive form of ruling. Key in this process was the emergence of (and shifts in) “normalising” discourses that constructed particular subjects and thus created the conditions for their correction by the state. In *Discipline and Punish* (1979) Foucault explains how the discourses of crime and punishment made necessary the creation of prisons in order to retain criminals, thereby keeping them from threatening the safety of society. In prison, criminals were taught new habits that would permit them to re-enter society as normal(ised) citizens. Prisoners were subjected to close surveillance, their conduct strictly controlled until eventually they would internalize the disciplinary norms and thereby regulate their own behaviour.

Although some of his critics have argued that in his account of how prisons worked Foucault still re-created a traditional view of power as repressive (see McNay, 1994 cited in Murdoch, 2006: 48-49), there are important observations to be made from his treatment of prisons (and asylums in his earlier work). It is in this work that Foucault

establishes the close relationship between discourse, power, material practices, and spatial organization. Reflecting on Foucault's writings on the prison, Murdoch (2006, 56) writes: "Foucault conjures us [a] circular assemblage of power... ..knowledge is materialized in practice, practice is materialized in the body, and the body is immersed in modes of spatial organization that in turn perform systems of knowledge". The discourse of criminality creates the conditions for the material construction of prisons, the prisons for the subjection of certain members of society to disciplinary techniques, and these techniques with the prisons and the discourses together to construct criminals as a societal group. Here we see power operating through discourse, through the architecture of the prison, and through the techniques of surveillance and correction all at once. According to Foucault, disciplinary (or normalizing) power circulated throughout society "anonymously, emerging from expectations, positions and discourses which coalesced from countless individual events whose particular personnel (their individual utterances) were of less import than the encompassing logic of their organization" (Sharp et al, 2000: 16). This is the beginning of Foucault's de-centered notion of power, which he later refines in his explanations of government at a distance.

In his treatment of the creation of prisons (and mental institutions) Foucault saw the success in the failure of these institutions. Although they did not reform criminals and cure the mentally ill (which were purportedly their goals), they did succeed in producing these two societal groups, and the conditions for their segregation from society. As such they also acted as normalizing agents on the rest of society. This was how Foucault

explained that the effects of power are not always planned or predictable, notions that he later expounded more fully.

Foucault's later work (1986, 1991) on "government of oneself" (discussed in Allen, 2003) attempts to expand (and necessarily modifies) his views of power in confined locations, such as the prison, to the government of populations. An important difference between populations in confined locations and those of society in general is the impossibility of close surveillance and control of the latter. In contexts where police states were no longer the norm, and a private, civil realm existed beyond the state (Murdoch, 2006: 42), government had to have a way of encouraging society to govern itself. Here no force or imposition could be involved. In fact, in order for government to work, states needed subjects to be free. They governed by "conducting their conduct" (Gordon, 1987. cited in Allen, 2003: 77), by influencing subjects to behave in certain manners and not others, for their own good. For this, subjects had to have the capacity to act and to fashion themselves (Allen, 2003: 76). They had to internalize the logic of government, and they had to believe that this logic ultimately led to their own well-being. In enabling and having a say in how people "fashioned" themselves, government or power can be said to be a productive force (*ibid*). Government then, in the sense that Foucault wrote, does not coerce or repress; it enables and conducts.

Before proceeding to the important connection between power and knowledge, and how this connection plays a role in the formation of societal and spatial relations, it is important to mention one more aspect of Foucault's concept of power that stems from the idea that it is a relationship between two or more entities. This aspect is that of the place

of resistance. Although power relations are unequal, power is always available to be used and transformed in positive (as well as in negative) ways by all actors, not only the “powerful”. This understanding leads to an interest in resistance, and to the recognition that dominance and resistance are mutually constituted; that they do not exist in separate camps, but are thoroughly intertwined, or “entangled”. Massey (2000: 283) describes it like a “ball of wool after the cat has been at it, in which the cross-over points, or knots or nodes, are connected by a multitude of relations variously of domination and resistance and some only ambiguously characterisable in those terms”. Unlike orthodox views of power, in which power is a zero-sum game, the object of resistance is not to overthrow a hegemonic and dominating power, a situation that may lead to a similar (albeit inverted) power relation, but to restructure the relationships, always charged with power, that produce effects that subjugate certain groups.

Power/Knowledge

Foucault saw knowledge as key in the processes of both disciplinary and governmental power. In *Power/Knowledge* (1980), Foucault stressed the uneven power relations between different groups in society, and the knowledges and “truths” that they produced. The concept of power/knowledge is founded on the idea that knowledge is not objective and impartial, but rather intricately linked to the subject positions of those who create it. Our interpretation of the world is inseparable from our being in it (Haugaard, 2002). Or put in another way, all knowledge is situated, partial and contingent (Haraway, 1991), being affected by the genders, social statuses, political positions, historical

moments, and geographical locations of its creators. Scientists and social planners, in spite of their claims to objectivity, are not immune. Their particular positionalities play a role in determining the ways in which they define problems, the assumptions they make, the methods and the evidence they use (and don't use), and consequently the solutions that they recommend. There can thus be more than one version of truth, engaged in a continuous tension and struggle to predominate. The concept of power/knowledge stresses that the apparent (and temporary) hegemony of certain knowledges - their "normalisation", and acceptance as truth - is the outcome of these struggles in which alternatives are silenced (Foucault, 1980). It also stresses that there can be no hegemony without counter-hegemony, no domination without resistance, meaning that power entails a continual provocation or tension; power and knowledge are continually negotiated, thus always allowing an opportunity for subversion.

Post-colonial theorists have highlighted the ways in which discourse operationalises the relationship between power and knowledge (Gregory, 2001: 86-87). As specific sets of representations, practices and performances, discourses explain and treat the world, and the objects of their interests, in particular ways, ways that extend the influence of their proponents. They establish the bounds of what can be considered knowledge and of what practices and performances are relevant or appropriate. Like this, they "enter fully into the constitution of the world" (*ibid*, p. 85). They produce realities, in part, by displacing, and replacing other discourses and in so doing are crucially implicated in the interplays of power and knowledge. As discourses are accepted,

routinised, and institutionalized however, they appear to be the natural order of things. That is, they appear apolitical.

Science, Representation and Governance

The workings of power and knowledge can be seen in the use of expert knowledge by governmental and non-governmental decision makers to guide and legitimate their actions. Science has played a key role in governance since the creation of the nation-state in the late 19th century. In replacing feudal powers that earned their legitimacy through a presumed link with God, state powers commanded their authority through science, which in turn got its credibility from the common belief that knowledge was derived from a rational, methodical, and thus objective approach to understanding and explaining the world.

The scientific advances and technological transformations of the Enlightenment and the industrial revolution came hand-in-hand with an uncompromising belief in rationality, order, efficiency, and the control of nature. These ideas were intricately linked to a promise of increased production and the betterment of society, today known as “development”. In Scott’s words:

[They created a] supreme self-confidence about continued linear progress, the development of scientific and technical knowledge, the expansion of production, the rational design of social order, the growing satisfaction of human needs, and, not least, an increasing control over nature (including human nature) commensurate with scientific understanding of natural laws (Scott, 1998: 89-90).

The “rational design of social order” described by Scott was thought to be a necessary part of the improvement of society’s well being. In order to achieve this, society had to be created as an object, separate from the state. State officials could then study society, create statistical facts about it and characterize it in all its facets. The creation of knowledge for this project of social improvement became the most effective instrument of intrusion into, and domination of, all aspects of social life (Scott, 1998).

The measurement, description and representation of the social reality that these states were to govern required an abstraction of its characteristics into numbers and statistics. In order to be unitary and coherent, this representation necessarily required a simplification of societal complexity. This meant that the state selected certain societal characteristics that would be a part of its representation of society, and others that would not. Scott explains however that in generating knowledge to measure and describe society, the high modernist state was not merely reflecting what it was seeing among its population, but was actively seeking to establish norms by which to model, manage and govern society (1998: 92). This process entailed an erasure of diversity and the targeting for “improvement” of parts of societies - the mentally ill, the poor, criminals - that did not fit the norm, and who were perceived as possible threats to the social order (Foucault, 1979).

In illustrating the equivalent simplification of nature by the modernist state with the case of the creation of Indian forests by colonial authorities in the early 19th century, Agrawal argues that the “making” of forests involved a “double erasure” (2005: 34). The first was the displacement of earlier ideas about forests with statistical and numeric

renditions that stood in for the forests in bureaucratic discourse. The second was “the erasure of the referents of those earlier ideas [the forests] when statistical ideals worked reclusively [through state interventions] to reshape referents” (*ibid.* 34). It was through this double erasure, that the state created a manageable forest. The rationalization, simplification, and “disciplining” of society by “high modernist” states and institutions are thus also apparent in the “taming” of nature, not only in forestry but also in agriculture and other areas (Scott: 1998). This taming of nature was legitimated through discourses of productivity, which promised to benefit society. The result however has been a more literal re-making of nature modeled on the simplified ideal drawn in state representations of reality.

What is important about this process is that the knowledges and discourses that inform the establishment of norms and the exclusion or marginalization of non-conforming elements (be they human and/or ecological) are never objective. The very establishment of norms is thus an enactment of power. However, the disguise of knowledge as impartial and the common belief that science is truth, hide power. Foucault explains that, in describing and addressing difference in scientific and technical terms, the governance of society and of nature is naturalized and hence de-politicised.

It is not only scientific and technical knowledge that has facilitated and legitimized government action since the Enlightenment. Representational practices were key instruments of control in the colonization of the Global South. Edward Said’s formative work *Orientalism* (1978) discusses how the West created a whole system of representation about the Middle East in which the latter was portrayed as biologically

inferior, culturally backward, passive, weak, and unintelligent (ironically an inverted image of the West's self-perception). This practice distanced the Middle East from the West, and situated the latter as superior in all those realms, and as knowledgeable of the Orient. This ultimately legitimated and justified colonization and domination.

Orientalism can be discussed and analysed as the corporate institution for dealing with the Orient – dealing with it by making statements about it, authorizing views about it, describing it, settling it: in short, Orientalism as a Western style of dominating, restructuring and having authority over the Orient (Ashcroft et al. 1995: 88; citing Said 1978).

Today, it is common to see actions vis-à-vis “development” and “environment” problems in the Global South, including those that address issues of genetic erosion in centers of crop diversity, accompanied by “expert” explanations of the problems at hand. It is clear that these representational practices are key to the planning and implementation of policies, programs and projects in many parts of the world by multilateral developmental and environmental agencies, and their national counterparts. As with the state representations of society, and colonial powers’ representations of distant lands and people, these explanations are far more than mere descriptions, and their effects are far further reaching and more important than the success or failure of countless “environment” and “development” projects (Ferguson, 1990). It is for this reason, that it is important to pay particular attention to the discourses that inform biodiversity and other environmental interventions and to be vigilant of the roles they play in governance.

One of the ways in which these discourses can begin to be called into question is by elucidating their historically and culturally specific provenance, thus showing that

they are in fact specific and not universal, as their dominance makes them appear to be. This is what Foucault (1977) called “genealogy”. As will be discussed later in the chapter, the separation of nature and society is a specifically Western notion that permeates much environmentalist and conservationist thinking. The apparent universality of these Western notions/constructions of nature effectively silences other views of the relationship between society and nature and hence pre-empts or displaces any different ways of acting or dealing with environmental issues that emanate from these silenced views.

The idea of development as a social progression towards an ever “better” state is also culturally and historically specific. It can be traced back to the Bible and the Judeo-Christian tradition. As a linear progression towards increasing social complexity, sophistication and affluence, the idea of social evolution can be traced to the Enlightenment, and to the early European social theorists such as Durkheim and Moser who both initially compared social evolution to the natural evolution of organisms (Esteva, 1992; Layton et al., 1997: 22). This “organic analogy” originally used by Comte and Spencer, also European theorists, gave the concept of social evolution an inevitable and universal quality. Darwin’s theory of species evolution added the idea of evolution, toward an ever “more perfect form”(Esteva, 1992: 8). These concepts of social evolution as linear, inevitable and leading to an ever more perfect form were later inscribed into modernization theory as articulated and popularized by Walter Rostow (1971) after World War II.

Modernization theory explains progress as a series of steps by which human societies pass from being “traditional” to being “modern”. These steps involve the modernization of society and technology modeled on the evolution of the industrialized west. The point of departure in this evolution, the “traditional society”, is assumed to be “backwards” and “underdeveloped” because at this “stage” societies lack the cultural values, education, institutions and technology that allowed the West to press forward (Rostow, 1971). “Traditional” societies were thus described as the antithesis to modern western society.

Latour (1993: 99), explains the imaginary separation, or “Great Divide” between modern society and “other cultures” slightly differently but still as a specifically “modern”¹, or Western way of thinking. He argues that the latter are considered different, and on the other side of the divide because their knowledges do not separate nature and society. Their understandings of nature are embedded, or coded by their cultures, whereas modern knowledge, from the “moderns” point of view, is objective and as such removed from nature.

As I will demonstrate in my discussion of PROINPA’s description of Candelaria’s society in Chapter V, these ideas of “development”, and the division between modern and traditional societies, permeate environmental and developmental thinking today. To acknowledge “development” as a historically and culturally specific concept is to understand knowledge as partial and mediated by uneven power relations. It also opens the possibility that there are other, silenced, views of societies’ existences, and

¹ I acknowledge that the use of this word is problematic, if only for its assumption that all of those grouped under it think in the same way. I use it in describing Latour’s ideas simply for coherence with his writings.

of their attainments of well-being, which themselves may be (and in many instances are) also defined in ways other than the Western notion of development.

Another way of calling dominant discourses into question is to show that these representations do not tell the full story about the people and places they claim to describe. A good example of this is the labelling of countries and people in the Global South as “underdeveloped” or “developing”. Numerous scholars have taken exception to these labels because they represent Third World people, and frame their apparent problems, in ways that do not do justice to peoples’ self-perceived identities/ or realities. Shrestha (1995) illustrates this point clearly in his article about how he and other Nepali people were gradually converted - both discursively and materially - into “development categories” after “development” arrived in Nepal in the 1940s. He does not deny that they were poor, and even often did not have enough to eat at the time. But, they were not poor in quite the ways that the “development” discourses described them to be. He explains how becoming “poor” as a development category implied a devaluation of their own culture, language, beliefs, education and knowledge, and their productive forces and economic organization. This characterization of poverty was dehumanizing and led to an increasing desire on the parts of “colonized” minds - those who accepted and came to believe that they were inferior to the West - to become ever more like the West and distance themselves ever more from their own cultural and ethnic identities.

Another critique of the partial nature of dominant environmental and development discourses is that they often rely on the essentialization of people and places. In critiquing Orientalist thinking, Said (1979) draws attention to the fallacy of grouping the vast

territory, myriad cultures and numerous countries of the Middle East under the label and description of “Orient”, which suggests that there is an essential prototype of an Arab that is constant throughout the region. Cultural and biological essentialization has been common, not only in Orientalist scholarship, but also in colonial, and ethnographic writings about other cultures, and of indigenous people.

An important essentialising practice that comes under this critique is the representation of cultures, and communities, as units, or “universe[s] of shared meaning” standing separate from one another, and holding an internal homogeneity and consensus (Gupta and Ferguson, 1997: 3).

The “polyphony” of ethnographic fieldwork – the many different “voices” present in the actual discussions and dialogues through which ethnographic understandings are constructed - is contrasted with the monophonic authorial voice of the conventional ethnographic monograph. Such critiques have implied that anthropology’s “cultures” must be seen as less unitary and more fragmented, their boundedness more of a literary fiction – albeit a “serious fiction” (Clifford, 1988: 10) - than as some sort of natural fact (Gupta and Ferguson, 1997: 3).

Gupta and Ferguson’s critique of this type of representation suggests that within cultures, locales and communities, there can be a diversity of positions and knowledges. The glossing over of these differences ignores the uneven power relations among them, and privileges certain “voices”. Obviously all Arabs, all indigenous people, all black people, all countries in the Global South, all rural people, and all people presumably from one culture are not the same. The concepts of relational identity and hybridity discussed in the next section, will explain that no identity is untainted by the encounter with its “other”

and further, that there is not, and never was, any such thing as a pure, authentic, and static identity that existed before the colonial encounter in the case of colonized people, and before the onset of modernity in the case of Westerners.

If modernity was equated with progress, enlightenment, reason, and efficiency, some Western philosophers also saw it as a decline, or a departure from the true human nature, and as a destruction of nature (Braun, 2002: 135). Originating in the work of Jean Jacques Rousseau in the mid 1700s, this idea of modernity, or civilisation as society's rupture from a previous harmony both with itself and with nature, has been a very powerful backdrop to contemporary representations of indigenous people and natural landscapes, particularly those that form part of environmental conservation discourses.

Rousseau argued that civilisation corrupted an essentially good and noble human nature. The moral undertones of this notion of modernity-as-decline should not be underestimated. Images of nature, and of "traditional" and "primitive" societies and people, as embodiments of an original harmony, purity and goodness are held up as a constant reminder of what we have lost to modernity (Braun, 2002: 135). This has been influential in forming the idea that we should try to recover, protect, preserve, or in some way recreate that original purity. It is also influential in the idealization of "traditional" societies, and of indigenous people as ecologically benign. The "noble savage" still appears in the background of many contemporary environmental discourses (Redford, 1990). As I will discuss in Chapter V, it is key to the discourse of *in situ* conservation.

As for nature, it will become clear in the discussion of the concept of social nature in the latter part of this chapter, that there is no such thing as a pure nature that precedes

culture; before colonization, nature was not “pristine” and devoid of humans (although Braun argues effectively that that is how the Europeans who arrived on Canada’s west coast saw it). Nature was already engaged/entangled with culture/society, only that it was another culture. Similarly, the presumed rupture between tradition and modernity is not a specific moment in history in which society stopped being “traditional” and began to be modern, as is suggested in certain theories of social evolution. Traditional society is like “pristine” nature in that it is an ideal against which contemporary society measures itself either in boasting its “progress” or in mourning its loss (Braun, 2002: 137).

Post-colonial and post-structuralist political ecologies take issue with this type of representation of nature and of indigenous people because of the implications for the material realities of those who are on their receiving end. It is not only that these representations do not speak the whole truth about the people they purport to describe; it is also that such representations are what Said (1993) called “rhetorical devices” that perpetuate colonial relations. Smith (1999) argues that the idea of “authenticity” is used by the West to “determine who is really indigenous, who is worth saving, who is still innocent and free from Western contamination” (Smith, 1999: 74). Underlying this is the belief, she argues, “that indigenous cultures cannot change, cannot recreate themselves and still claim to be indigenous. Nor can they be complicated, internally diverse, and contradictory.” (1999: 74).

Explaining the implications of viewing nature and culture as separate, Braun (2002) draws on George Dawson’s descriptions of native people’s physical features, their

culture – social organization, customs, behaviour, and the physical landscape – the flora and fauna, and the geological characteristics, as two completely different and separate realms. In spite of the diligence and detail of Dawson’s accounts, and in spite of his observation of native artifices that spoke precisely of the intimate relationship between these people and their surrounding environment, Dawson failed to see beyond his and his colonial companions’ “double vision” which kept nature and culture completely separate (Braun, 2002: 57). These representations were much more than texts.

More than mere texts, they did not leave the land untouched. Instead, they actively displaced and resituated landscapes within new orders of vision and visibility, authorizing particular activities and facilitating new forms of governmental rationality. It was only after the land was staged as a theatre of nature, after all, that it could be made available to the sorts of political and economic calculation that Dawson and others anticipated (Braun, 2002, 61).

The representation of indigenous people in isolation from their historical and territorial context provided for their displacement, and set the stage for the subsequent redefinition of BC’s temperate rainforests’ spatial and temporal organization according to the colonial state’s concepts of forestry. When authenticity or “pristine-ness” serve as a way of making a cut between those who are and those who are not “traditional” or “indigenous” or between nature and society (thus making nature a candidate for enclosure or conservation), the implications of representations are immense. I will return to these issues in the discussion below on social nature.

There are several important points to be taken from this discussion of power, knowledge, and their implications in governance. Foucault’s notion of power is quite

different to the notion of power commonly used outside academia, and in areas of study that have not been influenced by post-modern and post-structuralist ideas. It is most useful perhaps because it trains us to see power, particularly when it is hidden, when actions, programs, norms, descriptions or explanations, institutions, natures, places, identities in general seem natural, or given. The implications of these notions of power, and the relationship between power, knowledge and governance is that discourses cannot be taken at face value. Instead they must be interrogated, and silenced views must be sought.

Identity

The concept of power/knowledge permeates all post-structural interpretations of knowledge, and all truth claims. Language, in this view, is not a direct and consistent reflection of reality. Instead, meaning (of identity, knowledge, culture, nature, place) is continually re-ascribed in different contexts, and in relation to others. In this way, the “creation of meaning” can be understood as a perpetually “unfinished process, a site of (political) struggle where alternative meanings are generated and only temporarily fixed” (Gibson-Graham, 2000: 96). Identities are *performative*; they require continuous re-enactment in order to maintain their meanings (*ibid.*; Butler, 1990). The varying contexts (including the relations of power), and ways in which re-enactments occur, have a bearing on the specific identity that is performed. This establishes a necessary link between being, acting and knowing and proposes that identities are constantly subject to

change as their performances, or articulations can, and often do, vary among iterations (McDowell, 1995).

Post-structuralist thinkers have been particularly critical of the way in which Western, or modernist thought, establishes identities and assigns meaning. In Western or modernist thought, objects and identities have often been given meaning in binary structures such as man/woman, society/nature, self/other in which it is assumed that one term negates the other (or is the opposite of it), and that both terms, together, encompass the full range of possibilities in the category described by the binary. These structures establish a “relation of opposition and exclusion rather than similarity and mixture between the two terms” (Gibson-Graham, 2000: 98). They come charged with uneven value between the two terms so that one is perceived as superior to the other, as the active agent, and as the positive member.

Post-colonial theorists have observed that this neat separation of self and other, colonizer and colonized, does not exist. They observe “the transaction of the postcolonial world is not a one way process in which oppression obliterates the oppressed or the colonizer silences the colonized in absolute terms. In practice, it rather stresses the mutuality of the process” (Ashcroft et al. 1995: 183). Hence both colonizer and colonized are changed by the colonial encounter such that the boundaries between them become blurred. More than this, however, postcolonial theory proposes that there never were any pure identities either of the colonizer or of the colonized awaiting an encounter with their others, but rather that these identities are formed in relation to one another.

Recent poststructuralist thought influenced by Science Studies scholars such as Latour (1987, 1993) and Haraway (1991) has added another dimension to this, asserting that it is not enough to blur these lines within binaries such as self/other that refer to people and natural/“man”-made referring to objects in our surroundings. It is also necessary to blur the lines between binaries. These scholars, among others (Callon, 1986; Law 1992; Whatmore, 2002) forward Actor Network Theory (ANT) which proposes that the world is a “seamless fabric” (Latour, 1993) in which nature, machines, people, institutions, knowledge, techniques, discourses, and any type of other ‘things’ exist in webs of relations, or networks, in which each actor’s identity is contingent on, and constituted through, its interactions with all the others. This renders a world where there are not pure and fixed identities (be they of people, nature, or objects). All identities are effects of their relations (Braun, 2002, citing Deleuze and Guattari, 1977). Whatmore (2002) gives an example of this in her “topologies of wildlife”. She traces the networks that made leopards the “performance of wildlife” that took part in ancient Roman gladiatorial and animal combats. This animal was:

...merely one piece in an elaborate set of procurement networks involving military supply lines and political patronage that connected Rome with China, India and Africa. ... Leopards that made it to gladiatorial and wild animal combats were often starved, abused and/or diseased. Their characteristics had changed through their circulation in networks ...By circulating through elaborate networks of heterogeneous elements, a leopard would become what the Romans called *leopardus* – a performance of wildlife (Bosco, 2006 citing Whatmore, 2002: 138).

The animal that arrived in the gladiatorial amphitheatres was not a pure and fixed identity of leopard, but was constituted by its traveling through the networks that brought it there. The networks themselves were also changed, as were their other actors, by the enlistment of leopards in their ranks.

This has important implications for how agency and power are understood. While most post-structuralist accounts invest practically all agency in human actors or society (and in discourse), ANT proposes that nature, technologies, discourse/knowledge are equally active in co-producing realities. My emphasis on discourse and governance in the previous section of this chapter should not be taken as a contradiction. In that section I emphasized the importance of discourse. What ANT contributes is the symmetry with other actors, or ‘things’ (Latour, 1993). Non-humans in this view can also act. Latour (1988) illustrated this vividly in his explanation of the societal changes that accompanied Louis Pasteur’s “discovery” of the anthrax virus:

After Pasteur, microbes became social actors in their own right. On the one hand they strengthened the social and rhetorical positions of the hygienists for whom microbes provided an ally, and they also elevated the position of Pasteur, who became a central figure in French society. ...by seeing the health of populations through the lens of microbes, many other elements of social (and material) life became rearranged.
(Castree and Braun, 1998: 30-31)

As society constructs nature and technology, so society is continually re-constituted through its relations with objects, technologies and also with nature. The ability of ‘things’ to act is clearly foregrounded in Foucault’s explanation of “techniques of power”. These can be any and all sort of entity. They can be people, discourses,

institutions such as prisons and asylums, spatial arrangements, but they can also be machines, technologies, techniques of calculation or measurement, practices, parts of nature or anything else. All of these have the capacity to act as normalising forces, or as agents of power.

Another important contribution of ANT is that although it considers that all entities can act, it argues that none acts alone. Since actors are constituted and have meaning within networks, their identities and their actions will always involve other entities in the network. To come back to the case of Pasteur's microbes, they do not have a will and interest of their own, and they certainly do not act alone. Rather, Pasteur recruits them into his network where they interact with many other objects including the instruments, techniques, and scientists in the laboratory, and the trials and the farmers in the field in order to extend his knowledge and practice from the laboratory to society. In turn Pasteur is unable to do this without the cooperation of the microbes and his laboratories and all the actors in between. The action of any actor in a network then necessarily involves the other entities in the network.

ANT explains power as an effect of the associations of actors in networks. As new actors adhere to them, or are enlisted or enrolled in them, networks gain influence. The greater the number of actors, the longer the network, the more powerful and influential it is (Latour, 1993). However, following Foucault's productive sense of power, actors are not forced to join against their will. On the contrary, their interests and goals must be aligned (or must be interpreted to be aligned) with those of the network (even if the latter must be modified in order for this to happen). They must interpret the network's

interests as theirs. It is important to highlight here that inanimate objects do not *speak* or *act* in the commonly used sense of these terms. They cannot *really* agree with the network's interests as a citizen would agree with his/her interests. However objects (particularly non-humans) are recruited by humans and their networks, who give them a sense and a place in their network, and claim to speak on their behalf (they "translate" the "silent behaviour of objects" Latour, 1993: 28). This process of consensus building is called "translation". It is the process by which links are made between the network and new actors.

Networks are also strengthened according to ANT through the stabilization of relationships between the network and new adherents. This is achieved by the production or recruitment of material artefacts, machines or other objects, which Latour calls "immutable mobiles" (Latour, 1987 cited in Murdoch 2006: 65). They are objects that continually re-entrench the work of translation. They carry both the interests of the network (and its centers) and those of the localities to which the network is extended back and forth between the two. Immutable mobiles are, in Foucault's terms, "disciplinary techniques" through which the behaviour of subjects is conducted and thus "control over the network" is assured (*ibid.*). In Pasteur's case, the vaccine served this purpose. It secured the interest of French farmers in Pasteur and his laboratory thus solidifying the relationship between Pasteur, the farmers and the anthrax virus.

The last contribution of ANT that is relevant to this thesis is its ability to explain the extension of power, or governance over large distances. This, according to some scholars, was a weakness in Foucault's explanations of power and space (Murdoch,

2006). Even with his theorisation of government (which took disciplinary power out of confined spaces and necessarily further de-centered it) Foucault's notions of power, they argue, seems to "drop the spatial dimension from view" (Murdoch, 2006: 56-57). ANT on the other hand claims to transcend scale, as networks travel across space linking distant localities. This is important for considering how power travels to and from distant locations. I will come back to questions of space and place in the final section of this chapter.

Before moving forward to discuss the concepts of social nature and place, and the important contributions that ANT makes in their regard, it is necessary to touch briefly on what is considered by some (see discussions in Bosco 2006, Hinchliffe, 2000, Sheppard, 2002) to be one of the weaknesses of this theory. As I have mentioned, ANT proposes that everything happens and comes to be within networks. For this reason it focuses on tracing networks, and taking account of the presence and influences of myriad actors within them (Murdoch, 2006). However in doing so, it concentrates on the building of powerful networks, paying much less attention to the place of resistance. If networks are made of myriad "things" that are aligned into a particular order, or rationality, where are the things that oppose or want to change that order? Law (1992: 386) mentions that "things" are continuously liable to break off from networks, thereby weakening them, but once these things have broken off, they disappear from view. Although Latour makes much of Pasteur's activities that enlist French farmers, laboratories, field trials, the anthrax virus, and other *actants*, he does not mention those who at the time might have

proposed other solutions to the problems caused by the virus. In Foucault's terms, these would doubtlessly be silenced or subjugated knowledges.

Whatmore (2002) seems to partially respond to this in her discussion of the many incarnations of the soybean, from "brings happiness", to "magical hybrids", "Roundup readyTM" and finally "Frankenstein food". She argues that each of these guises, or re-assemblages of the soybean represents a very different social ordering, "agglomerate[ing] very diverse acts and complicat[ing] the distribution of powers and knowledges in the precarious business of growing and eating" (2002: 142). Each of these configurations, she writes, is partial in the sense that it "co-exists with other modes of ordering" (*ibid.*) and provisional, in the sense that (at least in the case of GM soya) their orderings are challenged by those who oppose the particular assemblage that it represents. However, we are still left with the doubt as to whether these are different networks, or the same one encompassing resistance.

For the purposes of this thesis, I draw on Escobar's (1998) notion of different "perspectives" within networks. He explains the "biodiversity production network" as being the network that produces the construct of "biodiversity" and everything that comes to play in addressing the issues around it. Within this network, Escobar describes different "perspectives", an idea that is similar to the feminist idea of positions (discussed in relation to networks by Sheppard, 2002: 318), which takes account of subject/objects' positioning in fields that always include power and resistance. Escobar (1998) uses the idea of a perspective in a network effectively in his explanation of how different perspectives within the biodiversity network mobilize the concept of biodiversity and

bring it into the network in different ways (what might be interpreted by ANT as different networks because different perspectives might mobilize different sets of actors to forward their perspectives) with different consequences. The result of this process is a tension that characterizes both the decentred nature of power, and the idea that power and resistance are co-constitutive (Sharp et al., 2000) and thus exist in the same network. Hence, the different soybeans that Whatmore addresses would, in fact, coexist in the same soybean production network and their different social orderings would be the partial and provisional effects of different configurations of power within this network. This discussion is central to the argument made in Chapter IV regarding the emergence of *in situ* conservation as a situated discourse and practice, and PROINPA's position and operation from a particular position within this network.

Social Nature

The understanding of how identities are established performatively and relationally through actor networks, combined with the understanding of knowledge and power as intricately linked, has particularly important implications and promises for the theorization of nature-society relations. At its most basic it raises questions as to what is nature? What is "natural"? This has far reaching implications for the analysis of approaches to biodiversity conservation, among them *in situ* conservation.

Conventionally, nature has been seen as something outside and separate from society (Castree, 2001). This view has deep roots in the Judeo-Christian tradition, and the European Enlightenment, both of which portrayed humans as superior to nature, and

having the right, and perhaps the obligation, to “tame” and mould nature to fulfill our needs. The separation from and superiority to nature also gives society the ability to describe and know nature as an object, outside and independent of ourselves. Society/nature, as seen in these western traditions, operates exactly as do the binaries described and questioned by post-structuralists in general (Gibson-Graham, 2000: 98). Society is the dominant, positive, active agent while nature is relinquished to passivity.

The idea that nature and society are separate is taken for granted in most Western thought, and has formed the backbone of environmentalist and of scientific-technocratic approaches to environmental issues (Castree, 2001). Briefly, the environmentalist, or eco-centric, stance has been that nature is endangered by and should be protected from, human activity. This has led to proposals to curtail human activities (and also to see human population growth as a direct threat to the environment). It has also led to the creation of protected areas and biological reserves, in many parts of the world, which isolate parts of nature from human activities in order to protect them (*ibid.*: 6). The ideal of a pristine wilderness (threatened by humans) is almost always present in such efforts.

The technocratic stance equates nature with “environmental problems” caused by humans. These problems, the thinking goes, can be solved by science, technology, and appropriate management regimes all of which rely on society’s ability to know nature accurately. This view of nature and society is fully entrenched in the discourses of nature as “environment” or as “natural resources” firmly linked to its productive and utilitarian characteristics in what Escobar (1996) calls the “post-modern form of ecological capital” which sees local people as “stewards of diversity”, and their resources as “reservoirs of

value". It is a view of nature that is key to the concept of sustainable development, in which nature becomes a factor in economic growth and thus must be conserved and used wisely in order to prevent its demise, and with it the demise of the capitalist system (Escobar, 1996). Both of these approaches rely on, and further, the idea that society and nature are separate. They are both operative, as we will see, in the biodiversity conservation discourse that informs *in situ* conservation, and hence also PROINPA's approach to "native" potato conservation in Bolivia.

Post-structuralist theorists and Science Studies scholars forwarding Actor Network Theory propose that nature and society are not in fact separate, but intricately intertwined². "Nature", they argue, "has never been simply 'natural'...Rather, it is intrinsically social, in different ways, at different levels, and with a multitude of serious implications" (Castree: 2001: 5). Some post-structuralist scholars emphasizing the role of discourse in the construction of realities propose that nature is intrinsically social because our treatment of nature reflects our identities, knowledge(s), and discourses about it. All knowledge about nature is impregnated with the positionalities of those who create them thus making it impossible to separate any account of nature from its narrator(s), and from the power relations implicated in their production.

Proponents of ANT do not negate this but they argue that it does not go far enough in recognizing hybridity and questioning the processes through which hybrids come to be. They acknowledge that the discursive is an important element of all

² Although these two groups have important similarities, particularly in their reliance on Foucault's writings, (Castree and Braun, 1998; Murdoch, 2005), they have important differences among which ANT's insistence on the symmetry of action or agency among human and non-human actors, and by consequence the two-way relationship of co-construction between humans and non-humans, are key (Castree and Braun, 1998).

assemblages, however they claim that this analysis still does not reverse the modern tendency to keep trying to pry apart an always already entangled social-nature (Latour, 1993). In fact, Latour argues that it re-institutes the divide, by focusing on human actions and discourses. He and other ANT scholars insist that humans and discourses form assemblages with other non-human and inanimate actors (sometimes called *actants*), which are as constitutive *of*, as they are constituted *by*, humans and their discourses. In Latour's view, the effort and need to separate society and nature is a modern obsession. He argues that "the moderns" are caught up in a paradox whereby we/they continually create hybrids (through the process of "translation" discussed above) while trying relentlessly to maintain the split between nature and society (a process he calls "purification" and that is very similar to the practice of essentialization discussed above). Both processes, he argues, reinforce one another: while the proliferation of hybrids makes us want to keep nature and society separate, this separation hides the existence and proliferation of hybrids. What is important about this process is that power is present, but hidden. It is implicated in the "translations" of new 'things' into hybrid networks, and it is implicated in the "purifications" that make things look only social or only natural, hence facilitating their "translations". What Latour (1993) argues is that "we have never been modern" in the sense of having lived in a world in which society and nature are separate, and that we need to stop trying to be "modern" in order to begin to resolve some of our most pressing social and ecological problems.

The implications of the recognition of social nature are far reaching. Following Braun (2002), I highlight three implications. The first is that nature cannot be taken as

given. This is the same argument presented above in the discussion of situated and partial knowledges stemming from Foucault's (1977, 1980) writings on power/knowledge and genealogy. It is necessary to question the provenance of that which counts, or is made to count, as nature. Likewise, it is important to observe the effects (not necessarily only in terms of what is prohibited, but perhaps more importantly in terms of what is enabled) on societies and on natures of privileging one account of nature over others. Braun argues that these natures are not objective reflections of an external and pure nature, but deeply historical, cultural and political spaces that come to be, as effects of power. By the same token, and drawing on the discussion above about essentialisations of local people and communities, society should not be taken as given either. This idea is central to the argument I make in this thesis in questioning how Candelaria comes to be a "place of origin", by what means its society comes to be taken as "traditional", and how the landscape is read as "natural".

A second implication of social nature, stemming particularly from the contributions of ANT is that nature, or what comes to be taken as nature, is about much more than its discursive constructions, or about its reconfiguration as commodity. It is about the creation and extension of heterogeneous assemblages, as discussed above.

The final, and perhaps the most important, implication of the idea that nature and society are always co-constructed, incomplete and under negotiation, is that it opens an opportunity, and perhaps an obligation, for human societies to understand and question the processes and relations through which nature and society are made (Castree and Braun, 1998), and to take responsibility for imagining and creating more ecologically

sustainable and socially just ways of being in the world (Braun, 2002: 10). This is ultimately the goal of most post-structuralist and post-colonial political ecology as well as that of some ANT scholars.

I now turn to the final section of the chapter, which addresses the concepts of place and space.

Place and Space

The concept of place is important in this thesis because the conservation program that I analyse is implemented in a place. Following the prescriptions of *in situ* conservation discourses, PROINPA, the foundation implementing the program, presumes, problematically as I will show, that this place is a “place of origin” of the Andean root and tuber varieties that it proposes to conserve. It is also important, because I conducted my field research in a place that is, as I will discuss in Chapter II, again problematically, referred to as “the field”, a place having characteristics of one’s choosing, and located somewhere separate from home. Finally, it is important to discuss place, because power is inscribed in space and in spatial organizations. Moreover, ANT theorists have argued convincingly that as nature and inanimate objects (in addition to humans and their discourses) constitute and are constituted by heterogeneous associations, so does/is space.

One of the most taken for granted notions of place is that it is local, while space, its counterpart, is global. Representations of place as local however are very closely related to the essentialised representations of indigenous or “traditional” people and

pristine natures discussed above. As Gupta and Ferguson (1997) argue, anthropological representations of the local, closely related to the “fieldwork” tradition of this discipline, established the local as completely separate from, and in many ways opposite to, the rest of the world, or at least the world from which anthropologists emerged. Recent analyses and critiques of ethnographic work on the local, and on place, have revealed that common-sense notions of these complex terms come packed with far reaching assumptions such as the equation of the local with nature, tradition, authenticity, origins, and the rural, while the global is usually associated with artificial nature, modernity, inauthenticity, urbanism. As such, the local becomes a “nostalgic” reference point for truth, purity, tradition and origins (Gupta and Ferguson, 1997). This nostalgia has permeated much ethnographic fieldwork and biological conservation programs, which, to varying degrees, seem to try to salvage the “vanishing primitive”, the ideal traditional (and ecologically noble) society, or a “pristine nature”. The problems with these assumptions must already be evident given the above discussions. Their allusion to essentialism and their reliance on binary constructions need no further elaboration. It is important however to reiterate that, like the representations of nature and society, what comes to be understood or characterized as a particular place, is an effect of power (Massey, 1995), and that, as an identity, place is not fixed, but performed. Thus it is always changing and potentially subvertible.

Massey (1994, 2005) proposes a sense of place that is quite different to “common-sense” notions described above. Seeing places as constituted by the heterogeneous relations that occur in particular locations, and seeing these relations in turn as extending

beyond the location, to broader scales, even embracing the global, place can be seen as a “point of intersection”, as “articulated moments in networks of social relations and understandings, but where a larger proportion of those relations, experiences and understandings are constructed on a far larger scale than what we happen to define for that moment as the place itself...” (Massey, 1994: 7). Places in this view are as much defined by what happens ‘outside’ them, as what happens ‘within’ them. They are as much global as they are local. From these insights, Massey (2005) proposes an erasure of the distinction between space and place.

She also proposes the erasure of the previously taken for granted notions of the relationships between space and time (and history). She points out that often people traveling to places, particularly in the Global South that have not been globalised or “modernized”, imagine their travels as travels in time, as if they went to the past. Needless to say, these ideas are linked to those I have discussed above regarding Western notions of “development” and “modernization”. Massey (2005: 5) argues that these places are of course not in the past, but have “their own trajectories, their own particular histories, and the potential for their own, perhaps different, futures”. These histories she argues, happen in the same time as ours, only in different locations and positions.

Conclusions

In presenting the theoretical background for this dissertation, this chapter has explained how key terms such as power, knowledge, society, nature and place can be theorized from a combination of elements of post-structural, post-colonial and feminist

political ecologies. Key to the understanding of the conceptualisation of these terms are the ideas of relational and performative identity, and of hybridity. In elucidating the close relationship of knowledge and environmental and development governance, this chapter has outlined two key areas of critique. The first is the demonstration that dominant discourses emerge from culturally and historically specific moments and thus cannot be universal. The second, and closely related critique, is the insistence that many of these representations of local people and their environments are partial and often rely on essentialisations.

While this theoretical background is critical, and involves for many a new way of conceptualizing several taken for granted concepts, it also hopes to contribute to a more balanced, socially and ecologically just understanding of the challenges posed by the need to conserve genetic materials while addressing some of the uneven power relations involved in deciding how this is to take place, where, and by whom. This challenge is particularly important in *in situ* conservation, as the targets for conservation programs are both the landraces and “natural habitats”, and the lifestyles and management practices of the people who have been key to their maintenance.

Chapter III.

RESEARCH EXPERIENCE: “FIELD” SITES, METHODS AND REFLEXIONS

Introduction

I arrived in Bolivia on July 17th, 2004, the eve of the referendum on the future of the country's oil and gas reserves. These reserves had been privatized by President Gonzalo “Goni” Sanchez de Lozada in the mid-1990s as part of his “New Economic Policy” that, under pressure from the International Monetary Fund (IMF) and the World Bank, set out to “neo-liberalize” the Bolivian economy. The referendum was a promise to the nation by Vice-President Carlos Mesa who took over when Sanchez de Lozada was ousted by the popular uprising of the previous October. More than sixty people were killed during this uprising, now known as the “gas-war”, as the president ordered the military out to stop protests against the awarding of oil extraction contracts to foreign companies.

Also privatized under Sanchez de Lozada's new economic policies, were Cochabamba and El Alto's waterworks. In the year 2000, Cochabamba residents began the “water war”, which after battles with the military on city streets, won back their water from Aguas del Tunari, a mainly foreign-owned consortium that raised household water bills by 200% once their contract was signed. A second water war, this time in the 700,000-strong shantytown of El Alto was brewing when I arrived in Bolivia. It eventually erupted, and was won by the residents in January 2005. The contract with Aguas de Illimani, another foreign consortium, was broken (Ballvé, 2005).

In the same time period (2002), the *Movimiento al Socialismo* (Movement Toward Socialism or MAS) party, and the *cocalero*¹ unions of Chapare and Yungas which they represent successfully pressured the Bolivian government to disband and expel the Expeditionary Task Force (ETF), a US trained and financed paramilitary anti-drug unit that was responsible for widespread human rights abuses committed against suspected coca growers in rural areas. In 2004 they negotiated an agreement with the government to expand (albeit only slightly) the area of legal coca cultivation in the Chapare region.

These natural resource “wars”, and the partial victory of the *cocalero* movement over the imposition of the U.S. Drug War in Bolivia, are all part of what Hylton and Thompson (2005) call a “revolutionary cycle” taking place in Bolivia. What seemed before to be many localized struggles had coalesced into a national movement whose demands included popular control of natural resources, land and territorial integrity for indigenous nations within the Bolivian State, an end to neo-liberal capitalism, anti-imperialism (mostly against the U.S., the World Bank, and the IMF), and the holding of a Constituent Assembly to rewrite the constitution of Bolivia in the name, and through the participation of, the poor indigenous majority (Webber, 2005). Since the year 2000 Bolivia’s popular sectors have actively rejected some of the key impositions of neo-liberalism and globalization. This is a feat that many Bolivians, particularly the poorer, indigenous, and rural segments of the population are very proud of.

¹ *Cocalero*, refers informally to people who cultivate coca. Since the mid 1980s it has become a synonym of the political movement of the coca leaf growers in defence of their rights to cultivate coca in the Bolivian tropics.

By the time I left Bolivia, the country had gone through intense political turmoil and months of massive political mobilizations. The “revolutionary cycle” that Hylton and Thompson (2005) write about culminated in the forced resignation of President Mesa, and the eventual democratic election of Evo Morales, the leader of the MAS, the first indigenous president of Bolivia. He promised to bring sweeping changes to the country, changes that would finally favour the rural indigenous majority and would secure national control of natural resources. These events also had profound effects on my research in Bolivia.

The present chapter has the objective of explaining where and how I conducted my research, and of reflecting on this process. As I will explain, my research experience was “complicated”² by a series of unexpected events, or “surprises” (Mackenzie, 2007: 450 citing Limb and Dwyer 2001), which did not allow me to conduct my research in the “field” site of my choosing, and for the duration that I thought necessary in order to fulfill my objectives. In one of my sites, my presence and research sparked a heated debate and negotiation among members of the communities in which I aimed to conduct my research, my institutional hosts (a local non-governmental organization or NGO, supported by a European donor), and myself, about my identity. While some community members cast me as a “foreign capitalist” that had arrived to “steal their story”³, the local NGO assured them that I brought the benefits of “development” and “progress”. Meanwhile, I struggled, in vain, to create a space in which I could be myself, with my

² ‘Complicated’ at first negatively, and very tangibly in terms of research logistics and relationships in the ‘field’, and later in a more constructive sense of requiring a problematization of the previously taken for granted notion of ‘field’ work.

³ Field notes on my meetings with the communities of Sivingani and Walk’eri in the Ayllu Chullpas not far from Llallagua, in the north of Potosí.

own intentions and convictions, and be, in that place, in that moment neither of the identities that were being debated before me. I eventually had to abandon this site and choose another, only to learn a few weeks later that political protestors had blocked the roads and that it was impossible to get to the new site until the blockades were lifted. These events inevitably had important implications on the quantity and type of data that I was able to collect.

In spite of the tendency for feminist and post-structuralist scholars for deep reflexivity regarding their research processes, it is still a bit unusual to write about major fieldwork problems. Exposing these problems is at best uncomfortable. Because of their personal and political natures, airing them makes us feel inadequate and vulnerable. Inevitably it is quite tempting to treat these problems as “fieldwork secrets” or, simply, parts of our experience that we would rather not, and perhaps should not highlight (Wolf, 1996: xi). They are instances and experiences, which we prefer to read as not being part of our “field research”.

This tendency is deeply problematic as it denies the importance of these research surprises, as research encounters in their own right, and it denies that there may be something important to be drawn from them. It is also problematic as it is based in a view of the “field” as a deliberate moment or place outside of the researcher’s everyday lived experience at home (or elsewhere), a physical location to which the researcher displaces herself in order to study a particular phenomenon. This sets “the field”, (and the people and processes that are lived there), as a “local” place that is separate and disconnected from the rest of the world and its processes, both in time and in space. As discussed in

Chapter II this conceptualization of “local places” as opposed to “global spaces” has come under serious critique by scholars such as Gupta and Ferguson (1997) and Massey (2005) who conceive of both place and space (or the local and global) as constituted relationally and thus in terms of continuity rather than discontinuity.

Recent scholarship, including key contributions from feminist and human geographers, has elucidated the importance of reflexivity in research (Rose, 1997). This has come mostly as post-modernist, post-structuralist, and post-colonial currents have problematized positivist knowledge and highlighted the entanglements of power and knowledge. As discussed in Chapter II, knowledge is always partial and contingent, mediated by uneven societal power relations. This has important implications for how knowledge is generated. In disciplines and areas of study such as geography and anthropology, in which “fieldwork” has important currency as a source of “first hand” accounts of “others”, it raises critical questions as to the places where, and the relationships through which research is conducted (Katz, 1994; England, 2006).

In retrospect, and upon months of reflection, I have come to realize that my fieldwork “surprises” are an important part of my research and make a crucial contribution to the questions I raise in the thesis. This experience has led me to question and to reflect on, as others have (see particularly Katz, 1992, 1994; Nast, 1994; Mackenzie, 2007), the notions of “field” sites and fieldwork. My objective is to make visible the story that connects the multiple “fields” that allow me to generate the “knowledge” that I have through this experience. In this regard, Katz’s (1994: 67) phrase “we are always, everywhere, in ‘the field’” is particularly relevant.

In acknowledging the partial and contingent nature of knowledge and experience, it is imperative that I, as the researcher, reflect on how my identity (constructed both by my-self and by my research subjects) affected the research encounter. Reflexivity has been posited as the main strategy for doing this, and has become a common component of the work of critical scholars. It is important to keep in mind however that as Rose (1997) points out, there is an inherent contradiction in this notion. A researcher cannot have comprehensive, transparent knowledge, and vision to completely know him/herself, the researched, and the context. Surely, the position from which s/he reflects also has an influence on the outcome of reflexivity. Further, the research process itself changes both the researcher and the researched so that he/she who writes is not entirely the same person as s/he who researched. Rose (*ibid.*) argues that the knowledge that is necessary to produce such a comprehensive contextualisation is unattainable. She writes:

[The questions asked for such reflexivity are] so presumptuous about the reflective, analytical power of the researcher, that I want to say that they should simply be unanswerable: we should not imagine we can answer them. For if we do, we may be performing nothing more than a goddess-trick uncomfortably similar to the god-trick (1997: 311).

Hence the ideas of situated knowledge and partial perspective are equally applicable to the process of reflection, and of writing, as they are to “field” research in general. Rose and others raise this caution as a reality check. It is important then to keep in mind that I make the following observations and reflections with the benefit of hindsight, and of a deeper understanding of the context in which my research took place, from the safety and

isolation of my home/office, and without the input of those who in one way or another are included in my reflections. As such my reflections and my knowledge, as my experience, are admittedly partial and subjective.

Research Objectives and Questions

The original objective of my research was to contribute to a deeper understanding of “expert farmers” - key individuals in rural communities around the world who actively conserve and enhance crop biodiversity, without the involvement of formal research and development organizations. The idea behind this was that these people had been cast in the role of “stewards of biodiversity” in international fora, in the academic literature, and in applied work (CBD, 1994 article 8(j); Wood and Lenné, 1999; Jarvis et al. 2000 respectively) without there being a good understanding of who these people were, what the social dynamics of their work were, how they interpreted biodiversity and its conservation, and importantly what their motivations and constraints were. The overall objective was to inform the design of projects, policies, and approaches that could support and complement the work of these “expert farmers” in addressing the pressing issue of the global loss of agricultural biodiversity.

Based in poststructuralist and postcolonial political ecology, my research proposal was concerned with diverging knowledges about biodiversity, and with the power dynamics involved in the marginalization and acceptance of different knowledges both at the “local” community level and also between local and outsiders’ conceptions and strategies of conservation. I was concerned that present approaches might exacerbate

local inequities and injustices, and entrench existing power relations between local communities and conservation agencies that try to “help” them conserve agricultural diversity. I was also concerned with what seemed to be an overly technical and managerial approach used and advocated by mainstream conservation institutions and how it might divert attention from a number of possible causes of biodiversity loss that are not addressed in these approaches, and not evident from their technocratic viewpoints. I intended to broaden the discussion of agrobiodiversity conservation from one that looks at the nature of agrobiodiversity and the ways in which it is managed, to one that also takes into consideration the broader, socio-political and economic forces that affect the ways in which local people use and conserve agrobiodiversity.

“Field” Sites

When I arrived in Bolivia, my host institution, the Foundation for the Promotion of Andean Products (PROINPA), proposed that I conduct my research in one or both of two main sites. One, Candelaria, was the site where it had been implementing, over the previous ten years, a series of projects aimed at *in situ* conservation of Andean roots and tubers; the other, Llallagua, was the prospective place for another site within the same initiative. I chose to work in Llallagua because, as I will discuss shortly, it seemed to be the place better suited to my original research objectives.

Llallagua

Llallagua is located in the North of the Department of Potosí, 95 Kms east of the city of Oruro (Figure 1, p. 7). It is a town located at 3,900 meters above sea level and surrounded by mountainous terrain ranging between 3734 to 4091 meters above sea level. The municipality of Llallagua comprises several urban and semi urban districts and in its rural area includes the *ayllus*⁴ Chullpa and Sikuya. The communities of Walkeri and Sivingani, where I began to conduct my research, are part of the ayllu Chullpa, one hour (motorcycle ride) outside Llallagua.

Llallagua was once a major tin mining centre that generated great wealth for mining companies, and for the state. During the tin mining apogee in the 1970s, it was the social and cultural capital of Bolivia. There were shops carrying the latest fashions, cinemas and theatres with the latest releases, restaurants, teahouses, hotels, and parks. Today there is nothing left of that except for the run-down buildings, a seemingly chronically under-funded hospital, and a series of mine-tailing mounds that line the winding dirt road into town. These mounds of little grey stones stand boldly contrasting with the surrounding hills, a constant reminder of Llallagua's history of exploitation and abandonment. At the foot of these mounds, numerous small mining operations have cropped up in hopes of extracting what the mining companies neglected to take from the tailings. Between these small stone and adobe huts run fetid streams of yellow and green contaminated water and debris. People work here all day. International tin prices plummeted in the 1980s and the main tin mines were closed. Today smaller mining

⁴ *Ayllus* were the main form of socio-political organization in the Andes in pre-colonial times. While some *ayllus* were never disbanded, others have recently been reconstituted as part of an indigenous social movement to regain territorial rights and autonomy.

operations still exist in Llallagua, and mining is still an important source of income for many.

The poverty and, perhaps more so, the social dislocation in Llallagua is striking. Many young men come to Llallagua from neighbouring rural communities in search of work. While some find daily odd jobs transporting things (on their backs), or working in construction, many end up working in the mines. Their earnings are very low and quite unreliable. Often they cannot rent rooms in Llallagua, and do not want to return to their communities for fear of social stigmas and rejection. Many turn to drinking cheap alcohol in large quantities and stumbling up and down the steep cobble-stone streets drunk, sometimes yelling, and crying. It is a scene that most Llallaguans take for granted (alcoholism, or alcohol abuse are quite common even among Llallaguans) but it is one that an outsider cannot feel indifferent to.

Llallagua, and particularly its miners' unions, have a history, and are known to be a centre of union activism and resistance to central government's social and economic policies. Many of the streets of Llallagua are lined with murals depicting revolutionary moments and themes, some remembering the infamous massacre of 1964 when the military opened fire on mining families returning from their San Juan festivities. Outside one of the university buildings stands a statue of Che Guevara – a testimony of Llallagua's Marxist and revolutionary past. Many of these sentiments are not only of the past. They are still alive and relevant in Llallagua and other parts of Bolivia. As Hertzler (2005) argues, although race, ethnicity, gender and other categories have grabbed the

attention of those who write about new social movements in Bolivia, class is still a very important aspect of popular activism in parts of this country.

The rural communities around Llallagua are said to have retained more of their cultural attributes than the populations in other parts of the country (Albó et al., 1990). They retain their “traditional” dress⁵, customs, and language, although Quechua, coming from the inter-Andean valleys, is slowly overrunning the Aymara language. The *ayllu*, the pre-Incaic socio-political organization, is the predominant form of social organization in this area. This is quite unique to this region (and the areas south of the Desaguadero river) as most other areas of the country were converted to the *sindicato* (union) system of organization more amenable to the modern state, after the revolution of 1952⁶.

Although some *allyus* had retained their systems since pre-colonial, and pre-incaic times, many are actually part of a post-colonial phenomenon. In recent years, there has been a movement among altiplano communities to “reconstitute” their *ayllus* and reinstitute their *autoridades originarias* (loosely translated as original authorities), a term that refers to their being “original” inhabitants, or First Nations. This self-proclaimed decolonizing movement is growing as more *ayllus* are reconstituted, and organized into federations of *ayllus* and First Nations across the altiplano demanding recognition and respect from the state (Choque and Mamani, 2001). This movement, whose objectives include territorial rights, the right to self-determination, and the affirmation of ethnic identity, is part of a larger indigenous nationalist movement, which is staunchly opposed

⁵ Although today many indigenous people in this area use “traditional” clothing as a symbol of cultural affirmation, it has been thought that some of these ways of dressing were introduced by the Spaniards in Colonial times in order to divide, or to accentuate the differences between, native groups.

⁶ Some historians view this as part of an explicit strategy of assimilation of Bolivia’s indigenous population into mestizo culture of the government/ cities/ lowland settlers (Choque and Mamani, 2001)

to the Bolivian State's ideology of creating a homogeneous, hybrid, mestizo, and unifying national identity (Canessa, 2000).

In sharp contrast, but showing striking similarities to the indigenous nationalist movement, the sweeping evangelization of altiplano communities (*ibid.*) is very pronounced in the Llallagua area. Whole communities are referred to as *hermanos* or brothers, indicating their conversion to Protestant Evangelism. These communities are different from those who have not converted in that they reject many of the rituals and practices of "traditionalists". They espouse an entirely different set of values more in line with a Western and individualistic notion of "development". Some communities however are divided among those who have converted and those who retain their syncretised mixture of Aymara spirituality and Catholicism, and a deep suspicion of "much of Western culture which they see as oppressive and imperialist" (*ibid.*:121).

PROINPA was particularly interested in establishing an *in situ* conservation project in the Llallagua area because of the alleged potato diversity that exists in the area, much of which has never been collected, and thus does not form part of the national nor the international potato gene banks. It was also interested in this area because of the cultural diversity and customs that are apparent in the area and which form the social and cultural context of the cultivation of potato landraces. At the time of my research in the area, PROINPA was in the process of negotiating a formal partnership with a local NGO and a European foundation to implement an *in situ* conservation project in Llallagua. My presence in the area, it seemed, would be helpful in the establishment of the partnership,

and in maintaining a contact between PROINPA, the local NGO, and the rural communities.

When I was presented with the option of working in Llallagua, I only had superficial knowledge of the complexity of its socio-economic and political context. My PROINPA colleagues described the North of Potosi as being the “poorest” in the country, as retaining its “traditional flavour” (in terms of music and dress), and as having an astonishing amount of potato diversity. They also warned, however, that it was a politically charged area, that the farmers there are *celosos* - literally meaning jealous but referring to a tendency to want to keep what is theirs, their own - and that I would undoubtedly come across people who casually use Marxist terms such as *compañero* (comrad), *capitalista* and *imperialista*.

Coming with a theoretical background, which highlights the social, cultural, and political dimensions that underlie biodiversity conservation efforts and their discourses, this description of Llallagua seemed to heighten my interest in the area rather than dampen it. I was particularly drawn to the possibility of seeing issues of biodiversity conservation, “development”, power, knowledge, “indigenous” identity, and “poverty” closely tied together. Escobar’s (1998) work with the Process of Black Communities (PCN) in Colombia’s Pacific Coast in which these communities mounted a political strategy for self-determination linking their cultural survival to that of the biodiversity that they maintain as part of their living was quite influential in my thinking. Llallagua seemed to offer a chance to witness (and perhaps, if the circumstances allowed, to have a constructive involvement in) something similar in progress. Moreover, I was intentionally

seeking out a place where seed and genetic diversity might have a different meaning than it does in the west, and particularly in the institutions that generate the discourses of biodiversity conservation. Because of PROINPA's limited prior involvement in this area, I thought that it was less likely to be an area where rural communities had adopted these discourses, and their associated ways of conceptualizing seed, nature, and their roles in conserving them.

It was important for me that many of the potato varieties in this area had not been collected for national and international gene banks, because it offered the opportunity for local people to negotiate the terms under which their varieties would become publicly accessible to scientists the world over. This related directly to my theoretical background that sees gene banking, and the associated environmental and development narratives that justify it, as a way for the west/north gaining access to parts of the natural world (here genes and genetic resources) that they otherwise could not lay claim to. In other parts of the Andes, as in my eventual research site, this is arguably a moot point because all the presently existing diversity is already in the gene banks and much of it has already been spread around the world⁷ without the knowledge and consent of the people who gave these materials to collectors, and without their benefiting from it. Today, the farmers in this area are demanding that PROINPA ask for their permission, before sharing with others, their materials stored in the gene bank (PROINPA, 2005).

Before beginning my PhD I had worked in an International Agricultural Research Centre promoting the use of participatory and gender sensitive methods and approaches among plant breeders, and documenting the processes of some Latin American breeders

⁷ Personal Communication with Julio Gabriel PROINPA breeder

who had begun to take-up these methods. During this experience, I came across many projects, and had observed the varying degrees to which, and intents with which, different breeders implemented various participatory methods. I also visited projects in their countries, and went to the field with breeders. One of the shortfalls of the movement toward the integration of these methods in breeding and other natural sciences is, what I perceived to be, an imposition of Western scientific understandings and methods onto farmers' own ways of experimenting and learning.

I became particularly wary of two prominent methodologies: Local Agricultural Research Committees (CIALs) promoted in Latin America, and the Farmer Field Schools (FFS) promoted mostly in Asia, which teach farmers how to experiment using the Scientific Method⁸. This is problematic in my view because, while supporting local people's efforts to conserve and/or enhance their crops or cropping systems, these methods threaten to displace or to be superimposed upon the knowledges, processes and practices that have been key to the management and conservation of agrobiodiversity to date. Since my focus was on farmers' motivations, constraints and skills in conservation, I wanted to go to a place where farmers had not been trained in the scientific method and made to believe that their own ways of knowing, experimenting, and handling their genetic diversity were inferior.

⁸ For more information on these two approaches see (Ashby et al., 1995 on CIALs, and Settle, 1997 for FFSs)

Research Surprises – Part I

My research experience in Llallagua was not at all what I expected it to be. After obtaining the communities' permission and approval, and beginning to do several participatory rural appraisal (PRA) activities (including seasonal calendars, participatory mapping, and community family tree) with them, the communities withdrew their approval for my research amidst some of their members' accusations that I had come to "steal their story"⁹. This, coupled with (what I interpret as) my local institutional hosts' lack of respect for the communities and their *autoridades originarias* (original or "traditional" authorities), and the growing anti-foreign sentiments fuelled by the rising popular movement in Bolivia to oust all foreign intervention in the country¹⁰ made it impossible for me to continue to work there. Feeling that I did not want to be part of a process that was being led on these terms, and also feeling a threat to my personal security, I felt forced by the circumstances to leave Llallagua.

Reflections on Llallagua research experience

My research experience in Llallagua brought to life the political and ethical dilemmas inherent in "First World" researchers conducting research in the "Third World". These dilemmas stem from who we are and how we are positioned *vis-à-vis* our research "subjects", our colleagues and institutional contacts, and the surrounding context in which our research is implanted. The importance of positionality and identity can

⁹ Notes from my meeting with the communities of Sivingani and Walk'eri, Ayllu Chullpas, October 2004.

¹⁰ In addition to this, a few days before I decided to abandon the site, the European leader of the local nongovernmental organization that was my host in Llallagua (one of the few other foreigners in Llallagua) was violently attacked leaving him with head injuries requiring hospitalization.

therefore not be overlooked. They deeply affect the research experience, and inevitably the knowledge that the researcher creates from it. As Skelton (2001) argues:

We are not neutral, scientific observers, untouched by the emotional and political contexts of places where we do our research. We are amalgams of our experiences and these will play different roles at different times. If we work in a post-colonial geographical context, then being white and born in the former colonial country may have an important impact upon the relationships we can establish during our research. It might mean that people feel they have to talk to us out of an encultured sense of deference; it might mean that people do not want to talk to us, because we represent a very negative and exploitative past. However, it might also be that people who live in the areas where we are planning to do our research decide to keep an open mind about us as individuals, wait until they get a sense of who we are and what we are like and then choose whether or not to get involved with the research (Skelton, 2001: 89).

As discussed in the previous chapter, the meanings ascribed to nature, people, places (or any object of inquiry) are always partial representations. Their establishment, and their contestation by countering meanings, are the sites of struggle between divergent interests and actors in fields of unequal power. While the greater part of this thesis is about the power relations in establishing the meaning of nature, society and place, I want to propose that a similar set of processes are at work in the establishment of researchers' identities and the meaning of research encounters.

Although I had attained the Llallagua communities' approval to implement my study, their erratic attendance and participation in the introductory activities suggested that they were not fully on board. Smith (1999) explains that research has been such a bad experience for aboriginal people that many are suspicious of all researchers, regardless of their intentions and beliefs, and regardless of their intentions:

Many researchers, ...may see the benefits of their particular research projects as serving a greater good 'for mankind'... . And, of course, most indigenous people and their communities do not differentiate scientific or 'proper' research from ...other ways of 'taking' indigenous knowledge that have occurred so casually over the centuries. ...From some indigenous perspectives the gathering of information by scientists was as random, *ad hoc* and damaging as that undertaken by amateurs. There was no difference, from these perspectives, between 'real' or scientific research and any other visits by inquisitive and acquisitive strangers (Smith, 1999: 2-3).

Interpreting my research subjects' ambivalence as the expected reservations that Smith explains, I welcomed their resistance to, and questioning of, my research. This was a good indication that they were not just talking to me out of "an encultured sense of deference" (Skelton 2001, 89). I thought (naively) that this would eventually lead to a more meaningful research relationship.

Instead, the discussions that ensued became a battlefield in which my identity and intentions were debated heatedly. Since my arrival in the area, I tried to establish my own identity "as an individual" (*ibid.*) and to allow the community members to get to know and understand me. I visited the communities, walked around and talked to the people, offered my help weeding or doing anything else. Sometimes I would sit with them in silence on the edge of their plots while they began to chew their first coca-leaf mouthfuls of the day. We would watch the morning take hold, the thick dew evaporating under the first touches of sun, other farmers arriving in their distant fields with their tools and their animals. I was quite sure that with time they would come to know and trust me. However, establishing my identity was not only up to me.

Even as I constructed my own identity based on my self-knowledge, self-perception and my own intentions, those with whom I interacted in the field also constructed me from their standpoints, experiences, and interests. Like this, some local people constructed me as “a foreign capitalist” who had arrived to “steal their story”. They warned their communities that I might seem nice on the surface, but that sooner or later I would make them *step on the twig*¹¹. They did not want any foreigners working in their community because, as one explained, foreigners made lots of money off the projects that were implemented in their communities, and that after all was said and done, the community stayed poor. They saw no benefit in participating in my project, or any other one for that matter. They said, “These projects hurt us more than they benefit us” (interview notes, community meeting Llallagua, 2004).

Kondo (1986) tells the story of how her identity was constructed by her informants and host family during the course of her research in Japan. Knowing that she was, at least in part, Japanese, her adoptive family actively redefined her as a Japanese woman, and treated her, and moulded her behaviour, accordingly over time. Eventually she had become so “Japanese” that she mistook her own reflection in a shop window, for that of a Japanese woman dutifully doing her daily dinner groceries. She had an identity crisis and felt that she had to withdraw from the family’s home in order to recover her own Japanese American, and researcher identity, and continue her research. Reflecting on her experience, she writes:

It is important to recognize the ways in which informants are also actors and agents, and that the negotiation of reality that takes place in the doing of ethnography involves complex and shifting

¹¹ An *Aymara* expression referring to trickery and deceit.

relations of power in which the ethnographer acts and is acted upon (Kondo, 1986: 75).

As research is lived experience, or reality, one's informants' versions of reality are as important as that of the researcher. This reality includes, as Kondo's experience so vividly illustrates, one's identity.

Apart from the fact that my identity could become the subject of such heated and open debate before my eyes, what was notable about this experience were the terms of the debate. The community members who were opposed to my working in the area did not have any complaints about me as an individual. Their opposition was to what I represented for them, in the cultural, historical and political context in which we were situated. Their words echoed the discourses of the leaders of the anti-foreign, anti-neoliberal, and anti-globalization social movement mentioned in the beginning of this chapter that was gaining strength and would come to paralyse the country and force a change of government within a few months of our encounter. Their words also echoed the now common critiques of foreign development projects and their workers who, on so many occasions before, had come and gone, sometimes with lavish funds and project perks, and not substantially helped them increase their wellbeing. Many of these projects as Walsh (2003) notes, did not build on their strengths, knowledges and worldviews but rather devalued and eroded local ways, and replaced them with the "modern", "productive" logic of mainstream development.

As I have mentioned, in the Llallagua area, as in many other parts of Bolivia and the Andes more generally, many rural communities are divided between those who agree

with and strive toward a western and “modern” form of “development”, and those who oppose this trend and would rather maintain and revive Andean ways. Sivingani and Walkeri, the communities in which I began to work, were among these, and the individuals who most vocally opposed my work were of the latter persuasion. Although the accusations that I faced in the area came from a select few of the persons present at the meetings I had with the communities, it was very difficult not to take them seriously, and not to think about them in reflecting on the experience and on how I was positioned in this place. The accusations spoke directly to the political and ethical dilemmas of “development” and research done by “First world” people in “Third World” settings. Regardless of who these comments came from, they were “critical questions” that Smith argues:

communities and indigenous activists often ask, in a variety of ways: Whose research is it? Who owns it? Whose interests does it serve? Who will benefit from it? Who has designed its questions and framed its scope?... What may surprise many people is that what may appear as the ‘right’, most desirable answer can still be judged incorrect. These questions are simply part of a larger set of judgments on criteria that a researcher cannot prepare for, such as: Is her spirit clear? Does he have a good heart? (Smith, 1999: 10).

Needless to say the questioning of my intents reignited a self-questioning that I had taken for settled before going to the field. Their repeated accusations and suspicions amounted to their casting me as a rich, white, capitalist, imperialist. This was very hard for me to assume. But there was no doubt that I was more privileged than they were, and that my research project was part of a course of study that would eventually lead to heightened employment and economic opportunities. Meanwhile I could not promise that

my project would accrue equal benefit to them in the short run. I was acutely aware that attempting to “barter privilege for justice” (Fine, 1994: 80 citing Said, 1978:97) by aiming to bring their marginalized voices into conversation with mainstream biodiversity discourses, is wrought with the ethical and political conundrums of representation. I could understand how they mistook me with so many other foreigners who came and left before me. But I retained the idea that I was different to most other foreigners who were in the region doing “development” work.

I was different because I too was critical of “development” projects that I came across in the region. I was not promising any easy, short term, or even long term material benefits, I was not offering food or money for participation, and I was not explicitly peddling any particular ideology or religion¹². I could not “fix up their generator” as Smith writes (1999:10), and I had already proven that I was quite useless at planting potatoes. I explained at great lengths that my project was not so much about potatoes (in fact I made a promise not to collect, nor require that they show me, their varieties if they did not wish to do so) but rather about them, about how they felt and thought about their potatoes, about their motivations and constraints in maintaining so many varieties, and about their history, and what they wanted to say about the alleged urgent loss of biodiversity.

I answered all the “critical questions” as best as I could. My intention was not to steal anything from them; if they wanted to write their story I would be willing to help them. In fact, I had not proposed to work on my own but with them; of course they would

¹² By this I am not suggesting that my work is apolitical; I am referring more specifically to the explicitly religious and political projects that are active in the region attempting to enlist rural people into their ‘camps’.

be the authors of their work; I was not a foreigner like others. But I felt that, as Smith (1999) writes, any of my answers could have seemed right to me, and be judged unsatisfactory by them. There was no credential I could show to prove that my “spirit [was] clear” and that I had a “good heart” (Smith, 1999: 10).

During one of the meetings that I had with the community in which the above views were expressed, one of my local hosts’ *técnicos* interceded with his version of my identity and intentions. I listened perplexed as he spoke in a mixture of Spanish and Quechua about the community’s “backwardness”, of how the only way they would stop “staying behind” and “being treated like puppets” by “those from above”, those who are “developed” was by opening up, by accepting and participating in the projects that are brought for “our” own good¹³. He told them that they were making the same mistake as they had done when they turned down the other project a few months ago that should have been working by now in their community, and told them that they were the only ones losing out, that they had “lost the income”. His persuasion included several mentions of *la doctora*’s (the doctor’s) superior knowledge and preparation, and of the rare opportunity that they were turning their backs on. Needless to say, the *técnico* was trying to establish my identity as a foreign agent, promising them the opportunity of “development”. This debate was evidently much more than a disagreement over my identity, and my motivations for wanting to work in the area. It was about the incursion

¹³ I come to the conclusion that the reason why he spoke in both languages was because some of these words and concepts (backwards, advanced, development, manipulation etc.) either do not exist in Quechua, or are most often used in Spanish. For this part, I rely on the written account of this meeting prepared by my interpreter/research assistant after the meeting.

of “development”, and all that it has come to represent and imply, into the life worlds of local people, and about these people’s assertion of their right to turn it down.

The *técnico*’s speech, delivered with exaggerated emphasis, pacing, and gesturing can be understood as what Shepherd (2004), basing his analysis in Actor Network Theory, argues is a process of “translation” used by development workers faced with the “much celebrated ambivalence” of Andean farmers, in order to ensure their participation, thus enrolling them in the “world of development”. Shepherd argues that this process of “translation” occurs in a social environment created by “development” initiatives, and characterized by unequal “knowledge relations” (Shepherd, 2004: 237) between the promoters of development (set in the superior and more knowledgeable position), and its subjects (in the inferior position). The personnel of development organizations use this knowledge/power differential in order to persuade indigenous communities of their “real needs”, converting these presumed needs into desires, and thus obtaining the farmers’ wilful participation:

Given that campesinos were not coerced to participate, it became clear that in order to be effective, promotores had to direct the emotional and behavioural responses of campesinos towards development’s innovations to ensure a satisfactory level of cooperation; part of this depended upon the deployment of strategies which, in effect, persuaded campesinos to desire particular outcomes. The “desirability” of these outcomes, however, was not self-evident since they did not automatically see the world in the way promotores had been trained to see it for them. As such, desire had to be translated by redefining for campesinos the very world in which they lived (Shepard, 2004: 237).

By calling them “backwards” and telling them that they were “staying behind” and losing opportunities to make money, move forward, be independent, the *técnico* in Llalagua was putting the farmers in a position, or representing them, as having the need for the “development” help that his project (and presumably mine) were offering. He went on to make a link between this and their desires for independence from foreign domination. The reason why the country was in the state that it was, manipulated by the United States, the World Bank and their new commercial policies he said, was because of people like them who *wanted* to “stay behind” and remain ignorant, poor, cheated, and manipulated. Their recruitment into the network was being negotiated, and resisted, before my eyes.

It was only after much reflection, once I came back home, that I came to fully, or at least better, understand my role in this. The *técnico* was not only trying to set my identity straight, he was also trying to re-legitimize his NGO’s project, that was rapidly losing credibility in the community. More importantly however he was giving me the role of mediator in the process of “translation”, a role that I might have already been given by PROINPA and the local NGO, and inadvertently playing. I was perfectly positioned for this; to a large extent, I shared PROINPA’s goals and interests; they were also mine, and I consistently brought these with me every time I went to the field. Likewise, if all had gone well, I would have consistently brought information about the communities and their management of diversity back to PROINPA, thereby solidifying the link between the institution and the communities.

The power of the *técnico*'s persuasion was evidenced by the fact that he was able to change the community's decision to reject my research project, which at this moment stood in for the "world of development". However neither the community's translation, nor mine, was complete. My identity and intentions continued to be contested among community members, and their decision continued to oscillate. Meanwhile, neither of the alternate identities formulated by the community members, and the *técnico* in question accurately defined me, and my intentions, as I understood myself. Although it might have been convenient for me to adopt, or allow myself to be moulded into, the *técnico*'s construction of myself (as Kondo inadvertently did in an admittedly much less contentious situation), doing so would go against my own ethical and ideological standpoint. After five months, I decided to abandon Llallagua as a "field" site.

Candelaria

Upon leaving Llallagua, I returned to Cochabamba and revisited PROINPA's other proposed field site, Candelaria, located 63 Km to the northeast of the city of Cochabamba, in the Municipality of Colomi, Province of Chapare (Figure 1, p. 7).

Candelaria is a valley nestled between the southwestern shores of Lake Corani, and the northeastern flank of the Cochabamba cordillera¹⁴. It is an area that ranges in altitude between 3200 and 4200 meters above sea level. The Candelaria River, fed by a number of smaller rivers in the area runs along the valley, feeding into Lake Corani. Immediately to the northeast of Candelaria/Colomi, begins the descent from the Cordillera to the Chapare tropics. The main road connecting the major cities of

¹⁴ This is part of the Cordillera Oriental of the Andes.

Cochabamba and Santa Cruz passes through Colomi; Candelaria is connected to this major transit way by a 20km cobblestone road.

The climate in Candelaria is cold and humid with an average annual temperature of 11 degrees C, and an average precipitation of 901 mm. The abundant rainfall and humidity in this area is due to its location in the transition between the warm and humid lowland tropics and the colder and drier climates of the higher altitudes. Two main seasons punctuate the year in this area. The summer, characterized by slightly higher temperatures and abundant rainfall, lasts approximately between December and February. The winter, characterized by drier and cooler conditions with abundant sunshine, lasts between May and August. Climatic extremes are common in this area, as are floods, drought, frost and hail (PRODISEC, 2002).

Candelaria has a total land base of 5,599 hectares (Table 1). It is made up of twenty adjacent communities having a total population of 3,426 inhabitants. Before the 1953 agrarian reform, Candelaria was part of a *hacienda* owned by a wealthy Cochabamba family. During the reform, the *hacienda* was divided into rural *sindicatos*, the political administrative units into which much of the reformed land throughout the country was divided. Each family living and working in the area was granted a piece of land within their community, and access to *sindicato* communal lands, mostly located in the higher altitudes.

Colomi/Candelaria is a predominantly potato producing area. It is renowned in Bolivia for the quantity and quality of potatoes that it produces. According to the Municipal Development Plan that describes Colomi, this area has higher average yields

Table 1 Land Use in Candelaria

Land use	Arable	Pastures	Forest	Fallow	Total
Hectares	2,873	1,477	243	1,006	5,599

Source: PRODISEC, 2002

of potatoes (and of other crops) than the rest of the department of Cochabamba and of the nation (PRODISEC, 2002: 87). In addition to potato, the people in this area cultivate broad beans, peas, barley, oats, wheat, two Andean tubers called *oca* (*Oxalis tuberosa*), and *papalisa* (*Ullucos tuberosus*), and an Andean leguminous crop *tarwi* (*Lupinus mutabilis*)¹⁵. They also keep sheep and dairy cows, and occasionally fish in Corani Lake. A large proportion of the population of Colomi migrates seasonally to the tropics of Chapare where many have bought lands and cultivate commercial potatoes, rice, cassava, *yacon* (*Smallanthus sonchifolius*, an Andean root vegetable), *locoto* (*Capsicum pubescens*, a type of chilli pepper), tropical fruits, and coca. Many have other occupations such as masonry, carpentry, bus and truck driving. Candelaria's population is mostly Quechua. Although many men in the area speak Spanish, most (particularly the women) only speak Quechua

PROINPA had offered the option of working in Colomi upon my arrival in Bolivia. After a first visit however, I felt averse to conducting my research there. This was for several reasons. The first was my perception that the farmers in the communities where PROINPA works were tired of participating in research. One person to whom I was introduced during my first visit to these communities told me "I've been in Franz's

¹⁵ There are no English equivalents for these names, nor for *yacón*, and *locoto* mentioned below.

thesis, Jorje's thesis, Juan's thesis, Rhimer's thesis, Luis's thesis...." counting on his hands the number of theses he had been interviewed for. Although I was sure that my objectives and questions were different, I preferred not to contribute to the research fatigue and cynicism that this farmer was expressing (sentiments and attitudes which I assumed were not only his).

My preference for working in a more remote and "poor" area, such as Llallagua, was also in accordance with my belief, deeply entrenched from several years of professional work in participatory research and development circles, that it is important for researchers to seek out the most marginalized people, and not settle for working with the "richer of the poor" who are often closer at hand and more comfortable to work with. It could be, that I was also seeking a more "authentic" community than I had found on my initial visit to Colomi, one that did not rely so heavily on the market, had not adopted elements of city culture such as televisions, vehicles, and urban clothing, and had not had so much contact with formal agricultural research institutions.

Perhaps this could be equated with selecting higher in a presumed "hierarchy of purity of field sites" (Gupta and Ferguson, 1997: 11), an idea that is evidently problematic, as I have discussed in Chapter II, for its assumptions that there exists a static, pure, homogeneous "other" waiting for ethnographers to discover, and a linear process through which fixed and pre-established cultures lose their authenticity as they gain contact with the West. I sought to work in Llallagua not because it was a more "pure" field site, but because I believed that there was a correlation between their cultural identity, their type of social organization and agricultural practices, and their semi-

subsistence economy and the conservation of agricultural biodiversity. This perception is increasingly questioned as recent research shows (particularly Brush 2000) that even communities that are more integrated with modern capitalist economies and markets are conserving much of their genetic diversity. The degree to which this is generally true however is not known, and the contrary trend of “indigenous” communities recuperating and cultivating their landraces as part of a process and symbol of cultural self-affirmation deny the settling, just yet, of this debate.

I was also reluctant to work in Colomi because I believed that after witnessing, and (for some at least) participating in ten years of agrobiodiversity related research conducted by PROINPA in the area, during which at least one CIAL and a number of FFSs had been established, farmers’ perceptions and realities concerning agricultural diversity, would surely have been influenced, and perhaps even moulded by that work. I expected local people, particularly those most involved in PROINPA’s work, to be well versed in conservation discourse and attitudes, and I was seeking, as I have discussed above, a place that had not had such an extensive contact with these discourses.

In keeping with this intention, I chose to work in Pie De Gallo and Pie de Gallo Alto¹⁶ two communities in Candelaria that had only had minimal and sporadic engagement with PROINPA¹⁷ (Figure 2). In addition to having some distance from PROINPA’s current and previous work, conducting my study in a community where

¹⁶ These two communities were previously one community. The division occurred some years ago when Lake Corani (an artificial lake that is the reservoir for the Corani hydroelectric power plant) was enlarged, flooding part of the land in the middle of the community previously named Pie de Gallo.

¹⁷ In this area, communities are located side-by-side, the only dividing line being a line of trees on the hill, a small river, or a dirt road. It is possible to walk from one community to the next. Many people belong to more than one community either by family ties, by land ownership, and /or by labour arrangements.

Figure 2 Map of Candelaria

Base Map Source: Instituto Nacional de Estadística (INE), 2001

PROINPA had not worked, would allow for a contrast with the communities that had been worked in the most. Since all of these were very close to one another, I thought that if there were a notable difference in the number and types of potato varieties found in Pie de Gallo and Pie de Gallo Alto, to that found in the communities already studied by PROINPA, the reasons would have to be other than location – i.e. family ties and origins, access (or not) to new materials from PROINPA’s gene bank, access to land, other occupations and interests etc., and/or the methodologies used to learn of local diversity. Working in Pie de Gallo and Pie de Gallo Alto could also allow me to explore the linkages and similarities between the people in this community and the “farmer conservationists” identified by PROINPA in their study communities, It could also serve as a point of comparison or insight on the sources and motivations (and/ or the constraints) of local farmers’ biodiversity conservation.

Research Surprises - Part II

Two weeks after selecting the community in which I would implement my study, obtaining all the necessary permissions, finding an interpreter, and beginning work in Candelaria, political protests broke out throughout Bolivia¹⁸; and as part of the political mobilizations all of the country’s major transit ways (particularly those between the main cities) were blockaded. Basic supplies of food, gasoline, natural gas and other essential goods were cut off from major cities. There were three weeks of general strikes in El Alto, leading to the closure of one of Bolivia’s two international airports and access to the

¹⁸ These have been going on in Bolivia, and particularly in that region for many years now. They happened to flare up again at this time because of differences in the interpretation of the referendum results concerning the treatment of Bolivia’s oil and gas reserves.

capital city of La Paz. Rumours of an impending military coup were confirmed on mainstream television. Finally, president Mesa felt forced to resign and an interim government was formed with a mandate of calling elections later that year. Being on the heavily travelled route between the cities of Cochabamba and Santa Cruz, and a stronghold of the MAS party, which was leading the coalition of actors participating in the mobilizations, the road through Colomi was blockaded. It was impossible to reach Candelaria until the blockades were lifted.

Once I was able to return to Candelaria (when the blockades were temporarily lifted), I collected my data as quickly as possible before protestors blocked the roads again as they mounted pressure for their unmet demands¹⁹. Because of this I was not able to spend as much time in Candelaria as I would have liked and thought necessary to fulfill my research objectives.

Changes in Research Direction

The change in research “site”, and the substantial shortening of the time that I had in which to do the “field” work, implied changes in methodology and in research direction. Although I maintained the main thrust of my original proposal – that of contributing to a critical understanding of local peoples’ relationships with biodiversity and with programs to conserve it – I omitted several aspects of the planned research. One of these aspects, and a central component of the original proposal, was the exploration of different “knowledge domains” within the study community. I also omitted the focus on

¹⁹ I ended my research in April. A few weeks later (May/June) blockades, protests and mobilizations were intensified.

local biodiversity “experts”, in part because I had counted on the “mapping” of “knowledge domains” and the social relations between people in different social positions, in order to identify “experts” within different “knowledge domains”.

Closely related to these omissions is my steering away from addressing gender (and also of other classes of social differentiation) as a central element of the study. While this was a significant part of my original intent, in Candelaria, I knew that getting beyond the farmers’ initial “we are all equal” was not likely in the time I had in which to collect my data. I collected socially disaggregated data, hoping that I could contrast the interview responses of people in different social groups. However, at least in part because of the small size of the sample involved, the data have been of very limited utility in revealing the differences in the ways women (and other social groups such as religious, wealth and age categories) live, and perceive the realities that my study addresses. The one exception to this is my comparison in Chapter VI of the results of the potato variety knowledge “test” (discussed below) among the three age groups of the participants. Needless-to-say, the omission of gender and other forms of intra-community difference should not be interpreted as an indication that social differences do not matter. Several studies in Bolivia and elsewhere in the Andes have shown that in fact these differences are an important aspect of the dynamics, including the conservation of potato diversity, that are unfolding in these places.

In Candelaria my research questions were of a more general nature than those I had planned for the Llallagua area. I designed three interviews to get a general idea of what the people in these communities perceived to be the main issues and concerns

regarding genetic erosion in the area. I sought to understand who planted which varieties and why, how seed flow and access among community members worked, if there was a loss of knowledge about varieties that paralleled an actual loss of varieties, what the effects of market proximity were on the maintenance of biodiversity, and how local people perceived the loss of agricultural biodiversity.

The change in location, to one where PROINPA had worked extensively, enabled me to expand the scope of my study to include PROINPA's *in situ* conservation strategy as it was being implemented in several communities in Candelaria. This was mostly to be done (although this later changed as I discuss below) through a comparison of my findings with those of the institution in different, but neighbouring communities. In order to get information for this, I collected PROINPA's documents on Candelaria (project documents as well as published and unpublished reports and theses)²⁰. The methodology I used was curtailed to include only interviews, participant observation, wealth ranking and a critical reading of these documents.

Participant Selection and Research Methods Used

The main participants in my research were 19 farmers from the communities of Pie de Gallo and Pie de Gallo Alto. In addition, I interviewed six key people from three other communities in Candelaria: Rodeo Alto, Chimpa Rancho and Alto San Isidro – where PROINPA has worked intensively for several years. These six people were recommended to me by one of PROINPA's staff in Candelaria because of their

²⁰ These include the book that PROINPA wrote and published about Candelaria in the year prior to the fieldwork (Garcia and Cadima eds, 2003), parts of the institution's annual reports (PROINPA, 1994, 1995, 1996, 2001, 2002, 2003), and articles published by its scientists in major international journals.

involvement in conservation activities. They were at one point PROINPA's partners in Candelaria and were thus labelled "farmer conservationists". Finally, I also interviewed several of the PROINPA staff who worked in the area.

The small size of Pie de Gallo, one of the smallest communities in Candelaria, allowed for a sampling of 65% of the community. To select the participants from Pie de Gallo and Pie de Gallo Alto, I drew a random sample from the *sindicato* list. When I began to locate the people selected, however, I noticed that it was not a representative sample of the community. Most of the people on the list were over the age of 50 (one was no longer alive), some had left the community either permanently or temporarily (for several months at a time), and most of the people were men. Perhaps even more importantly, while conducting the first few interviews, I realized that there were people who lived in the community who were not at all on the *sindicato* list. Many of these were the sons and daughters of the people on the list, but others were not related. It turned out that the *sindicato* list was the list of only the beneficiaries of the land reform of 1953, not a list of the people who lived in the community. As would be expected, since 1953 some have passed away, some have left, others have come. Also perhaps, some were never beneficiaries of the land reform. Neither of the leaders of the two communities had, or could, produce a complete list of community members, and such a list was not available either at the municipality offices, or at the national census bureau in Cochabamba. The only "official" list of the community was the *sindicato* list.

Realizing the bias of the *sindicato* list, I changed my selection strategy from a random sample to a purposive sample. The majority of participants, who had not already

been interviewed when I discovered the problem with the *sindicato* list, were selected based on age and gender, from a longer list that I compiled as I started the interviews, and through informal conversations with people in the community. In compiling this list I realized that community membership is a nebulous concept in this area as people migrate seasonally and because land holdings, and social and labour relations are often scattered over more than one community. For instance more than one participant from Pie de Gallo Alto also has a home and land in neighbouring communities. Attending the *sindicato* meeting of other communities in the area, I encountered people from Pie de Gallo and Pie de Gallo Alto participating as members of these other *sindicatos* as well.

I selected twenty people from Pie de Gallo and Pie de Gallo Alto to participate in the study. Seven of the participants were from Pie de Gallo Alto, and thirteen are from Pie de Gallo. This difference reflects the availability of people to interview in the two communities, and perhaps is a function of the relative sizes of the two communities - Pie de Gallo Alto only has 21 families, Pie de Gallo has 40. Nine of the participants of the study are women and eleven are men. Three age groups were established and five participants were selected from the youngest of three (35 and under), 8 from the middle age group (36-50), and 7 are from the oldest group (51 and older). One of the twenty participants was eventually removed from the sample, as the information he gave proved to be inconsistent.

Participant Observation, Interviews and Wealth Ranking

The methods I used in the research I conducted in Candelaria were participant observation, wealth ranking and interviews. Almost all of the interviews and interaction that I had with farmers in the area took place through an interpreter who translated to and from Quechua and Spanish for me.

Participant observation was on-going from the beginning to the end of the research and included informal conversations with participants and non-participants of the research in and around their homes and fields, and my participation in local events. When doing participant research, I was very conscious not to get in the way or take the time of the people with whom I talked. Most were very busy, particularly the women. None however seemed too comfortable with the idea of me helping them cook, weed or do any of their other tasks. When I did help, they would quickly reciprocate offering me food, which made me feel that I was burdening them. This made it difficult to plan to participate in specific activities. Instead I found it much more fruitful to meet people more informally. On a few occasions I climbed up the steep path leading to the mid and higher altitude plots to talk to farmers in their fields. On the way I would also run into women going to the grazing grounds with their sheep and cows. Other times I would drop by their houses for short visits on my way to or from interviews.

I conducted three interviews with each participant in Pie de Gallo/Alto (see Appendix 1). The first involved a survey-type questionnaire consisting of ten basic questions about family ties in the community and in Candelaria, varieties planted this year and last, varieties abandoned, varieties desired, seed sources and access, and

women's roles in potato cultivation and their preferred varieties. The purpose was to get a general sense of who my informants were, and some basic data regarding the varieties they planted and exchanged. The survey was conducted on my first meeting with each of the participants and was quite straightforward.

The second interview was a potato variety 'knowledge test' (see Appendix 1.1). This was conducted using a list of varieties that included the more common, introduced and local varieties, and the more rare, local varieties²¹. For each variety listed, the participant was asked if he/she knew the variety (yes, or no, or only the name), and if so, if s/he could describe the color of the peel and pulp, the tuber shape, and the eyes. For this we used the shapes and the colour table published by the International Potato Centre (CIP), and used by scientists to classify potato varieties in gene banks. In addition to these descriptions, the participant was asked the uses of the potato variety, and the soils in which it was usually planted. An extra column existed in case the farmer, upon hearing the name of a variety, noted that he/she planted that one, in addition to the ones that he/she had indicated in the survey.

The purpose of this potato variety "knowledge test" was not to measure the farmers' knowledge of the varieties against a standard, scientific description of the same varieties entered by geneticists as classification of gene bank materials. Although this could be done with the data collected, doing so would assume that the scientists' descriptions were correct and that those of the farmers were to be measured against them, a proposition that was by no means the intention of my work. It would be much more

²¹ The former was to get a sense of the possible variations in the descriptions of the varieties that I was confident everyone in the area knows; the latter were the main interest of this instrument.

interesting and revealing, if one were concerned with the characteristics of the varieties per se, to compare the results for each variety among the respondents to assess the degree of variability within what they classify as one variety (given the name). Nevertheless, the purpose with which I designed and implemented the potato variety “knowledge test” was to assess the knowledge of the list of varieties among the participants – if they say they know it, and if their description is close to that of the other respondents - in order to see if there is a parallel between the loss of knowledge of the varieties, and the actual loss of the potato varieties indicated by their absence from farmers’ lists of cultivated varieties, and/or by their identifying a particular variety (in the initial survey, or in the third interview) as being lost or abandoned. The potato variety “knowledge test” also served to identify the varieties that are not at all known, suggesting that they were cultivated by very few people and/or that the seed system was somewhat closed to some community members. Finally, the “test” also served to confirm and add potato varieties to the list of varieties that the farmers said (in the first interview) that they planted.

The third interview was semi-structured and aimed at understanding various qualitative aspects of local potato cultivation, conservation, and loss (see Appendix 1). While the first and second interviews could be qualified as “superficial encounters”, this one aimed to complement them in asking interpretive questions as to reasons, opinions, motivations, constraints, feelings and perceptions. It also allowed me to follow-up on some of the issues raised in the first two interviews. The third interview included questions about the rationales for cultivating a multitude of varieties, access to different varieties, relations between those who plant more varieties and those who only plant a

few, the effect of close-by markets in decisions of which varieties to plant, which varieties (if any) are disappearing from the area, possible remedies to this situation, and opinions on varietal ownership.

All of the third interviews were taped, except those in which the respondent was not willing to be taped. Most did not have a problem with the use of a tape recorder, but a few did and in those cases I did not record but rather took as many notes as possible during the interview. Sensing that there was probably more to the responses than I had picked up in the translations, I went over each interview, and my notes, with my interpreter shortly after it took place. In addition, I later had the tape-recorded interviews, translated and transcribed by a third person in order to assure that I did not miss anything.

The single interview conducted with the farmers in the communities of Rodeo Alto, Chimpa Rancho, and Alto San Isidro was tailored to their position of “farmer conservationists” as identified by PROINPA field staff. The interview was semi-structured, and it had significant overlap with the third interview done with participants from Pie de Gallo/Alto. Questions included rationales and motivations for planting so many varieties, obstacles felt in the maintenance of these varieties, relations with others who plant many varieties and with those who do not, opinions regarding the disappearance (or not) of local varieties and possible remedies, varieties planted before having contact with research institutions, market influences, among others.

The interviews conducted with PROINPA staff had the purpose of complementing and formalizing information obtained in informal conversations throughout the duration of the research, and in the institution’s annual reports and other

documentation. Each interview varied slightly according to the specialization and area of action of the particular person. Questions included facts and opinions on the loss (or not) of local varieties in the region, the persistence of numerous local varieties, the effects of market opportunities for “native” varieties, the relationships with potato “conservationists”, the functioning and obstacles faced by the Association of Producers of Native Potatoes of Candelaria (APROTAC), and about PROINPA’s *in situ* conservation strategy.

I conducted a wealth ranking exercise with three community members in each of Pie de Gallo and Pie de Gallo Alto. Each person was asked to organize cards, on which were written the names of all the community members, according to their perceptions and definitions of local wealth categories. Each ranking was assigned a score and then averaged in order to determine the wealth ranking of each person. The ranking was not used in participant selection as it took some time to gain the trust of a few farmers with whom to do this activity. Meanwhile, I proceeded in selecting participants and interviewing them.

“Field” and “Not-field”: considering the whole research experience

If we are to take seriously the argument that local communities are not isolated places where “difference grew out of the soil” (Massey, 2005); but rather that the identities and differences of (and within) places are constituted by their interrelations with spaces and places beyond their borders, then we must be able to study phenomena, expressed in one place, beyond that place. In fact, in this light it becomes increasingly

difficult to distinguish between “field” and “not field” (Katz, 1994: 67) and increasingly evident, that “we are always, everywhere, in the field” (*ibid.*). This insight leads Katz to deliberately conduct her research in more than one site, and to make the “key narrative theme” (1994: 68) of her work, not the marginalization of people in one site, but the broader processes of global economic restructuring that are implicated in this marginalization.

Although my working in more than one site was not deliberate, Katz’s insights help me to appreciate that while I struggled to get approval for my work, and to establish my identity in the communities of Sivingani and Walk’eri in the Llallagua area, I was *already* in the field, and I was *already* researching. While I was stuck in Cochabamba city, glued to the television waiting for news that the blockades had been lifted and that I could go to Candelaria and do my research, I was *already* in the field. My challenge, and my goal is to recognize this, and to draw on this inadvertent research to tell a story, that is somewhat different to what I had originally intended.

Upon reflecting on the *whole* research experience, it was evident that there was common ground (Katz, 1994: 68) between all that had transpired in Llallagua, and what was keeping me, as I saw it then, from doing my research in Candelaria. Although the people of Candelaria were much more approachable and welcoming than those of Llallagua, and although they had been described to me by PROINPA staff as far more acculturated, and inserted into “modern” life, they played a key role during the political mobilisations and road blockades that paralyzed the country in the early months of 2005. In fact, on some days during the blockades, parts of the road between Cochabamba and

Santa Cruz were open, however the passage through Colomi remained impenetrable for most of the duration. Most of the people in Candelaria and Colomi (and of course there are exceptions), being migrant coca cultivators, were staunch supporters of Evo Morales and the MAS party, which emerged from the coca growers' struggle to gain the right to grow coca legally (a struggle that made them the targets of the United States' war on drugs and specifically of its military interventions in Bolivia), and which was leading the ethnic, cultural and political movement, now with a far broader political base, against foreign influence, resource ownership, and cultural and developmental models in Bolivia. It was all too ironic, in my reflections, that *in situ* conservation, a system of intervention so impregnated (as I will explain in Chapter IV) with the concepts and worldviews of western "development" practice, could continue its activities in a political environment so contrary to these views.

The possible explanations and effects of this contradictory co-existence led me to shift the focus of my research again, this time once I returned to Canada to write my thesis. While the main thrust remained as before, the key narrative theme changed from the ways, motivations and constraints of farmer conservation to the plays of power and knowledge in *in situ* conservation as it is implemented in PROINPA's work in Candelaria.

This shift has required that I use the data I collected in ways that I had not originally intended. The main change has been in my use of PROINPA's documents. While at first I intended to use them as a source of information on the institution's findings regarding the Candelaria communities in which it had worked, I subsequently

(also) used them to draw out PROINPA's underlying ideas or philosophies of "development" (society) and "conservation" (nature) and to show how these are tied to dominant discourses of sustainable development and biodiversity conservation (this is done in Chapter IV). PROINPA's documents became also a "field site", the data from which are key to the argument made and questions raised by this thesis.

The method used in the analysis of PROINPA documents is discourse analysis which originated in the recognition by postcolonial scholars of the importance of language in the representation, and thus in the production of social and natural worlds. The idea of discourse analysis is not only to observe what is said, but also how it is said, the terminologies used, what is not said, and how these create and enable certain images and possibilities and not others. Discourse analysis thus is a tool through which the processes of the creation of knowledge, the social construction and assignment of meaning to social and natural realities can be analysed (Phillips and Hardy, 2002). It is therefore important in the exploration of the social construction of nature, and in the representation of local people, which are key to this study.

Conclusions

In this chapter I have summarized what turned out to be a much more messy, complicated, and arduous research experience than I had expected at the outset of my research. I have explained how, given my fieldwork surprises, I went about adapting my research questions and methods according to the changing circumstances I found myself in. It is important to reiterate that the limited amount of time that I spent in Candelaria

necessarily has implications on the strength of the empirical data that I was able to collect there. It affected both my sample size, and the depth of the relationships that I was able to establish with research participants, which also affects the quality of the data albeit in unpredictable and unknowable ways. Given this, my objective in this thesis is not to prove or demonstrate a position conclusively, but to raise questions, and provoke a deeper reflection on the aspects of *in situ* conservation that are most of the time silenced in favour of the technical and managerial questions that, for their seeming lack of politics, make addressing genetic erosion simpler, at the risk, and the cost, of perpetuating broader scale, “systemic predations” (Katz, 1994: 68).

In making this argument, I do not and cannot remove myself from “the system”, in this case, the “biodiversity network” (Escobar, 1998), that is made up of the myriad “things” that have to do with the conservation of biological diversity. My original proposal could have fitted squarely into the discourses that characterize the dominant positions in this network. Moreover, in proposing as I did, to bring the community members’ “voices” into conversation with these discourses, I implicitly had to have some degree of access to these discourses. And to have access I surely had to belong in some way to the world that made some of the actions of this network “predations”. My distancing myself from my institutional hosts in Llalagua was an effort to disassociate myself from these predations. It is important however to recognize that these “predations” are effects of power relations among the different “perspectives” or positions in the network. “Development” in its most abusive and destructive styles is still prevalent in many areas, including Llalagua, and there are places that are so scarred by it

that attempting to distance ourselves from that, or proposing a whole new/different type of interaction, is far from straightforward. While some have proposed a “post-development” era (Escobar, 1995), in which these relations and histories may be reversed, in reality it is impossible to go back in time, or to erase history and start anew. Regardless of how critical one may be of mainstream discourses and the power relations they perpetuate, it is impossible to disentangle oneself from them. However, it is not impossible to challenge them.

Chapter IV.

THE AGROBIODIVERSITY NETWORK: SITUATING PROINPA AND DEMARCATING A CONSERVATION SPACE

Introduction

Having established in Chapter III that the purpose of my study is to understand the workings of PROINPA, or how it addresses the pressing concern of genetic erosion, this chapter takes the first and necessary step of “situating” PROINPA. I borrow this term from Haraway (1991), and more generally from feminist theory that, drawing on Foucault, argues that all knowledge is contingent on the identities of those who generate it. As there are multiple identities in society, so is there more than one knowledge, more than one truth. However, discourses of nature and of development are often presented and acted upon as singular and universal truths. Their use of scientific explanations gives them an air of impartiality and objectivity. As Foucault observed (1980), the apparent truth of dominant discourses is the effect of the uneven power relation between these partial truths and other competing discourses. The latter are silenced by the dominance of the former.

Understanding this relationship between partial knowledge and power requires a questioning of the discourses that inform and legitimate environment and development interventions in the Global South such as *in situ* conservation. As knowledge is tied to identity, and identities are continually established in networked relations, it is important to inquire after PROINPA’s network, and the position within this network that it inhabits and at once has a hand in constituting. From where/what does this foundation emerge? What are the other actors that play a role in its constitution? What is the understanding of

the world, the “system of signification” (Braun, 2002: 259) that it at once embodies and propels forward into the new spaces that it engages?

In order to answer these questions, I use Escobar’s (1998) concept of the “biodiversity network”, which he derives from Actor Network Theory. Escobar argues that the multitude of actors engaged in biodiversity conservation can be grouped into various perspectives in the network. He explains that each perspective defines and acts upon the issues of biodiversity conservation in different ways, emphasizing that although “biodiversity” has concrete material referents, it is also a “discursive invention” that is given meaning, and mobilized in different ways and for different purposes, by the various perspectives, in the biodiversity network (Escobar, 1998: 53).

Escobar speaks broadly about the “biodiversity network” and in it includes agricultural diversity (*ibid.* 56-57). However he does not explicitly include what I will explain, and what others have expressed to be (also), the agricultural network or “collective” (Fitzsimmons and Goodman, 1998). This network, which I see as intercepting and overlapping with, but not exactly mirroring, Escobar’s “biodiversity network”, includes some of the same actors and/or *actants* mentioned by Escobar (for example some elements of mainstream environment and development discourses, genes, biotechnology, and local people constructed as “stewards of biodiversity”), but also encompasses others such as hybrid crop varieties, and the Green Revolution. Perhaps it could be called the agro-biodiversity network. I rely on Escobar’s notion of the “biodiversity network” because it provides a way of understanding the different

perspectives within a network, and not necessarily for the exact congruence of the network he describes with the one I wish to trace.

This chapter focuses on what Escobar calls the “globalocentric perspective” in the agro-biodiversity network. It is that of the world’s dominant development and environment institutions including the World Bank, the United Nations, the Global Environment Facility and many of the large northern environmental non-governmental organizations (NGOs) mobilizing scientific conservation and development discourses. It operates on a “particular representation of the ‘threats to biodiversity’” and particular rationales for its conservation, matched with a set of prescriptions, including *in situ* and *ex situ* conservation (Escobar, 1998: 156-57). It is important to recall here the discussion in Chapter II regarding Escobar’s notion of a “perspective” within a network, and how it differs slightly from ANT’s rendition of networks, which seems not to make space for alterity, difference, or resistance, and can thus be interpreted as either downplaying or even overlooking power (Bosco, 2006: 143), or as focusing mainly on disciplinary power (Hinchliffe, 2000). As discussed in Chapter II, I understand Escobar’s idea of different perspectives within networks to be similar to the feminist idea of positionality or situatedness (see Sheppard, 2002: 318), which takes account of subject/objects’ relational becoming in fields that involve power. Taken like this, the idea of a position¹ in a network facilitates the understanding that the same or similar *actants* in a network, can be

¹It is important to stress that although I use the word position, which is often used to refer to one subject, I am referring to a constellation of different actors that occupy a position in the biodiversity network. As Whatmore (2002) demonstrates clearly in her discussion of the differences among United Nations agencies on the nature of plant genetic resources, there are very different perspectives even within one position.

mobilized by different positions within a network with different and possibly conflicting effects.

Drawing on the ideas of social nature discussed in Chapter II, the first part of this chapter explores the emergence and evolution of the mainstream movement to conserve agricultural biodiversity embodied in this “globalocentric” position² and in its particular take on the challenge of agrobiodiversity conservation. I explain the development of this position as a product of shifting meanings ascribed to nature/seed as agricultural production was increasingly commercialized and capitalized, high yielding crop varieties were developed and deployed to the Global South, the environmental movement took hold in the Global North, gene banks were created (and found to be wanting for certain crops), scientific breeding techniques were refined, and local knowledge began to be valued by western science.

In the second part of the chapter I discuss PROINPA’s origins, its institutional ties, and its narratives, demonstrating that it subscribes to the same ideas and concepts of development and of nature as those held in the “globalocentric perspective” of the biodiversity network (Escobar, 1998: 56). Situating PROINPA like this denaturalizes its discourse, showing that it is partial and specific to a particular worldview and set of actors.

In the final part of the chapter, I analyze PROINPA’s representation of genetic material and of local knowledge as they appear in the institution’s literature and its biodiversity conservation strategy. I argue that their portrayal as “reservoirs of value”,

² Given the discussion in the previous paragraph, I now replace Escobar’s “perspective” with the word position.

consistent with the “globalocentric position”, sets the stage for PROINPA’s establishment of a genetic reserve where access to the genetic material, and the people, can be secured. PROINPA gives a new meaning to Candelaria, that of a biodiversity hotspot, or “microcenter”, thus making it appropriate and available for conservation as a “reservoir of value” (Escobar, 1996). Candelaria is thus re-made, as a social-nature, or a hybrid that has, inscribed in its creation, the rationality and the system of signification, of the globalocentric position. As such, the move to create this genetic reserve can be read as a “symbolic conquest”.

The Agro-biodiversity Network and the Conservation of Crop Diversity

As I have discussed in Chapter II, the concept of *social nature* erases the arbitrary boundary between nature and society, making it imperative to question what is made to count as nature, through what means, and with what effects. Marxist scholars have observed that constructions of nature have “followed historical shifts in modes of production” (Braun, 2002: 11; citing Castree 1995), seeing nature increasingly made as a commodity form that reflects the capitalist logic of accumulation and profit (Kloppenburger, 1988). Poststructuralist and Science Studies scholars have added to this the proposition that nature is made and remade not only according to shifts in economic organization but also in the company of “social, technical, discursive and organic elements simultaneously” (Castree and Braun, 1998: 6). Seed, as part of nature, has been, and continues to be constructed and (re) constructed, materially and discursively in ways that reflect changing social relations. In turn, it has participated in the co-construction

both of discourses and of evolving social relations. Agro-biodiversity conservation, whether *ex situ* or *in situ*, must be understood to be a part, at once a product and an actor of these processes.

In a classical Marxist analysis of the emergence of commercial agriculture in the United States, Kloppenburg (1988) traces the transformation of seed (and the meaning of seed) in the United States from a public good into a commodity form. In the course of his detailed explanation, he implicates a number of actors including U.S. state sponsored germplasm collections around the world, U.S naval expeditions and consular services, colonial botanical gardens and experimentation stations, the array of different climate and soil conditions of the United States, national experiment stations, experimenting farmers throughout the country, the national postal service, the state land-grant universities, the development of the first hybrid corn varieties, these varieties' inability to produce more than a couple of productive plant generations, infant seed industries, the national development strategy, scientists, politicians, lawyers, and patents. Also implicated were, as Fitzsimmons and Goodman (1998: 209) point out, "the rediscovery of Mendelian genetics... research into hybrid vigour, or heterosis, parent corn lines, hand pollination, the double-cross technique of hybridization and the development of the Burr-Leaming hybrid". All of these actors (and surely also others) were involved in the emergence of what Fitzsimmons and Goodman (1998) call the agriculture network or collective which is still active and growing today. Their involvement with one another, brought to be through their common endeavour of the conversion of seed into a commodity, implied a very different ordering of social relations than those that had produced non-commercial

seed before it (Whatmore, 2002: 128). This social network would later change again to accommodate the enlistment of seed as part of nature that should be conserved.

To these actors I would also add the emergence of diffusion studies, an area of sociology that sought to trace and explain the spread of innovations through social systems, to identify the patterns of their adoption, and the consequences for those who did. Diffusion studies became a very influential area of agricultural (and later development) research after the publication of rural sociologists Ryan and Gross' 1948 study on the diffusion of hybrid corn in Iowa (Rogers, 1995). Closely related to this is Modernization theory, which I have explained in Chapter II, emerged after World War II as the dominant explanation of, and model for, planning societal progress or development. This theory describes development as a series of steps through which "traditional" societies progress to "modernity" by using technology to increase agricultural productivity and later invest in other sectors. These two areas of social science played, and continue to play, important roles in the agro-biodiversity network.

In the early 1960s the agricultural sectors of many so-called Third World countries became the targets of the "Green Revolution" as alarm was raised, particularly by neo-Malthusian thinkers and the political interests that supported them, about uncontrolled population growth exceeding the capacity of agricultural systems to produce enough food, and about the social and environmental crises that would ensue if something was not done about it. Hybrid seed was mobilized as a technology that would increase the efficiency and productivity of these countries' agricultural sectors. These sectors were portrayed in accordance with modernisation theory as backwards,

inefficient, unproductive and messy. The massive diffusion and adoption of hybrid or “modern” varieties of major world crops in the Global South, it was argued, would propel economic development as it had done in the industrialized nations of the north. The agriculture network was thus “translated” to the tropics and subtropics, argue Fitzsimmons and Goodman (1998: 210), enrolling in its path a number of other actors including the Rockefeller Foundation, and later other private philanthropic organizations, national agricultural research and policy institutions in the Global South, irrigation programs, and multinational seed and agrochemical corporations.

This extension of the commercial agriculture network to the Global South was solidified, and made to last, through the creation of the international agricultural research centers such as the International Centre for Maize and Wheat Improvement (CIMMYT), the International Center for Tropical Agriculture (CIAT), the International Rice Research Institute (IRRI), the International Center for Research in Dry Areas (ICARDA) the International Potato Center (CIP) (among others), based in a number of different countries and mandated to continue developing high yielding varieties to feed the Green Revolution and “diffusing” them to rural areas around the world.

The far-reaching consequences of the adoption of hybrid seeds in many parts of the Global South attest to their being far more than re-combined genetic material (Yapa, 1996). Again, what is important about this enrolment of distinct actors is that it was created by, and also reinforced, a particular relationship, “social ordering” (Whatmore, 2002: 128) among these actors (and the many more that I do not mention). Among the relationships that should be mentioned was the nullification of land reform options in

several parts of the world to which the Green Revolution was taken. As I mentioned in the introduction to the thesis, in Bolivia, perhaps somewhat ironically, hybrid potato varieties were promoted on a massive scale along with agrochemicals and farm machinery as part of the development plan of the revolutionary government, which *did* implement land reform. Interestingly, this government's agricultural programs instilled a set of relationships, some of which are still in place today that had far reaching social and ecological impacts.

With the hybrid seeds came the world view embraced by the "globalocentric position" in the agriculture network and its American model of industrial agriculture, and with them not only a transformation of the social relations of agricultural production that existed in many parts of the world before the arrival of "modern" varieties, but a whole model of development. As Escobar (1992) explains in his discussion of development, it was not only a set of institutional and technical practices, it was "an entire and particular rationality and civilizational experience that was being transferred to the third world" (1992: 136). This rationality *produced* the "Third world" and "Underdevelopment" (Escobar, 1992; Yapa, 1996) as the stage and condition for its extension to new areas of the world.

The idea of plant genetic resources conservation emerged in the mid 1970s as scientists began to take stock of the rapid spread of "modern" varieties to many parts of the world. Although this spread was, by many means, a reflection of the success of modern plant breeding, it also carried the seeds of its possible failure. The Southern Corn Leaf Blight epidemic that spread throughout the American Midwest in 1970 (destroying

15% of that year's crop and causing \$1 billion in losses), was an eerie reminder of the Irish potato famine, and of the great susceptibility of large expanses planted to only a handful of genetically uniform 'modern varieties'³. It was also a reminder of the narrow genetic base in scientific collections readily available to breeders to breed varieties with greater resistance to pests and diseases that could affect national, and global food security. The spread of "modern" varieties in areas of the Global South, such as Bolivia, previously identified by scientists such as Vavilov and his colleagues as centers of crop diversity, raised a concern about the replacement and eventual disappearance of the diverse landraces that were the source(s) of the genetic "raw" material from which "modern" varieties were made, and from which would come forms of pest, disease or climate tolerance.

The creation and diffusion of hybrid seeds had produced, discursively and as an object of interest and concern of the agriculture network, the construct of the "native" seed, or landrace – the opposite of the "modern" variety. This does not mean that these parents and relatives of the hybrid seeds did not exist materially beforehand. What it means is that they had not yet been enlisted *as* "native" varieties or as landraces in the network (although obviously some of their genes had been used to create the hybrids). Here we see the modern paradox of environmentalism that Latour (1993) and his Science Studies colleagues describe. As hybrid seeds (and their network) proliferate, "we" (by this he refers to "the moderns") re-entrench the supposed divide between society and nature. Landraces in this view can be likened to "pristine nature" or wilderness in the

³ The Irish potato famine was more of a consequence of few varieties than of the genetic uniformity of them.

sense that they are deemed by the dominant discourse to be untainted by, and in need of protection from, society, modernity and science.

It is important to recognize however, that landraces are also, and have always been hybrids that co-evolved with humans, their cultures and practices and their environments over the centuries. To the extent that the globalocentric discourses recognized this, and landraces were seen as products of human selection and management closely associated with local people's cultures, knowledges, and ways of life, these human systems were folded, or "collapsed into nature" (Braun, 2002: 12) such that they are also treated as pure, original, native, traditional, and hence also in need of protection from modernity. The establishment of the concept of "native" varieties can be seen as a reestablishment of the divide between nature and society, a "purification" in the ANT lexicon, whereby modernity continues to hold a veil over its continual production and extension of hybrid collectives.

It should come as no surprise that the effort to conserve genetic materials coincided with the emergence of the environmental movement and the transformations in the meanings of nature that it entailed. In response to the environmental pollution and degradation that had become evident in the 1970s, the environmental movement sounded alarms of impending crisis. Nature was no longer viewed as an infinite source of clean air, water, soil, species, and genes. It was converted discursively into "environment", a new concept that equated nature with problems of degradation, problems that required for their solution the interventions of humans – usually in the form of technical knowledge (Sachs, 1992), and in the form of protection or preservation as nature "reserves". Both

the technocratic and ecocentric positions that characterize different strands of environmentalism posit nature as outside society, in its own camp, albeit affecting, and affected by society (Castree, 2001).

In the late 1980s environmental problems began to be seen as posing a threat to continued economic growth in the West. The concept of 'resources' arose to accompany "environment" in dominant representations of nature, emphasizing nature's utility for the generation of economic growth. The sustainable management of resources was seen as imperative for the survival of the world economy (Sachs, 1992: 27). Environment and development were for the first time explicitly linked in the new discourses of sustainable development and biodiversity conservation, which became the *raison d'être* and mission of governments and multilateral institutions worldwide (Escobar, 1996).

Escobar (1996) discusses this capitalization of nature at length. He proposes that capital entered an "ecological phase" in which rather than destroy nature in its quest for profits as it had previously done, it took on a conservationist tendency. This tendency, as Marxist scholars have pointed out, has led to the conservation of nature, through its privatization and enclosure, as an "accumulation strategy" in biological reserves, and in the case of agricultural diversity, in gene banks, where nature's availability, and the access to it, can be secured (Katz, 1998; McAfee, 1999).

Escobar (1996) stresses the importance of these developments not only as economic trends but also as cultural ones. Reflecting on the emergence of the sustainable development discourse and the conversion of nature into "environment", he argues that in this process, nature lost its agency, its ability to give life, to move, to create, to inspire

(*Ibid*: 52). Nature as all that it is, or was, for many “traditional societies”, he argues, died, symbolically making way for resources, a static entity that is only worth our attention for its utilitarian potential activated by human agents and technology, and I would add, for its ability to stunt our economic growth. Rather than interpret these trends as the end, or the death of, a pure nature, or the encroachment of humans and their economic systems into nature, it should be seen as a change in configuration of an already social nature. It is the extension of a particular way of understanding and interacting with nature, an understanding specific to the globalocentric position in the agro-biodiversity network, enabled by (among other things) its discursive conversion into capital. In this sense, the emergence of nature as capital, or anything else for that matter, “what counts as nature”, Braun (2002: 258) writes, “is unavoidably, an *effect* of culture (and power)” (*ibid.*).

An important development that accompanied the transition of nature into environment and resources was the allocation of authority for conservation to global (western) science. The globe began to be seen by policy makers, influenced by ecosystem theorists, as a finite and closed system (Sachs, 1992). Environmental problems were not only local problems, but were also global. ‘Global society’ became the main unit of analysis of the environment’s condition (*ibid.*), and from here was derived the global mandate for environmental conservation, a rubric under which the conservation of the world’s agricultural diversity falls. Those who were naturally given this mandate are what Sachs (1992) and Escobar (1996: 50) call the “global eco-cracy”, the world’s dominant financial and scientific institutions. What happened to the plant genetic materials that farmers managed, or left untended to in their field-margins when the

“global eco-crazy” decided that nature was under threat and in need of protection is very important. The *de facto* rights over, and access to, these materials changed fundamentally. They went from being governed by an array of different local customary rights and obligations, to being designated the “world’s resource” and subjected to conservation and management plans mostly designed by outsiders, informed by their discourses and their concepts of nature and of society.

In the early days of environmentalism, and continuing until today, the conservation of agricultural diversity took the form of its accumulation in gene banks. The International Board for Plant Genetic Resources (IBPGR) was established as part of the Consultative Group on International Agricultural Research (CGIAR) in the early 1970s to coordinate this effort. *Ex situ* conservation – the collection and storage of genetic materials in gene banks – was established as a priority at national, regional and global scales and several of the newly formed CG centers mentioned above as anchors of the Green Revolution in the Global South, were fitted with gene banks and collections of the crops that they were mandated to breed. Today, they hold the largest collections of accessions of the world’s major crops.

Soon after the establishment of *ex situ* collections, it became apparent that this system of conservation has three important limitations. Firstly, *ex situ* conservation proved very difficult for certain tree species and some crops whose seeds are “recalcitrant” and do not germinate after having been treated for storage. *Ex situ* conservation also proved to be particularly difficult, and impractical, for crops that are propagated vegetatively and whose planting materials (seeds) could not be stored for long

periods and would thus have to be continually grown out in order to be conserved. This is the case of cassava, banana, potatoes and other Andean roots and tubers, among other crops. The necessary growing-out of collections of these species makes them continually susceptible to biotic and abiotic stresses. In addition, the resources needed – including land area, irrigation, chemical inputs and labour – in order to maintain collections of these crops in this way, make it extremely costly.

The recognition of these difficulties has provided the rationale for the creation of “field gene bank conservation” which involves the planting of materials collected in one, or a variety of places, and transferred and planted for conservation purposes (and ready access for breeders) in other locations (Maxted et al., 1997: 27). However this type of *ex situ* collection still does not overcome the problem of land availability, as materials still need to be grown out. An additional problem is encountered, as “field gene banks” often do not encompass the full range of eco-geographic conditions required by the variety of materials being conserved in this way. In many cases, this necessarily means that the genetic diversity held in “field gene banks” is not comprehensive (*ibid.*).

Another limitation of *ex situ* conservation is that accessions in gene banks are not subjected to the evolutionary pressures – climate changes, pests, diseases – which continue to evolve and to which stored accessions do not get the opportunity to adapt. This problem is compounded by the collections’ isolation from their wild and weedy relatives, which are the main source of the genetic variability that gives rise to new combinations, or genotypes. A final and related limitation of *ex situ* conservation is that collections often do not include these “wild” forms of cultivated crops and thus

potentially important sources of genetic variability continue to be “unprotected”. In sum, although the globalocentric position of the agro-biodiversity network had created the conditions for the enlistment of all genetic materials into the network, nature would not allow this move to be comprehensive. There were materials that would not conform to the conservation modalities established. The need to encompass them necessitated an important change in the main discourse and practice of agro-biodiversity conservation.

In situ conservation emerged in the late 1980s largely in response to the limitations of *ex situ* conservation. Several important features characterize this approach to genetic conservation. While *ex situ* conservation collected landraces and took them to the gene banks, *in situ* conservation aims to conserve genetic materials in their “places of origin”. Within these places of origin it is expected that both the biophysical as well as the socio-cultural conditions will allow for the conservation and evolution of landraces and their wild relatives. A key aspect of *in situ* conservation is its emphasis on the utility of genetic materials. Landraces are to be conserved *through* and *for* their use. In accordance, many *in situ* conservation projects have components such as diversity fairs by which institutions hope to increase local people’s awareness, curiosity and knowledge of their crop genetic diversity. Other ways of ensuring that local people continue to use and conserve landraces have included technical, marketing and organizational help. The main concern has been to link economic benefits to conservation in order to sustain the interest and involvement of the people who live and farm in areas designated as *in situ* conservation sites.

There are at least two important elements that enabled the emergence and acceptance of *in situ* conservation in scientific circles and in the globalocentric position: firstly, the growing recognition in scientific circles of the ecological soundness and sustainability of some traditional forms of agriculture, and the acknowledgement of, and interest in, local knowledge about agroecosystems; and, secondly the refinement of genetic engineering techniques that render all genetic material potentially useful. Although both these trends have been welcomed in certain circles as positive trends for conservation, Escobar (1996) has pointed out that this valuation of local knowledge and culture, and of every last bit of nature, is the trademark of a “post-modern phase of ecological capital” in which the “semiotic conquest of social life by expert discourses and economic conceptions”, begun during the modern phase, are being “extended to the very heart of nature and life” (Escobar, 1996: 56). He argues that in this new phase of ecological capital, nature is no longer only seen as a resource, but as a “reservoir of value” that can be released through the application of biotechnology. All of nature, even those parts that were never bought or sold or given material value thus become valuable in the sense that they represent a possibility for future material benefits. Now nature by virtue of the existence of biotechnological techniques needs to be preserved *in its totality*. Both *in situ* and *ex situ* conservation respond to this call. While *ex situ* conservation has been given a new boost by the potential utility of all genetic material – rendered by the latest biological techniques - *in situ* conservation ensures that even the uncultivated wild and weedy relatives of crops are conserved.

With regard to local knowledge, the post-modern form of ecological capital values it to the extent that it can be an instrumental complement to biological science in the generation of economic value from nature (Escobar, 1996: 57). In this sense, local people and their communities, folded into nature as I have discussed above, also become reservoirs of value whose collaboration with conservation efforts is imperative. This collaboration is often assured through the recognition of local peoples' links to, knowledge about, and sometimes ownership of parts of nature, and their incorporation into biodiversity discourse as "stewards of biodiversity" (*ibid.* 57). To the extent that this requires their acceptance of these discourses of nature and of society, the advance of the post-modern form of ecological capital entails a cultural domination and conversion that was not seen in the modern form.

In sum, *in situ* conservation, as a mainstream agro-biodiversity conservation discourse and practice promoted by the globalocentric position of the agro-biodiversity network, emerged in the context of the profound transformations in the meanings assigned to nature, and to seeds, that were brought about by the commercialization of agriculture, the development of hybrid seeds, the Green Revolution, modernization theory, the environmental movement, the capitalization of nature, the coupling of environment and development and a number of other *actants* that have come to form the agro-biodiversity network. It is important to keep in mind that the views held in the globalocentric position discussed in this section, far from being universal, neutral, and static, are firmly tied to the evolving economic, political, social, discursive and institutional contexts of which they are part. As such, they are "situated". Although it

represents significant changes from previous conservation practice, particularly in the ways that local people and their roles in agrobiodiversity conservation were constructed, *in situ* conservation must not be interpreted as a new approach to the conservation of agricultural diversity that was introduced to interrupt previous notions of and relationships with nature (or the environment, or genetic resources). Rather, it is a practice that represents continuity in the social relations that characterize the agrobiodiversity network.

It is important to highlight, before going on to situate PROINPA in the globalocentric position of the agro-biodiversity network, that there do exist other positions in the agro-biodiversity network, populated by different actors who mobilize some of the elements in the network in different ways. This is the case of the “sovereignty”, “biodemocracy”, and “cultural autonomy” perspectives that Escobar (1998) writes about. These perspectives explain the issues of biodiversity in different terms, some constructing and mobilizing them together with issues of culture, ethnicity, and territory.

Some of these renditions, particularly those, like Gonzales’ (2000) concept of the “culture of the native seed” that emphasize cosmological and ontological differences with the mainstream agro-biodiversity movement, may lead to the idea that there are spaces outside the agro-biodiversity network from which entirely different and separate treatments of seed emanate. What is important to highlight however is that although these positions may understand nature and seed in very different terms, they are engaged in the biodiversity network, and their positions and knowledges are in constant tension and

struggle with dominant actors and discourses. It is important to understand Gonzales' "culture of the native seed" not as being outside the network but as being in a subjugated, and often silenced position in this network.

It is also important not to consider these differences solely on the grounds of ethnicity and culture. As I have discussed in Chapter II, political strategies that rely on essentialised identities are wrought with questions of authenticity. Who has the right to decide what is Andean and what is not? What purposes and interests do conflicting constructions of culture serve? And what happens to dissident voices *within* what comes to count as authentically Andean? This process of establishing culture and ethnicity must be understood as a political one in which different renditions of the Andean will struggle for prominence, some will dominate and others will be silenced. As Escobar (1998) has effectively demonstrated in his writings on the Process of Black Communities of the Pacific Coast of Colombia, culture and ethnicity are as open to re-articulations as is nature. The ways in which they are constructed and mobilized are not mere reflections of real identities, but effects of power.

I now turn to "situate" PROINPA, and to demonstrate that its narratives and its conservation strategies are firmly embedded in the globalocentric position in the agro-biodiversity network.

PROINPA's mandate, institutional ties and narratives

PROINPA was created in 1989 as the potato research program of the Bolivian Institute of Agricultural Technology (IBTA) and was originally supported by the

International Potato Centre (CIP), the Swiss Agency for Development and Cooperation (COSUDE), and later also by the World Bank. As the national counterpart of CIP in Bolivia, PROINPA's mandate mirrors that of the international centre⁴. Its general objective is to "develop and transfer technological alternatives adapted to the agro-socioeconomic conditions of potato production in Bolivia in order to increase production and productivity (PROINPA, 1995: 17. my translation). Today CIP, COSUDE and PROINPA are partners in the *Papa Andina* project, which seeks to "reduce poverty among small-scale farmers by improving the competitiveness of potatoes in the market by allowing small farmers to participate more effectively in markets for potatoes and potato-based products" (<http://papandina.cip.cgiar.org>). A special section of PROINPA's latest compendium report is dedicated to the relationship with CIP: "The PROINPA-CIP relationship, through the Papa Andina project, has developed such that an association has been constituted with the same levels of decision making with regards to defining priorities, strategies, investments, hiring personnel and resource administration" (PROINPA, 2003: 95, my translation).

PROINPA is also tied to these two international entities through its conservation activities. Since its creation in 1989, PROINPA has been the legal custodian of Bolivia's national potato and Andean roots and tubers gene-bank with close ties to the CIP gene bank. In 1993 PROINPA became the Bolivian executing body of the international

⁴ For a genealogy of CIP and an analysis of its evolving mandate see Gonzales (1996: 291-302). My mention of CIP here, and of several other Consultative Group on International Agricultural Research (CGIAR) centers in the previous section should not be interpreted as a claim that these institutes' roles and mandates have not continued to evolve and shift. Surely they have been changing as dominant discourses have changed over the years.

collaborative project titled “Conservation, evaluation and utilization of Andean root and tuber biodiversity”, whose main objective is to stop the erosion of Andean root and tuber biodiversity through a concerted, Andean region initiative. This eco-regional project encompassing Bolivia, Peru and Ecuador, is led by CIP, and financed by COSUDE. It was preceded by an initiative of CIP and the International Plant Genetic Resources Institute (IPGRI, another of the IARCs) which aimed to help national Andean programs to “recover and consolidate their collections” (CIP-COTESU, 1992 cited in Gonzales, 1999: 305) of Andean roots and tubers. This project included the “maintenance of representative samples of RTA [Andean roots and tubers] in the CIP experimental station in Quito, and a duplicate of them in the respective countries where the germplasm was collected” (*ibid.*). It is clear then that since its inception, PROINPA has been closely associated, through its institutional ties, funding, mandate, and not least through its gene bank and its development and conservation activities, to the international agricultural research institutes, particularly to the CIP⁵.

PROINPA sees itself mainly as a rural development research institute. This is very clear in the above-quoted institutional and project objectives to “reduce poverty”, “increase production and productivity” and “improve competitiveness”. PROINPA’s annual reports demonstrate all types of potato production and commercialization challenges. These range from virus-contaminated seed, to environmental factors, to a series of pests and diseases, to farmers’ lack of access, or appropriate access, to markets.

⁵ Further detail on PROINPA’s international alliances with these and other institutes can be found in PROINPA’s 1998-2001 Annual Report (PROINPA, 2001: 7-8).

All are seen as barriers to the development and well being of Bolivian small-scale farmers.

The solution that PROINPA puts forward in order to solve the situation of Bolivia's small-scale agriculturalists is to help them become more productive and better integrated into national and regional markets. PROINPA's role in this context is to generate technologies - among them a range of improved, high-yielding, and disease-resisting potato varieties, integrated soil- and pest-management systems, protected rustic seedbeds, and alternative treatments for potato storage. A necessary corollary to this is an effort to find, develop, and adapt ways to introduce these technologies to farmers. For this PROINPA involves farmers in Local Agricultural Research Committees (CIALs) and Farmer Field Schools (FFS). Finally, PROINPA networks with urban food-related businesses such as potato chip companies and supermarkets in order to connect farmers and their produce to urban markets.

PROINPA's focus on technical problems of productivity, and on scientific and technical solutions, is a reflection of its mandate and its human resource base. However, it is also a manifestation of the institution's belief that poverty can be resolved by the use of technology. Fundamentally, this thinking, particularly as it relates to rural poverty, emanates from modernization theory, which as I have discussed postulates that, an increase in productivity, spurred by the use of technology (improved varieties, chemical inputs and farm machinery) and coupled with market access, is the recipe for agricultural development and poverty reduction. This worldview is clearly associated with the Green

Revolution and with the International Agricultural Research Centers (IARCS), such as CIP and its sister organizations.

PROINPA's repeated use throughout its institutional literature of terms such as "diffusion" and "technology transfer", originating in diffusion of technology studies, adds further credence to its affiliation to this worldview. Even as it recognizes the questioning of "traditional methods for generating and transferring technology" and the need to implement participatory methods in their place (PROINPA, 2001: 36), PROINPA continues to view these methods as ways to "transfer", "diffuse", and "validate" technologies to and for farmers, calling them "participatory diffusion", "participatory extension" or "participatory validation"⁶. The use of these terms, and others associated with the "transfer of technology approach" in the institution's literature, coupled with its underlying view of development, and its institutional proximity to CIP, makes evident PROINPA's location in the agro-biodiversity network.

In addition to seeing itself as a rural development institute, PROINPA sees itself as a biodiversity conservation institute responding to the erosion of agricultural biodiversity in the Andean region. As such, it (re)produces an environmental or conservation narrative that runs parallel to its development narrative. Biodiversity is being lost in "natural conditions", the narrative reads, because of a destruction of natural habitats, replacement of local varieties with improved varieties, changes in food habits and agricultural practices, and market demands (García et al. 2003: 5). One of

⁶ There is a fundamental difference between processes that use participatory methods to develop solutions to local problems, and processes that use these methods to extend to farmers solutions that have already been developed in a laboratory or elsewhere away from the locality in which farmers experience and identify the problem.

PROINPA's documents for example reproduces the commonly used narrative associated with the 1992 Rio Summit and the Convention on Biodiversity:

In spite of the invaluable economic, productive and cultural importance of our resources, this great diversity is *in danger of erosion and even of disappearance*. ...Presently, genetic resources are *in most part* being conserved by the rural population that usually uses them as part of their nourishment... Genetic diversity is *fundamental for local food security*. For these reasons, it is *urgent* that we design and implement conservation strategies (PROINPA, 2003: 15. my translation; my emphasis).

There is an urgent threat of the disappearance of diversity, which would lead to the consequent inability of farmers to produce enough food to fulfill their basic needs.

To remedy this situation, PROINPA has a conservation program that includes the collection, characterization, study and preservation of genetic materials on their research station and in their gene bank (*ex situ*), and the inventorying, study, and conservation of materials in the field (*in situ*). Alongside these activities, PROINPA has a deliberate strategy of bringing *ex situ* and *in situ* conservation closer together through activities such the viral cleaning of seed and its devolution to communities, the establishment of local or *in situ* gene banks, and the organization of visits from farmers to the national gene bank.

A central part of the strategy is the promotion of an increased use and commercialization of "native" germplasm and the raising of awareness among local farmers, local and national politicians, and urban consumers of the importance and value of these resources. This neatly ties conservation to economic development, reflecting PROINPA's absorption of discourses of "sustainable development". Another of PROINPA's publications illustrates how ideas of biodiversity "preservation",

“sustainable management” and “rational use” are carefully woven into the institutional literature making room for the extraction of economic value, and development to be attained as the biological crisis is averted:

Genetic conservation should be focused on the long term. It should be framed in a strategy of *sustainable management* that permits the persistence of the *properties of ecological systems (productivity, stability and resilience)* and considers the *properties of economic systems (equity, solidarity and association)* (García et al. 2003: 3. my translation, my emphasis).

Conservation efforts are *worthwhile to the extent that genetic resources can be utilized*, either in genetic improvement, in agro-industry, the identification of molecules, or other uses (*ibid.* p.12 my translation, my emphasis).

Increasing the use and commercialization of genetic resources is so important to PROINPA that the idea has a motto: “the more use, the more conservation” (*Ibid.*: 8. my translation) recited periodically in the institutional literature. This echoes, almost literally the discourse generated and used in the “globalocentric” position in Escobar’s “biodiversity network” and summarized in Janzen’s and Hallwach’s catchphrase: “you’ve got to know it to use it, and you’ve got to use it to save it” (D. Janzen and H. Hallwachs, 1993, cited in Escobar, 1998: 56).

PROINPA’s mandate, institutional ties, and narratives anchor the foundation in the “globalocentric position” of the agrobiodiversity network. It is from this position, that PROINPA projects the discourse of *in situ* conservation onto Candelaria. It is a position, as Escobar (1998) argues, of power, not only vis-à-vis local farmers and their natures, but also in relation to other ways of understanding and treating the issues of genetic erosion.

I now turn to discuss the ways in which PROINPA represents genetic materials and local knowledge in the context of its conservation activities and strategies.

PROINPA's Conservation Strategy and Representations of Nature and Society

Genes and Local Knowledge: reservoirs of value

In order to create high-yielding and disease-resistant potato varieties to overcome Bolivian farmers' production problems, and in order to continue to do so into the future when other forms or configurations of production problems may emerge, PROINPA needs to continue to find, collect, document and preserve germplasm that is not yet in the gene bank. It takes this task seriously enough that its scientists will (attempt to) collect germplasm at any time, in any place. Even when PROINPA is not explicitly on a collection mission, collecting casually forms part of its other "conservation" activities. Consider for example these two unproblematised reports of collections undertaken during diagnostic studies and seed cleaning activities:

In the 1993-94 campaign [PROINPA] undertook multidisciplinary *diagnostic studies*, and did follow-up in Andean root and tuber production plots in three regions of the department of Cochabamba.... The objective was to identify micro-centers of biodiversity of Andean roots and tubers as well as the biotic, abiotic and agro-socioeconomic factors that limit and favour the production of Andean roots and tubers in different agroecological zones. *In parallel, we made complementary collections to enrich the Andean roots and tubers germplasm bank at the Toralapa experimental station* (PROINPA, 1994: 67. my translation, my emphasis).

With information from the germplasm bank, twenty-four varieties of native potato were prioritized for *viral cleaning*: between 1995 and 1996 these varieties were returned to their zones of origin. ...*The selected material passed on to form part of the germplasm bank* (Cadima et al. 2003: 58. my translation, my emphasis)

Similar experiences have been successfully undertaken in other zones such as the North of Potosí⁷ where...[a coordination of actions among various organizations] permitted the *viral cleaning of ten potato varieties*. Likewise, *a collection of 88 varieties* originating in 8 communities in the Ayllu Chullpas was effected. *These varieties are [now] in the Andean Tubers Germplasm Bank in the Toralapa Station...* (ibid: 60. my translation, my emphasis)

PROINPA's policy on germplasm collection is summarized in a passage of the main chapter in PROINPA's book on its *in situ* conservation activities in Candelaria. The passage outlines the selection criteria for materials to be collected:

The acquisition of germplasm for ex-situ conservation is implemented through collections, donations and exchange of native species based on the following selection criteria:

- *Potentially interesting* species from cultural or economic point of view
- Species that are in *some degree of threat*: is *underutilized*, or in danger of erosion
- Species that are not under any conservation system *at a national level* (García et al., 2003: 9 my translation, my emphasis).

Evident from this passage is PROINPA's subscription to the view of nature as "reservoir of value" that Escobar argues is characteristic of the "post modern form of ecological capital". The selection criteria leave no materials off the list of collectables: the only "*national level*" conservation system *is* the gene bank, and all materials are

⁷ This activity was conducted in the same Ayllu, and the same community where I initially tried to conduct my research.

conceivably under “*some* degree of threat” since this conservation strategy is designed as a response to the “urgent threat” of disappearance. Finally, all materials are “*potentially* interesting” because of the existence of simple biological and advanced bio-technological techniques that can turn genetic materials into economic value. As I have explained, the view of nature as “reservoir of capital” deems every part of nature potentially valuable, and thus worth conserving. In this way of thinking, Katz (1998) notes “nothing should be allowed to become extinct, let alone destroyed, because it might one day prove useful (and profitable) to humankind” (*Ibid.*: 48). This gives an important impetus to germplasm collections and *ex situ* conservation.

As Escobar (1996) observes, the notion of “reservoir of value” is extended to include local knowledge, culture and practices having to do with [the cultivation of] diversity. We see this both in the folding of local people into nature, and in the way that their knowledge is valued. PROINPA’s texts show a keen interest in local knowledge:

It is important to *make the best of* the phyto-genetic *resources* of Andean tubers *starting with an ample native knowledge of their properties* (Cadima et al., 2003: 53 my translation. my emphasis).

The *objective of ethno-botanic information* is to discover more about these varieties from the point of view of farmers. This information could help to *calculate their economic value* and like this *make a stronger case for their conservation* (*ibid.*: 56. my translation. my emphasis).

The use of the terms “ethno-botanic” and “native knowledge” here and elsewhere (see for another example Terrazas and Valdivia, 1998: 11, 14) emphasizes that this is not the same knowledge that scientists have. It is truly different from, or “other”, than scientific

knowledge. The farmers in this area are said to have their very own “logic” and “traditional strategies”, their “traditional knowledge” and social and cultural expression having been “passed down through generations” (Terrazas and Valdivia, 1998: 9; García et al., 2003: 4).

There is no doubt that the people who have nurtured the vast genetic diversity of potatoes and other crops in the Andes have a great deal of experience and knowledge about the cultivation and use of these materials. However, PROINPA seems to value this knowledge in a very particular way. *Ethno-botanic information* can help scientists to understand and reveal the *economic value* of genetic materials and to *make the best* of these *resources*. Again, implicit in this rationale for conservation and the valuation of local knowledge is the institution’s appreciation of local people as “reservoirs of value” because local knowledge is seen, not as a “complex cultural construction, involving movements and events profoundly historical and relational” (Escobar, 1996: 57) but as a crucial instrument through which the increased use and commercialization of landraces (and/or their genes) can be attained. It is for this reason that the participation of local people is important to PROINPA. And it is in order to ensure their enlistment, as I will show in the following chapters, that PROINPA characterizes the people and culture of Candelaria as “traditional” and as indigenous.

PROINPA’s representations of genetic material and of local knowledge confirm that this institution is firmly rooted in the globalocentric position of the agro-biodiversity network that I have described above. Through its interventions in social and natural systems in rural Bolivia, PROINPA becomes a vehicle through which this culturally and

historically specific way of apprehending and addressing biodiversity and the people who have maintained it is extended to new areas of the world. Keeping this in mind, I turn now specifically to the establishment of a genetic reserve in Candelaria. I will explore PROINPA's selection of the site as well as the way in which PROINPA's discourse and practice work to "symbolically conquer" (Escobar, 1996) this particular place, enlisting it as a "biodiversity microcenter".

Candelaria, "Microcenter of Agro-biodiversity"

In situ conservation explicitly refers to genetic conservation in *a place*. Usually, the "*in situ*" refers to the place of "origin" of the genetic diversity in question, and it includes the "traditional farming conditions" in which this diversity has been maintained (Maxted et al. 1997: xx, 29). Specifically with regards to potato conservation, a prominent *in situ* conservation text states:

Ideally, and as a matter of urgency, a chain of genetic reserves to conserve cultivated potatoes should be established throughout the Andes in areas with high levels of genetic diversity. These could be situated in ... northern Bolivia (La Paz area), northern Bolivia (Cochabamba region) and central Bolivia (Oruro, Potosí). This does not, of course, preclude the establishment of other indigenous tuber and grain crops in the reserves proposed (Maxted et al. 1997: 55).

The identification of micro-centers of diversity is one of the first objectives of the CIP-COTESU eco-regional conservation project mentioned above, of which PROINPA is the Bolivian partner. A central element of PROINPA's *in situ* conservation strategy therefore is the designation of an area, 62 kilometres outside Cochabamba as a

biodiversity “micro-center”, and its demarcation as the institution’s *in situ* conservation pilot site. Most of the *in situ* conservation activities conducted by PROINPA with relation to Andean roots and tubers, including seed cleaning, the establishment of a “communal” gene bank, the creation of the Association of Andean Tuber Producers of Candelaria (APROTAC), the organization of the annual biodiversity fair, and more than ten years of scientific and social research, take place and have taken place in this area. There are also future plans, for more “environmentally” oriented activities such as agro-ecotourism and the “preservation” of certain designated areas within the micro-center (García et al. 2003). In sum, PROINPA is heavily involved in Candelaria.

Unlike other conservation efforts that seek pristine sites to reserve parts of nature thought to be untouched by humans, the proponents of *in situ* conservation acknowledge that so-called “disturbed” areas can have considerable diversity, and that “for many parts of the world, [traditional] farming methods along with the diversity of local landraces have long ceased to exist” (Maxted et al. 1997: 55). The loss of “natural habitat” and the conversion of “traditional systems” to modern agriculture are ongoing concerns in the literature on *in situ* conservation. Both refer to lost essences of nature and culture. *In situ*’s proponents promote the establishment of biodiversity reserves in areas of concentration of agro-biological diversity in order to protect the “wild” relatives of landraces, the landraces themselves, as well as the “traditional” and “native” systems of agriculture with which these genetic materials are associated (Maxted et al. 1997: 10). They propose the conservation of a nature with humans in it. However these humans are not modern humans. As I will discuss in Chapter IV, they are “traditional”; they are on

the other side of what Latour (1993) calls the *Second Great Divide*. Thus they are, from the modern point of view, in essence part of nature, and this is what makes them (the people, the natural environment, and the seeds), for PROINPA, interesting recruits into the biodiversity network.

In spite of this, far from being a simple move to preserve or conserve nature, an exercise in “purification” (Latour, 1993) where nature is separated in order to protect it, PROINPA’s establishment of a genetic reserve in Candelaria is actually a massive exercise in “translation” (the creation, and connection, of hybrids *ibid.*). Rather than separate nature and society, PROINPA’s involvement in Candelaria, at every turn and, in every move, increasingly weaves them together. What is important about this is not the fact that they are woven together. From Latour’s a-modern perspective (*ibid.*) this is not a novelty, as he famously states, “we have never been modern”; society and nature have always already been woven together. What is important is that through the establishment of Candelaria as a microcenter of diversity, society and nature get (re-) woven in a way that bears the imprint of PROINPA’s identity and position in the agro-biodiversity network, of its worldview, and of its interests.

PROINPA’s desire to protect and conserve Candelaria must be understood in relation to what can be interpreted as a “closing frontier” in terms of land availability in the region of Cochabamba in question. Land on the outskirts of Cochabamba (and in many other parts of Bolivia) is in chronically short supply due to soil degradation (a result of overexploitation and deforestation) and due to population growth, the hereditary

subdivision of family landholdings, and the migration to the inter Andean valleys of farmers from the highlands⁸.

This situation is aggravated by the existence of two national parks in the vicinity of Candelaria (Figure 3) that do not welcome human inhabitants: the Carrasco National Park, less than 70 Kms to the north, and the Tunari National Park, bordering Candelaria/Colomi to the south. The area of the latter park overlaps land re-distributed to farming communities inside its southern border during the 1952 agrarian reform (Quinteros, 1993). This does not appear to have happened in the north-eastern part of the park where Candelaria is located, however Serrano (2004: 16) estimates that the park does affect approximately twenty percent of Colomi's land⁹. Both parks are periodically "invaded" by landless people and highland migrants, and are fiercely defended by urban environmentalists. The presence of these two parks in the vicinity of Candelaria is a symptom of a perceived threat on the part of environmentalists, of impending human damage to the remaining open areas in this region. Ironically, the enclosure of these areas as parks that do not welcome human presence increases the perceived human threat to the areas surrounding them, as the amount of available land, or nature, for migrants diminishes.

⁸ The unclear, contested, and haphazard land distribution situation left by the agrarian reform of 1952 and its later modifications (Urioste, 2003), have made land availability and distribution one of the most contentious issues in the country today. This is so much so, that land reform became one of President Morales' first priorities when he took office in December 2005.

⁹ Colomi has a total of 366,296 hectares of which Candelaria occupies 5,599 (Gobierno Municipal de Colomi, 2002). The municipal development plan mentions the problematic issue of undefined or overlapping borders between Colomi and neighbouring municipalities (Gobierno Municipal de Colomi, 2002: 151).

Figure 3

Protected Areas of Bolivia

Base map source: Servicio Nacional de Areas Protegidas (SENA), 2007

Another important element in this is the recent expansion of the Corani dam, located on the northeastern edge of Candelaria (Figure 2, pg 82), which flooded a large part of Candelaria's valley. As discussed previously, this led to the division of the community of Pie de Gallo into two communities, and the relocation of farmers whose lands were flooded to other parts of the valley. The expansion of the dam represents an appropriation, and designation to another use, of a piece of Candelaria's land by an entity that has no particular interest in the conservation of potato biodiversity in the area.

If PROINPA's goal were to protect a pure nature (if we can allow for a moment that such an entity exists), there would be no need to target Candelaria because the two parks in the vicinity presumably already do this work (I will come back in a moment to the idea that the material natures in the parks are not necessarily the same and or of the same conservation value to PROINPA as that of Candelaria). However, the presence of the two parks can be interpreted as increasing PROINPA's desire to protect Candelaria, not only because, as I have mentioned, they increase the human pressure on the lands around them, but much more importantly, because they do not represent the type of nature that PROINPA wants to protect. PROINPA is not seeking to protect an already established universal nature. It is seeking a very particular nature¹⁰. It is a nature, as I have discussed, with humans in it. But again, not just any humans; recently settled

¹⁰ An elaborate methodology was implemented by PROINPA for the selection of these sites. It includes the review of secondary sources of information including production statistics, biophysical and ecological maps, and reports of early explorations, collections and studies of diversity in the region; and primary information including the conducting of surveys in rural markets (to assess the number of varieties of different species of interest that can be found in the area), and diagnostic studies in select communities as the number of potential sites was narrowed down (in order to confirm the information obtained through surveys, and to get an idea of the 'traditionality' of production systems).

highland migrants will not do. The people in *in situ* genetic reserves must be “traditional” societies and they must cultivate a large number of potato varieties.

In addition to the question of human presence, the parks in Candelaria’s vicinity do not represent the type of nature that PROINPA seeks to protect because they do not have the biophysical conditions that it deems necessary for the establishment of a genetic reserve. Candelaria in this respect is not just any piece of nature. It was carefully selected by PROINPA following an elaborate methodology that took into consideration (among other things) the candidate sites’ production conditions. Candelaria’s soils, climate, and precipitation are very favourable for the cultivation and maintenance of Andean roots and tubers. Colomi, the municipality where Candelaria is located, is considered a “high potential” area having potato yields among the highest in the department of Cochabamba (Gamboa, 1993: 57). Being at the junction between the Chapare tropics, and the inter-Andean valley of Cochabamba, Candelaria/Colomi has a range of conditions that allows for the establishment of one site where a range of materials of conservation interest could be cultivated and maintained. PROINPA’s gene-bank (which *in situ* sites, by definition, are supposed to complement) is located in Toralapa, a lower lying and drier area that is not ideal for such a wide range of materials, and particularly not for many of the “native” potato varieties cultivated in Candelaria/Colomi. As I have discussed above, one of the limitations of *ex situ* conservation of potato and certain other crops is that gene banks need to, but often do not, encompass the full range of eco-geographic conditions required by the materials they conserve. Although Toralapa offers ‘optimal’ conditions for many materials, PROINPA scientists have often observed that certain materials perform better,

and express their characteristics more fully in Candelaria. Candelaria is thus perfectly suited for PROINPA's needs.

While PROINPA's selection of Candelaria reflects its desires and its views of what nature is or should be, or the type of nature it wants to protect, it is also, perhaps contradictorily, a continuous source of new genetic material and of associated local knowledge. The view of nature as "reservoir of value" that forms the background rationale for its collection of all genetic materials found in its fieldwork, and for its valuation of local knowledge (Escobar 1996; Katz, 1998) also plays a part in the establishment of the micro-center:

A micro-centre constitutes a genetic well where genes of potential economic value exist that have not yet been identified for their quality, productivity, agronomic characteristics, resistance to plagues and diseases or environmental adaptation (Cadima et al., 2003: 53. my translation, my emphasis).

The natural *reservoir* of genetic resources is important because of its contribution to the food security of the Andean farming families that have accompanied these crops during their evolution (PROINPA, 1996: 69. my translation, my emphasis).

In an argument that parallels that of Escobar (1996) on the capitalization of nature, Katz (1998:47) argues that once nature's "frontier" was closed (in the sense that new parts of nature were no longer available for capital's expansion), nature conservation became an "accumulation strategy" for capital. She sets her analysis of the growing number of biosphere reserves around the world in this context arguing that it is a "new enclosure movement" (*ibid*) in which parts of nature are "immediately recognized as productive or potentially productive sites" (*ibid*: 49). The enclosure of these sites then is

not simply about the protection of nature. It also is about their capture and conversion into the type of nature that its captors decide. Katz writes:

To all appearances, the preserved landscape is secure; but in the world of action, mediated by particular axes of knowledge, power and wealth, its conversion to resource in some global accounting ledger has fundamentally altered its status and temporality. The preserve becomes, in current lingo, “a biodiversity bank.” ... All of which begs the question of who has the rights to determine the “appropriate” use of preserved land; of how the altered temporalities of nature bias future social access to the landscape. (1998: 49).

Unlike other biological reserves around the world, there is no physical boundary that has been erected to surround and delimit Candelaria as a conservation area¹¹. The “enclosure” of Candelaria is more of a “symbolic conquest” (Escobar, 1996). Far from meaning that this is not a “real” or material conquest, a “symbolic” conquest means that the struggle is over the meaning of nature and, importantly, of place. What PROINPA does in selecting and characterizing Candelaria as a microcenter of diversity is bring this particular place – Candelaria, *the microcenter of biodiversity* – into being. It displaces its prior meaning(s), and replaces it with this one (Gregory, 2001: 97). It further entrenches this move by successfully lobbying Colomi’s authorities to pass an ordinance declaring the municipality an “Agroecological and Biodiversity Municipality” (Gobierno Municipal de Colomi, 2003: 85; PROINPA, 2002: 32). In addition, as part of its conservation strategy, it has lobbied the Bolivian government to strengthen support for *in*

¹¹ It is important to note here that while PROINPA names and works mostly in Candelaria, it has activities in a broader area and sometimes names this broader area the “micro-center of diversity”. This inconsistency can be understood as a reflection of the difficulty of establishing a fixed area of biodiversity conservation, an issue to which I will return in a later chapter.

situ conservation (García et al., 2003: 3, 7) and as a result Colomi has been prioritized as a zone for the implementation of the Ministry of Sustainable Development's National Strategy for the Conservation of Biodiversity (ENCB), and *in situ* conservation (and ecotourism) lines of action have been written into Colomi's Municipal Development Plan (PROINPA, 2002: 32. my translation).

The act of naming Candelaria a "micro-centre of diversity" and Colomi an "Agroecological and Biodiversity Municipality", overrides (perhaps only temporarily) their naming as anything else by outside actors and/or by the residents of Candelaria themselves. Importantly, it suggests that Candelaria did not have a prior identity, and meaning, imparted to it by others. Naming place therefore is much more than nominal. "Naming" as Tuan (1991: 688 cited in Cresswell, 2006: 98¹²) writes "is power – the creative power to call something into being, to render the invisible visible, to impart a certain character to things". Imparting Candelaria with the character of microcenter of diversity, PROINPA "places and locates it in [the] wider cultural narrative" (Cresswell, 2006: 98) of the globalocentric position of the agro-biodiversity network discussed above. Candelaria, the microcenter of diversity, must thus be understood as (one of the) the space(s) through which the power relations of the agro-biodiversity network are performed and materialized. Candelaria is reconstituted through PROINPA's conquest, or enrolment in the network. Once this happens, it extends these relations (Bosco, 2006: 147 citing Sharp et al., 2000).

¹² My citing of Yi Fu Tuan here should not be understood as an endorsement of his views on space and place, which have been critiqued convincingly by post-structuralist scholars among whom Massey (particularly 2005) should be highlighted. My citation is simply an acknowledgement of Yi Fu Tuan's observation of the power of naming places.

It is important to stress here that the conquest and reconstitution of Candelaria is not only a function of discourse. Candelaria's biophysical and socio-cultural traits, which I have discussed here, play a role in its selection as PROINPA's *in situ* conservation pilot site. They are not irrelevant to its becoming a microcentre of diversity, or its symbolic incorporation into the globalocentric position of the agro-biodiversity network. They are not merely the stage(s) on which PROINPA performs its *in situ* conservation discourse; they also play an enabling role in this performance. As I will argue in the coming chapters, PROINPA's construction of a particular image of the agroecology and socio-economy of the place (itself coming into being through its link with the assemblage of entities in the globalocentric position in the network) further entrench and materialize the "symbolic conquest" of Candelaria.

Conclusions

Taking as starting point the partiality of knowledge, its relationship with power, and the mutual imbrications of society and nature, the first part of this chapter contextualized the emergence of *in situ* conservation within the evolution and growth of the agro-biodiversity network, and specifically associated with the views and standpoints of the constellation of actors that form the globalocentric position in this network. Among these, are the world's dominant development and environmental institutions, which forward a particular explanation and set of solutions to the pressing issue of genetic erosion and poverty in biodiverse areas. Important among the worldviews and practices of the actors in this position, and one the central themes of this thesis, is the view of

nature and society as separate realms. This view leads many of the initiatives that emanate from this position to embody what Latour has called the modern paradox, or the contradiction of environmentalism: whereby objects are at once “purified” (washed of their other, be it nature or society), and simultaneously “translated” (mixed or hybridized with their others) (Latour, 1993). Although most of the chapter addresses the globalocentric position, it stresses that it is not the only position in the network. There are others such as what Escobar (1998) calls the social movements perspective, and what Gonzales (1999) calls the Culture of the Native seed that also work within the network but in different, often subjugated positions.

A close look at PROINPA’s mandate, institutional links, and its valuation of genetic diversity and local knowledge in the second part of the chapter, reveals that the institution forms part of the globalocentric position in the agro-biodiversity network. As such, its discourses are legitimated by, and extended as, an effect of power. Thus, they cannot be taken as neutral and impartial. On the contrary, as will become evident in the following two chapters, PROINPA’s discourse carries some of the worldviews and paradoxes characteristic of the “globalocentric position” and of what Latour calls “modern” thinking.

The final part of the chapter addresses how PROINPA goes about selecting Candelaria as a pilot site for its *in situ* conservation activities. This selection process reveals the “purifying impulse” of both the institution and its conservation strategy. The recruitment of Candelaria into the globalocentric position in the network, done through its classifying and naming as a “microcenter of diversity”, can be understood as a

“symbolic conquest” in which Candelaria is inserted into the cultural narratives and practices of the globalocentric position.

In closing this chapter, it is important to note that PROINPA’s move to have Colomi named an “Agroecological and Biodiversity Municipality” was replicated in the Llallagua area. During the time of my fieldwork there, PROINPA and its partner organization in Llallagua were actively lobbying the municipal authorities to give Llallagua a similar title. The exact wording was still under negotiation but included ideas of cultural and biological diversity. In sum, naming was an important part of establishing the meaning of place, and hence making it appropriate and appropriate-able, as a conservation area.

Chapter V.

CANDELARIA, A “NATURAL HABITAT”?

Introduction

As discussed in Chapter II, modern governance is characterized by the use of science as a source of guidance and legitimacy. Most contemporary governmental and institutional strategies regarding the improvement and/or conservation of human and environmental conditions are based on knowledge about the people, places and ecosystems involved. Narratives, or stories, produced by experts in the field of intervention - be they academics of relevant disciplines or professionals engaged in the area of work - describe the situation, and explain the problems or challenges at hand. The importance of these stories is not only that they claim to describe realities accurately, but that they also prescribe how social and biophysical conditions should be, and hence the necessary interventions, in order to achieve a (presumably agreed upon) better state. In so doing, they have an active role in (re)moulding realities. Understanding the relationship between knowledge and power in this way makes it imperative to question the narratives that support governmental and institutional strategies. These stories carry the authoritative and legitimizing voices of experts, as well as their inevitably “partial perspectives”. It is important therefore to ask what these perspectives leave out, what they emphasize and what they play down, and how marginalized voices and perspectives can contribute to the formation of more inclusive and more just narratives.

In the introduction of the second chapter of PROINPA’s book about Candelaria, Gonzales et al. (2003: 1. my translation) write “The present chapter limits itself to describing the Candelaria microcentre”. It does much more than that however. In writing

about Candelaria, and particularly in claiming to describe its agroecology and socio-economy as they are, PROINPA positions itself as an authority or expert on the place, and establishes its discourse as the (only) truth about it. As discussed in Chapter IV, the particular way in which Candelaria is described, what is said about it, and how it is said, sets Candelaria in the discursive realm to which PROINPA belongs, and enables the particular type of approach that the foundation takes to the challenges at hand. PROINPA's narrative is not only a description then, it is a partial representation, which, as an instrument of power, enables Candelaria's conquest.

In the previous chapter I "situated" PROINPA, and explained its enrolment of Candelaria into the globalocentric position of the biodiversity network, of which the foundation is part. Following Escobar (1996), I described this enrolment as a "symbolic conquest". In thinking of the enrolment of Candelaria in these terms, however, it is important not to fall into the common trap of interpreting the conquest as PROINPA's move "across space" to find Candelaria simply waiting for it (Massey, 2005: 120). This, Massey argues, denies that the conquered also have a history, a trajectory. In the beginning of her book *For Space* (2005), Massey recounts the story of Hernán Cortés' conquest of Tenochtitlán (current day Mexico). She explains several things that were happening in Tenochtitlán at the time of the conquest:

It was the Year One Reed, a year of both historical and cosmological significance: a particular point in the cycle of years. Over past cycles the city had become mightily successful. It was only a few cycles ago that the Mexica/Aztecs had first set up in this huge high valley. ...[S]ince their arrival, and the founding of this city Tenochtitlán, the Azetcs had piled success on success. ...But these armies approaching now are ominous. Empires do

not last forever. Only recently Azvapotzalco, on the edge of the lake, had been brought down after a brief blaze of glory. And Tula, seat of the revered Toltecs, now lies deserted. All these are reminders of previous splendours, and of their fragility. And now these strange invaders are coming from the direction of acatl [what in the Aztec world view was, the geographical direction of authority]; and it is the Year One Reed (Massey, 2005: 2-3)

Massey gets into this (rare) explanation to stress that Tenochtitlán had a history that had been going on for many years before the arrival of the Spaniards. Conquest then should not be understood as an event in which the conqueror overruns the conquered, but as a “meeting point” of trajectories, or of histories (*ibid.*: 4). This suggests that the history of the conquered also has a role in determining the form that the conquest will take. I want to propose that Candelaria’s enrolment in the agro-biodiversity network should also be understood like this, as a meeting up of PROINPA’s and Candelaria’s trajectories. This highlights the fact that Candelaria, its society and its nature, have an agency in the making of the new place that emerges from the meeting up of its trajectory with that of PROINPA’s.

In this chapter my objective is to analyse PROINPA’s representation(s) of the local people and their agro-ecosystem, and to discuss two *in situ* conservation strategies that it has implemented in the area: the designation of “farmer conservationists”- roughly the equivalent of the idea of “stewards of biodiversity”, and the commercialization of “native” varieties. Through this analysis and discussion, I show that PROINPA’s representations leave out important parts of what makes-up Candelaria, and that, while many people are participating in PROINPA’s *in situ* conservation activities, some have withdrawn, and others are not interested. I show that Candelaria has a social and natural

dynamic of its own, a history both buried and very much alive and in the making, which interacts in important ways with its cultivation (and abandonment) of potato varieties of conservation interest, and hence with the ways in which it can be enrolled in the agro-biodiversity network. This creates a tension between PROINPA shaping of Candelaria through its discourse (and that of the globalocentric position in the network), and Candelaria either provoking a change in the discourse (as a condition for its enlistment), or not “accepting” its enrolment and thus breaking the link with PROINPA. The outcome is, and will be, an effect of power (and of resistance).

In order to understand this, it is important to see Candelaria as an assemblage made up of a number of “things”, which include (among others), PROINPA’s representations and activities. As I will show in this chapter (and in the next), these activities make Candelaria the microcenter of diversity. As Law (1992) explains however, “the bits and pieces assembled into an order are constantly liable to break down, make off on their own” (p. 386). In this way, Candelaria’s enrolment can be seen as unstable, and incomplete.

A parallel aim of this chapter is to address the “purifying” impulse of PROINPA’s representation of Candelaria and its agroecosystem as “traditional”. This label essentialises Candelaria and its inhabitants, setting them apart from the rest of the world, as part of an original purity that should be protected from modernity. In doing so, it erases its history, and bounds, or localizes Candelaria. Importantly, it is through this “purification” that Candelaria *becomes* a “natural habitat”. I draw on both Latour (1993) and Massey (2005) to dispute the possibility that any people or place can in effect be

local and ahistorical. In doing so, I expose the power relations that allow them to be represented as such, and call for a problematization of the process through which Candelaria is (re)constituted as a microcenter of diversity.

For this chapter, and the next, I rely on several of PROINPA's key texts as representatives of its discourse about Candelaria¹. I also use the data from the interviews that I conducted with farmers in Pie de Gallo, Pie de Gallo Alto and several other communities in Candelaria. In addition, I use the data from the interviews that I conducted with PROINPA staff in Candelaria and in the offices in Cochabamba. It should be recalled that due to the challenges I had conducting field work in Bolivia (discussed in detail in Chapter III), and the limited time I had in which to conduct the interviews with farmers in the field, the number of informants that I rely on is small.

Candelaria: a traditional agro-ecosystem?

PROINPA describes Candelaria's socioeconomic character through a brief description of its salient social and economic characteristics (Gonzales et al., 2003). The population is young (42% is between ages 16 and 51), mostly literate (77%), and mostly bilingual (with Quechua as a first and Spanish as the second language). The main productive activity is agriculture but some people also have other occupations such as masonry, carpentry, commerce and transport. Between 60 and 70% of farmers in the area migrate to the Chapare tropics for part of the year, and many (30% of migrants) own land in the tropics. There are three main wealth categories based on land and cattle tenure,

¹ The main text that I use is the book recently published by PROINPA about Candelaria. The second chapter of this book, titled "Agroecological and Socioeconomic Description of the "Candelaria" Microcenter of Diversity" is of particular interest as it shows how PROINPA reads Candelaria.

working ability of the family, and availability of capital to purchase agricultural inputs and to hire labour. Many of those in the higher wealth categories have purchased lands in the lower altitude zones of Colomi (such as Corani Pampa) where they cultivate a range of different crops. The area is well linked by asphalt road and public transportation routes to the cities of Cochabamba and Santa Cruz, and to various urban and peri-urban markets. The area is a former hacienda that was converted into a sindicato during the agrarian reform of 1953. What is perhaps most important about this description is what it does not explain. Although these characteristics are informative, they are not discussed in any depth, nor are they contextualized in the broader social, political, economic or environmental history of the area. Neither does the text explicitly relate any of these characteristics to the conservation or erosion of genetic diversity.

What does link the people of Candelaria to the diversity in the area in PROINPA's texts, is their alleged "traditionality". These excerpts from an article in the Plant Genetic Resources Newsletter published by the Food and Agriculture Organization (FAO) and the International Plant Genetic Resources Institute (IPGRI), and from PROINPA's 1995-'96 Annual Report are illustrative of the institution's representation of Candelaria and its people:

Farming in the area of Candelaria is *fundamentally traditional*. The *methods of farming practiced for centuries are still used* by farmers and local cultivar seeds are part of this tradition. Seeds are one of the most precious resources *a farmer has and great care is taken in conserving them*. This *respect and care for seeds* has been *passed down through generations*, so that *the Candelaria farmers have held on to valuable traditional germplasm*. Compared with other regions of Cochabamba,

Candelaria has a maximum concentration of *native oca, papalisa, isaño and potato cultivars*. In fact it *is considered* to be a microcenter of Andean tuber biodiversity (Terrazas and Valdivia: 1998: 9. emphasis added).

As owner and *protector of sources of Andean tuber germplasm...*, the *farmer family* was, and is fundamental to the *traditional strategies and processes* that allowed the preservation of biodiversity in the (in situ) *centers of origin*. The distribution of populations, ethnicities, and communities in specific ecologies, is linked to the distribution of a diversity of crops in microcenters where important collections of *traditional germplasm* were concentrated and maintained (my translation, emphasis added. PROINPA, 1996: 69).

Most PROINPA publications - articles, annual reports, project documents, theses, and the recently published book on PROINPA's research findings of the past ten years in Candelaria - are sprinkled with terms such as "traditional agriculture", "traditional Andean tuber production", "traditional knowledge", "traditional [crop] rotations", and "traditional seed flows". This language is not exclusive to PROINPA but is common to the broader discourse of *in situ* conservation. Take for example the following two excerpts from a compilation of articles on *in situ* conservation:

Vital to the future potential of many crops are the landraces of them that are grown by many *traditional* farmers. Since the tendency has been to *replace such traditional systems with modern agriculture*, serious genetic erosion is occurring. The best people to preserve these *traditional varieties in situ* are the *farmers and native inhabitants* themselves. The *in situ* conservation of *native systems of agriculture* could be vital for the future of various crops such as maize and potatoes (Prance, 1997: 10. my emphasis).

Farmer-based conservation involves the maintenance of *traditional crop varieties* or cropping systems by farmers within *traditional agricultural systems*. On *traditional farms*, what are

generally known as ‘land races’ are sown and harvested; each season the farmers keep a proportion of harvested seed for resowing. ... This is perhaps the most recent technique for genetic conservation recognized by scientists, but has obviously been practiced by *traditional farmers for millennia* (Maxted et al. 1997: 29. my emphasis).

None of these texts explain, or problematize, the possible meanings of the important term “traditional”.

The term “traditional” has been used profusely in the anthropological and agricultural development literature to describe agricultural systems that use few or no external inputs such as commercial and improved seed, chemical fertilizers and pesticides, modern agricultural machinery, and irrigation. The term ‘traditional’ has also often been used to describe systems that are mostly subsistence oriented, having little engagement with markets beyond their immediate surroundings (Sanabria, 1993: 5-8)². According to Altieri (2000), although traditional agricultural systems vary, they have the following structural and functional characteristics in common:

1. The combination of a large number of species
2. The exploitation of a variety of micro-environments whose soils, temperatures, altitudes, slope, fertility etc. differ within one plot or region
3. The maintenance of closed cycles of materials and refuse through effective recycling practices
4. The reliance on complex ecological interdependencies that result in some degree of biological suppression of plagues
5. The reliance on local resources, human and animal energy, and little outside inputs
6. The reliance on local varieties and wild plants and animals. Production is generally for local consumption; and non-economic factors have substantial influence on decision-making (Altieri, 2000: 17-18).

² For a more detailed discussion of the theoretical roots of the well-entrenched myth of the “subsistence-oriented” and “traditional” peasant, see Sanabria, 1993: 5-8).

In spite of this grounding of the term “traditional” in the characteristics of certain agricultural systems found around the world today, many of which are indeed remnants or modifications of previous or historic systems, it is also important to take note of the philosophical underpinnings of the word “traditional”.

The use of this term with regards to agricultural systems has its roots in early anthropological and peasant studies literatures, which, having modernization theory as the context for their emergence, defined traditional societies as the opposite of modern, dynamic, growth oriented, capitalist agriculture. As I have discussed previously, while modernization theory and its proponents generally saw the traditional as the antithesis and binary opposite of the modern, a condition that could and should (according to its proponents) be remedied by the forces of modernization and market insertion, many of its opponents have idealized the traditional as a pure, and original state of society and of nature. Although the latter has been done with the intent of protecting this purity, it establishes the “traditional” as somehow removed, or isolated from, modernity, and importantly, as a place, or people, whose history has stood still, or remained in the past. As Massey (2005) explains, this is an impossibility because places are not only local. Places, she explains, are constituted as much by their “internal” dynamics as by their connections with the outside. They are at once local and global. If the places outside the microcenter are changing and evolving, the inside cannot remain unchanged. There is nothing that can put an impermeable barrier around the local; there is nothing that can interrupt its connections with the global.

The underpinnings of the word “traditional” can also be understood through the lens of what Latour (1993: 99) argues is the second (or external) Great Divide that characterizes “modern” thinking. As I have discussed, the first divide is the separation between society and nature. The second is the cut between Western society, defined by its use of science and scientific knowledge to understand and explain nature (and thus separate society from nature), and what Latour calls “other cultures” (1993: 99). Other cultures, by virtue of their lack of separation from nature, due to their knowledge being read through culture, are considered part of nature. They are conflated with nature, and thus, the social (of “other” cultures) is washed out of nature.

On the surface, Candelaria could (mistakenly) be interpreted as a “traditional” agro-ecosystem. The use of certain agricultural tools reminiscent of Inca times, the predominantly Quechua speaking population, the few items of colourful clothing sported by the people from time to time, the use of reciprocal labour sharing arrangements, the chewing of coca, but most of all the cultivation of numerous varieties of “native” potatoes, and other Andean crops impart to Candelaria a certain aura of traditionalism, particularly to the uninitiated³. Thus Candelaria is easily represented or categorized as a “traditional” agroecosystem, that like so many others around the world are described by conservationist discourses as being threatened with being irreversibly damaged by modern forces. However, a closer look at Colomi/Candelaria, and the relative quantities and different types of varieties cultivated there, and the ways in which they are cultivated,

³ Zimmerer writes about much the same phenomenon in Paucartambo, Peru, to where tourism agencies lure foreigners describing the area as timeless and traditional (1996:2).

raises questions as to the suitability of this term to describe Candelaria/Colomi, and as to the effects of its use.

Colomi, the municipality to which the county of Candelaria belongs, is generally known in Bolivia as a potato producing area. It is considered a high potential area for the production of potatoes (Gonzales et al., 2003: 4) and in fact, its average potato yields are estimated to be higher than the departmental and national averages (Gobierno Municipal de Colomi, 2002: 86-87). Colomi is known for the large quantities of commercial potatoes sold in its market, for the quality of these potatoes, and also for the diversity of potatoes that can be found in the market. In PROINPA's publications, however, what is emphasized is the cultivation of a vast diversity of "native" potatoes. This is evidently due to the institution's interest in the conservation of these potatoes, and is part and parcel of its strategy to make Candelaria a genetic diversity reserve and tourist attraction. However the market does not reveal nearly the amount of diversity existing in the area. Visitors hoping to find rare "native" varieties at the markets are sure to be disappointed. As Hellin and Higman write, "The Colomi area is well known as a center of potato diversity, but where are all the other varieties?" (2003: 1).

The potato varieties cultivated in Colomi can be divided into three classes: "native" non-commercial varieties, "native" commercial varieties, and "improved" commercial varieties (Table 2⁴). Apart from their being "native" or "improved", and

⁴ The grouping of the varieties listed into different classes was done with the help of Julio Gabriel, one of PROINPA's breeders. There was some doubt regarding the class into which some of the varieties listed should be placed. This is, at least in part, because of the overlap and similarity of some of the varietal names, and because of the "native" provenance of the "improved" materials. As will be discussed in Chapter VI, there is also considerable question as to what the word "native" means in the context of classifying potato varieties in Candelaria.

Table 2 All Varieties Listed for Candelaria/Colomi

<u>"Improved" Varieties</u>	<u>"Native" Non-Commercial Varieties</u>	
Americana	Ajawiri	Pinkilo
Argentina papa	Amajaya*	Puka imilla
Azul ñawi*	Bola canastillo	Puka Lluthá
Bola toralapa*	Bola Luki	Puka mama(ita)
Doble H*	Bola runa	Puka ñawi*
Desiree*	Ch'aska imilla	Puka Pali
Jaspé	Ch'ejchi canastillo	Puka Qoyllu*
Jucuta Papa*	Ch'ejchi wawilu	Puka runa
Kori songo*	Choqo runa	Puka tani
Holandesa	Chúi phureja	Puka t'ica imilla
Mosoj sepa/ Rosita*	Ch'uisillo*	Puka Waych'a
Perla	Ch'urcu runa*	Qéto papa
Puka Toralapa*	Condor imilla	Rosca Pureja
Robusta	Condor uña	Runa papa*
Runa Toralapa*	Condor wallak'u	Saululu
Wayna sepa	Cuchi sullu	Sani runa
Yunga papa/ Yunguy*	Culi	Sani/ Imilla/ Toralapa*
	Ikari	Suta mari
	J'hose papa/ J'hoseña*	Tani papa
	J'achun/Kachun papa	T'anta wawa
<u>"Native" Commercial Varieties</u>	K'ellu phureja	Uthuruncu
<i>Introduced</i>	K'ara pierna	Waca Chilena
Chola Imilla	K'ellu amajaya	Waca luron
Imilla Blanca*	K'ara walluk'u	Waca pierna
Sani Imilla*	K'atawi*	Waca q'allu*
Waych'a*	Keto Luki	Wila imilla
	Khuchiaka	Yana canastillo
<i>APROTAC</i>	Kóje imilla	Yana imilla*
Bola qoyllu	Kúnurana	Yana lunca
Canastillo/ Machuwañuchi*	Lila papa	Yana pali
Candeleró*	Llogallitu	Yana sani
Pinta boca*	Lluthá*	Yuraj canastillo
Puka Wawilu*	Lunca/ Lunka Imilla*	Yuraj candeleró
Wawilu (yana/ yuraj)	Lunka Pintada*	Yuraj lluthá
Yana Qoyllu	Luk'i	Yuraj Pali
	Monte phureja*	Yuraj P'alta llusta
	Mora papa	Yuraj phureja
	Moyonqollu	Yuraj qoyllu
	Ñojcha (wagachi)	Yuraj Runa
	Othutunku	
	Pali papa	
	Palta Luki	
	Papa rosa	
	Perla	
	Phureja/ Kinsa Killero*	
	Phureja menor	

*Varieties planted in study communities

Sources: Gonzales, 2003; Salazar, 2000; Terrazas, 2003; Almanza, 1994; data collected in study communities, 2005.

“commercial” or “non-commercial”, these classes of varieties differ in the ways they are cultivated, in their agronomic and tuber qualities, in their values to farmers, and in the ways that their cultivation is affected by socio-economic trends affecting the area.

Most of the “native” non-commercial varieties are very difficult to find in the market. They are used almost exclusively for home consumption, as gifts, and for special occasions being highly valued as food because their high dry-matter content makes them tastier (richer and more pleasant in texture) and quicker to cook than other types of potatoes. Some of these varieties are valued because they are resistant to cold weather. These varieties are used to make *chuño*, freeze dried potatoes. Most “native” non-commercial varieties are known to be susceptible to several of the pests and diseases in the area (late blight, root rot, and potato weevil), which are less common in the cooler temperatures of the high altitudes. They are also known to “prefer” well-rested soils, or *phurumas*. For the most part, these varieties are grown in small plots of mixed varieties. They are rotated with oats, and after 2 or 3 agricultural cycles the plots are left fallow for 10 to 15 years. The land is mostly prepared by hand or using ox-drawn ploughs and is exclusively rain-fed. Organic fertilizers, mostly from family farm-animals, such as cows and donkeys, are applied. Agrochemicals are almost never used on varieties and plots that are destined for home consumption (Villaroel, 2002: 29). Seed of these varieties is “renewed” by moving it to higher altitudes and is mostly selected at harvest time and stored until planting time (*ibid*: 28).

With support from PROINPA, the Native Potato Growers’ Association of Candelaria (APROTAC) began to select, wash, package and sell seven of the most

common “native” varieties: *Pinta Boca*, *Candelerero*, *Yana Qoyllu*, *Canastillo*, *Puka Wawilu*, *Wawilu* and *Bola Qoyllu*. These varieties were selected by APROTAC based on their demand among city dwellers in various parts of Bolivia, and because of their yield potential and their robustness for transportation and handling. Although these varieties’ agronomic and culinary characteristics are for the most part similar to those of the “native” non-commercial varieties, because of their commercialization, these varieties are grouped with three other widely grown “native” varieties: *Imilla Blanca*, *Sani Imilla* and *Waych’a*⁵ into the class of “native” commercial varieties. A major difference between these three varieties and those commercialized by APROTAC, according to PROINPA scientists and local farmers, is that they are more resistant to the pests and diseases in the area and thus are cultivated in the three agro-ecological zones. Almost everyone in Candelaria plants at least one of the “native” commercial varieties. They are an important part of farmers’ commercial potato production, and are also commonly consumed in everyday meals. I will come back to these varieties in my discussion of the commercialization of native varieties in the third section of this chapter.

The improved varieties include varieties such as *Puka Toralapa* and *Azul ñawi* that emerged from formal breeding programs (both national and international) and have either been formally introduced to the area, or have made their way there through farmers’ seed networks. Although some farmers eat these varieties from time to time,

⁵ While *Waych’a* was introduced to the area from other parts of Bolivia in the 1960s, *Imilla Blanca* was widely cultivated since the time of the haciendas. It is not known whether *Sani Imilla* was also introduced to the area or if it is actually “native” to Candelaria. Healy quotes Mauricio Mamani, an Aymara anthropologist who cites the widespread distribution of *Sani Imilla* as one of the few examples of US and Bolivian government programs that promoted the use of “native” varieties in the 1950s and 60s (2001: 28). This suggests that it is not necessarily “native” to Candelaria.

they do not value them as food because they do not taste as good, or cook as fast as the native varieties. One farmer told me “Toralapa doesn’t serve as food. You can eat [it] for one week but not after. You can’t. The stomach can’t. Those *Waych’as*, *Gori Songos*, those you can [eat].” Only one of the farmers I spoke with in the area admitted to eating “improved” varieties on a regular basis.

Commercial potato production in Candelaria takes place mostly on the mid altitude slopes and in the flat lowlands of the valley (Terrazas and García, 2003: 7). Here potatoes are grown in larger, mono-varietal plots. They are rotated with other Andean roots and tubers such as Oca, Isaño, and Papalisa, and with oats and/or tarwi, after which plots are left fallow for 2 to 4 years. Land in the flat zone is prepared using oxen or tractors. Although most plots are rain-fed, some farmers use irrigation. The use of chemical fertilizers, pesticides and fungicides is common. The most common fertilizer is manure from urban chicken farms, which is used in considerable (and apparently growing) quantities by 90% of the farmers in the area (Villaroel, 2002: 28; Gonzales et al. 2003: 7). Seed of improved varieties is bought from markets more often than it is kept from farmers’ own harvests.

What is immediately striking about Table 2, is the number of “native” non-commercial varieties listed, and their numbers in relation to those of the other two classes of varieties. “Native” non-commercial varieties vastly out-number commercial varieties in the compiled list. “Native” non-commercial varieties also represent the greatest number of varieties planted in the study communities (Table 3)⁶.

⁶ The relative difference in number of “native” non-commercial varieties and the other two classes of varieties at the community scale is far smaller than at the larger scale represented in Table 2.

Table 3 Varieties Cultivated in Study Communities

<u>Classes of Varieties</u>	Number of Varieties	% of Total Number of Varieties
“Native” non-commercial	15	45
“Native” commercial	8	24
<i>APROTAC</i>	5	15
<i>Introduced</i>	3	9
“Improved”	10	30
Total	33	100

Source: Interviews conducted in study communities, 2005

The large number of these varieties represents an important source of genetic diversity and this is why they are of so much interest to PROINPA and other conservation oriented organizations. The relative quantities of seed of the different classes of varieties cultivated in Candelaria however are given less attention. Although the number of varieties is important, the quantity of seed of the various varieties also provides important information about Candelaria and its people. It provides insight into how they distribute their time and resources (land, labour, agricultural inputs), and hence provides an alternative window into the relative importance of “native” varieties in their agricultural system.

The data collected in Pie de Gallo and Pie de Gallo Alto show that a large majority of the potato seed planted (86% by weight) in these two communities is commercial seed. More than 50% of the total is seed of ‘improved’ varieties⁷ (Figure 4).

⁷ Terrazas and García (2003: 7) do mention that 70% of production is sold, but they do not mention the make-up (“native” or improved) of this 70%.

Figure 4 Percentage of Total Weight of Seed Planted in Study Communities Represented by the Three Classes of Varieties (total weight = 22,260 kg)
Source: Interviews conducted in study communities, 2005

Only 14% of the total weight in seed planted in the two study communities is of “native” non-commercial varieties. Of course, this does not automatically mean that these varieties are less important to the farmers than the commercial varieties. The survival of “native” varieties in the area is probably one of the best indications that they are very important to the local people. What the relative quantities of the different classes of varieties planted do suggest however is that the portrayal of Candelaria as a “traditional” agricultural system leaves out a substantial and obviously very important part of the production system.

The data show that Pie de Gallo and Pie de Gallo Alto are principally commercial potato producing communities. Seeing that commercial varieties, and more specifically

the improved varieties are cultivated on larger, more intensive, mono-varietal, and sometimes mechanized and irrigated plots using chemical fertilizers and pesticides, and importing large quantities of manure from nearby cities, it is difficult to interpret the production system as simply “traditional”. If we recall Altieri’s description of a traditional agro-ecosystem discussed above, Candelaria only fits two of the six criteria: the combined cultivation of a large number of species, and the exploitation of various different micro-environments (Altieri, 2000: 17-18). Candelaria does not have closed cycles of materials and refuse, nor does it suppress plagues biologically, nor does it rely only on human and animal energy, rainwater, local varieties and wild species. Finally, by no means is production in Candelaria “generally for local consumption” (*ibid.*). Therefore, Candelaria’s agro-ecosystem would perhaps be more suitably described as a mixed, or hybrid system.

In thinking about Candelaria as a “traditional” agroecosystem, and considering “traditional” to refer in some way to an original or pure state, it is also important to notice other aspects of the system. For example, the main animals in the system are sheep, cows, and horses, none of which are originally from the Andean region. Sheep, imported to Bolivia by the thousands during the 1960s, as part of a massive agricultural modernization campaign, are known to have caused considerable damage to native shrubs, grasses and pasture and degraded soils, in many places beyond repair (Healy, 2001: 26). The Andean camelids, the llama and the alpaca, are conspicuously absent from Candelaria’s agroecosystem. Similarly, oats, barley and broad beans, which are important

parts of the system, are not native to the region (or the continent). Oats and barley were also introduced in the 1960s as forage for livestock.

Another aspect of Candelaria's agroecosystem that can be mistaken as being "traditional" or unchanging from its original state are the non-wage, reciprocal arrangements that the local people make among themselves in order to share their labour at crucial times in the agricultural cycle. While these social relations – *ayni*, *mit'a*, *companía* to name a few – have deep historical roots and stem from the Andean ideology of reciprocity, they have been changing over the years. Sanabria (1993: 147) illustrates this point by explaining the changing meaning of the *mit'a* as it passed from being used by Andean communities to organize their labour allocations, to serving as an imperial tool of the Incas, and later into a form of forced labour under the Spanish colony. In his study of contemporary Pampa, a community not far from Candelaria, Sanabria looks at the distribution of agricultural labour in face of the massive migration of many community members to the Chapare during the 1980's coca boom. He explains that behind what looks like a non-wage and reciprocal labour arrangement surviving from pre-Incaic times, is a social practice that has been strengthened as a result of these migrations and the ensuing shortage of labour in the community. As such, these labour practices although not wage- based themselves help, indeed allow, the community's integration to the market economy (Sanabria, 1993: 147). Today, even PROINPA cultivates potato and other roots and tubers in *companía* with Candelaria farmers: the institution provides the seed and the fertilizers and the farmers provide the land and the

labour. The persistence of these labour relations, in places such as Pampa and in Candelaria, then cannot be taken as an indication that they are *still* “traditional” societies.

A final indication that Candelaria cannot be considered “traditional”, this time in the sense of being isolated and only local, is that many of Candelaria’s people migrate seasonally. Many of them go to the Chapare to cultivate coca (among other crops). Their displacements to this area, the money they make there, the relationships they establish with other farmers in the tropics and with other land owners and coca intermediaries, the violent repression at the hands of police and anti-drug units, their organization into the *cocalero* movement, their mobilizations in support of the MAS party, and so on, connect the people in Candelaria politically far beyond their borders. This makes them much more than local, traditional people.

These and other examples seriously question the claim that Candelaria can be considered “traditional” in the commonly used sense of the word. The effects of the use of this term are far from trivial but should not be interpreted as the conscious intent of PROINPA and the proponents of *in situ* conservation. As I have discussed previously, PROINPA acts based on its knowledge, on its worldview, and on its genuine “will to improve” (Li, 2007).

In terms of the effects, or what it enables, in the case of Candelaria, the concept of the “traditional” agroecosystem is one of the characteristics that led to its selection as a pilot site for PROINPA’s *in situ* conservation activities. As such, it is an important channel (but certainly not the only one) through which Candelaria *becomes* a microcenter of diversity. Moreover, by “purifying” the nature in this place, making the society part of

nature, the center of diversity becomes a truly natural habitat. In more than one way then, the concept of “traditional society” plays a role in the justification of the conservation program in Candelaria.

This presumed characteristic of Candelaria’s people (and importantly of their knowledge) also makes them seem different from PROINPA (and its knowledge). It makes them fit squarely into the idea of “stewards of biodiversity” used in the “biodiversity network” to refer to small-scale farmers in the developing world, who take care of, and preserve, landraces. This makes Candelaria’s people an object of PROINPA’s studies of traditional agricultural knowledge and management practices, (as I will discuss in the next section). The knowledge derived from these studies (always partial and subjective) in turn becomes the basis for the norms by which PROINPA decides which practices are acceptable in Candelaria given its status as microcenter of diversity, and also through which it attempts to “conduct” the local population’s behaviours (Gordon, 1987, cited in Allen 2003: 77). This knowledge earns the institution the authority to speak on behalf of Candelaria, and to recommend ways in which it can maintain the diversity that is found there. The importance of PROINPA’s description of Candelaria as “traditional” can therefore not be overlooked, it is an important part of the discourse that it enacts in Candelaria (Gregory, 2001).

If, stemming from the above analysis, we determine that Candelaria is not “traditional” because it shows many signs of not fitting the commonly used definition of the term, and because elements of its presumed “traditionality” have in fact changed in the course of the place’s history. What if the concept of a “traditional society” is

understood as unviable because, after Massey (2005), no place and no people have stood still while the West developed and moved to conquer the rest of the world, and because, after Latour (1993), the two great divides that characterize modern thinking are just that, parts of the way we think, but not necessarily an adequate reflection of the world as it is. Would Candelaria be as attractive a place to set up a biodiversity reserve or conservation area? Would it fit so nicely into the ideal set up in the *in situ* literature of traditional societies living in “natural habitats”?

Given that the area’s “traditionality” was one of the criteria in its selection as pilot site, the answer is probably negative. However, given Candelaria’s other attractive features (one of which is the topography which will be discussed in Chapter VI), perhaps PROINPA would want to maintain its activities there regardless. In this case, it would be forced to describe Candelaria and its people otherwise. It would be encouraged, perhaps, to recognize the hybridity and the historicity of these people. In so doing the terms of their recruitment into the biodiversity network, the positions they take, and thus the “order” or worldview that they have a role in forwarding would need to change, and hopefully would be openly negotiated amongst all those involved.

“Stewards of Biodiversity”

As argued above, Candelaria’s presumed “traditionality”, and its inhabitants’ “ethno-botanical knowledge”, likens the people the “stewards of biodiversity”, a term commonly used in the “biodiversity network” to refer to small-scale farmers in the developing world, who take care of, and preserve, landraces. In this section, I discuss

Candelaria farmers' views and perceptions with regard to their cultivation of potato varieties of conservation interest. I discuss two groups of farmers. The first are a group of six farmers who worked closely with PROINPA and were at one point labelled "farmer conservationists". The second is a group of nineteen farmers whom I selected as representative of the communities of Pie de Gallo and Pie de Gallo Alto⁸. This discussion provides a window into the silences in PROINPA's discourse. It sheds light on the current situation of Candelaria's farmers and thus allows a more nuanced understanding of what it takes to be, or to become, a "steward of biodiversity", and of the difficulties that Candelaria farmers face in cultivating the diversity that they do.

Six farmers were drawn to my attention by PROINPA for being, or having been, "conservationist" farmers. The exact definition of this term is a bit elusive as many questions arise as to who gives farmers this label, based on which criteria, and for what purposes. I was given these persons' names by one of PROINPA's field staff in Candelaria when I asked if he knew of any farmers who "stood out" because of their maintenance of large numbers of varieties. A few days later he retracted on the label "conservationist farmers" that he had used saying that these were rather, and simply, the people who had most worked with PROINPA on conservation related activities. His oscillation can be understood in the context of PROINPA's abandonment of the label, as is reflected in their cessation of its use in their literature. I interviewed all six of the farmers that the PROINPA staff named.

At the time of the interviews, only two of the six "conservationist farmers", continued working with PROINPA. One of them, a 24-year-old man cultivated 45 potato

⁸ The selection method is detailed in Chapter III.

varieties (in addition to 25 Oca varieties, and 17 Papalisa varieties). He said that he had inherited most of these varieties from his grandfather and his father, receiving only around five varieties from PROINPA. He had been a source of varieties for the scientists and for other farmers in the area:

I don't sell. I only take to the fair for the people to see. Some want to buy, others not. Many people ask me about the potatoes. How is this? How? How? How? Wow! They get excited by some of them... They always ask me for potatoes, when I am at the fair and I take my potatoes. There I sell in small bags. They take for seed. It comes to one Boliviano⁹. (Alberto Dominguez¹⁰, personal interview, 2005)

When I asked Alberto what motivated him to cultivate so many varieties, he said that he did it to get help. He wanted help to buy fertilizers and to rent more land so that he could plant more varieties:

I want them to help me. Of course, if they help me, I could plant more. We buy fertilizers; for that we need money. At times there are international interests and they help, you see? That's it. If they help me then I could plant more, you see? I could manage varieties of everything. We could sell all the varieties (*ibid.*).

Here we also need lands to cultivate more. The land is already tired. Here the land almost doesn't rest, you see. We plant year after year. For that, some people want to rent us their lands but for that we need money, to plant more. They have rested lands. ... Oh, the land is tired now. Now in the soil there appears [diseases], those things enter now, you see? It doesn't give any more. Fertilizer, wow! We put a lot of fertilizer (*ibid.*).

⁹ This is roughly the equivalent of 8 cents, for a small bag of 1 kg.

¹⁰ All the names in this section have been changed in order to protect the identities of the farmers who I interviewed.

Alberto went to great lengths to maintain the varieties that he did: “I sacrifice myself always. I always take care like this, well. We fumigate up to 5, 6 times, depending on the humidity. ... Some [of the potatoes] are a bit delicate. It costs. That’s why I don’t plant a lot, only a little bit of each variety”.

When I asked him what he thought would happen if he did not do this work, he said that the varieties would be lost. And what if no help arrived in two, three, five, ten years? He said, “Of course, if I’m alive, it continues... I will manage these varieties on my own... That is why I plant [commercial potatoes], you see? Papalisas, potato... I sell in the market; it’s just for that.” Alberto was of the opinion that potato varieties were slowly disappearing from the area. He named a couple of varieties saying that a PROINPA scientist had introduced them to him and that he had cultivated them ever since. He knew that nobody else in his community, nor in Candelaria, cultivated as many varieties as he did. “Here they manage only *Waycha*, *Toralapa*, *that Yana qoyllu*, *Candelerero*, *Pinta Boca*, those, ... *Papalisa*... Those are the only ones that people are managing”.

The other farmer who had continued to cultivate many varieties and who was still working with PROINPA was a 65-year-old man, Tomás Alvarado. At the time of the interview, he cultivated 36 potato varieties. He had been working with PROINPA for three or four years. Before that, he used to cultivate around 12 varieties. However, he had accidentally lost all of them. When he began working with PROINPA, the scientists gave him a new collection of varieties. He explained:

I used to plant our potatoes, and [the *ingeniero*] used to bring me other potatoes. I used to plant *Chola Imilla*, *Papa runa*, *the Qoyllu*, *Yogalla papita*, *Waka Lorum*, *Amajaya*, a long time ago. Then I lost them and the *ingeniero* brought me around 36 varieties saying, “You won’t lose them again” (Tomás Alvarado, personal interview, 2005).

Don Tomás had several reasons for planting so many different varieties:

To take to the fair, that is why I have not lost them... I want all the classes of varieties to produce; and some of my friends want me to have seeds to give them. That is why I do not want them to get lost. More and more, I want them to increase. I have won fumigators and *picotas* by going to the potato fair. I have won potato seed, and also a clock that rings every hour. I want to produce potatoes to win. I do not want them to disappear (*ibid.*).

He also wanted to maintain the varieties as a show of gratitude to PROINPA for having given him the varieties after he had lost his own.

Don Tomás did think that certain varieties were being lost from the area. “They don’t plant any more. That *Chola Imilla*, has been tired for a long time. Only *Waych’a* produces big potatoes. The *Chola Imillas* are totally tired for the soil; they are no good any more”. He thought that he was the only farmer, or one of only a few who was getting many varieties from PROINPA. “Other people” he said “only plant five, six, seven varieties. They don’t plant more”. He said that many people in the area would see his varieties and would ask him for some. He was a source of seed for some of his neighbours, but not for all. Few other farmers in his community planted as many. Only a few, according to him, planted up to ten or twelve varieties as he did before beginning his work with PROINPA.

He said that it was not easy to maintain so many varieties. It was hard work. It was very time-consuming to keep them all separate¹¹. He said that he needed sacks to pack and transport the potatoes; and he needed money for the fertilizers because he used a lot, and they were expensive. However if he did not plant many of these varieties, Don Tomás was of the opinion that the “native” varieties would be lost from the area.

The four other farmers who were mentioned to me as “farmer conservationists”, no longer worked with PROINPA. Don Benigno Salgado was a 39-year-old man from Rodeo Alto, one of the communities in Candelaria in which PROINPA had worked the most. Don Benigno had begun working with PROINPA ten years prior to my research. As a member of the Association of Native Potato Producers of Candelaria (APROTAC), he had worked with the “garden of varieties”, and on an individual basis with PROINPA scientists. He had attended several technical courses offered by PROINPA in order to work with the institution as a local liaison in the area. He was a leader, having occupied a number of political and organizational posts at the community and the municipal level. He was also an entrepreneur. He owned a truck and transported sacks of potatoes to and from Candelaria on market days. He was also trained as a mason and practiced this profession when he obtained contracts to build houses. In sum, Don Benigno was not a usual farmer. He was more highly educated, better off, and probably better articulated in social and political circles than most of his fellow community members.

At the time of the interview, Don Benigno was cultivating 11 potato varieties (6 native-commercial, 2 native non-commercial, and 3 improved). When I asked him why

¹¹ In Candelaria many farmers plant many of their “native” non-commercial varieties mixed with one another in one field.

he had so many varieties he said that it was because he had land in many different areas and that because of this his *qoyllus* got mixed. He also said that it was advantageous to have many varieties because on different years, depending on the climate, some varieties perform better, and others worse. “A farmer has to consider everything, to see where he can draw advantage,” he said. In spite of this, he did not cultivate as many varieties as he had access to. He had a brother who lived in the higher altitudes and managed a broader range of varieties. But Don Benigno was not interested in cultivating any more varieties than those he currently cultivated.

Before working with PROINPA, he cultivated fewer varieties and was interested in obtaining seed of varieties that he did not have. However, he had only slightly increased his number of varieties as a result of his work with PROINPA. He said that only around half of his community cultivated as many as he did, and he was very sceptical of accounts of other farmers cultivating much more. “Who can plant thirty-five varieties?” he asked. “They can go up to twenty; but thirty five? I don’t believe”. At the time of the interview, he no longer worked with PROINPA because he felt that it took too much of his time, and that he did not benefit in any way. He did not think that “native” non-commercial varieties were being lost from the area.

Another of the “farmer conservationists” who had stopped working with PROINPA was a 60-year-old woman, Doña Gloria Martinez. Like most other farmers in the area, she had obtained her varieties by inheritance from her parents, and from her husband’s parents. Her family had amassed many varieties because, having been poor, they worked on other farmers’ fields and were sometimes paid in part with seed. In

addition, she used to weave woolen blankets and her customers would give her seed to ensure that she would pay special attention while making the blankets that they had ordered. She liked having these varieties; and she collected them. When I asked her why, she said, “It’s that they blossom beautifully [together in one field]; and when we cook, some are *floury*, others are *watery* [some have different flavors]. I like that.”

Doña Gloria did not receive seed of potato varieties from PROINPA or any other institution, as did some of the other farmers interviewed in my research. Rather, she was a source of seed for the scientists. “They would take seed of all types of varieties; they did not bring. From here, they would take ... To where might they have taken them?” Like most farmers in Candelaria, Doña Gloria periodically bought seed from other places, including the communities of Pisli and Palqa in the higher altitudes around Candelaria, in order to ‘refresh’ her seeds. She explained however that it was not always easy to get seed from other people.

At the time of the research, it had been around five years since Doña Gloria had been working with PROINPA on conservation related activities. She had stopped because the potatoes no longer produced well, they were infested with diseases, and she had lost her seeds. Even the seed from other places, with time, she said, would get ‘tired’ and stop producing:

It’s difficult; it’s not cheap. That’s how I lose them. It’s work to work on the land and then when we plant, we eat the potatoes, sometimes we plant one load¹² and it all gets worms. The disease takes the potatoes and sometimes they freeze. Like this we loose the seeds, the *qoyllito* does not want to produce any more. It only produces on the good soils; it only produces on the slopes.

¹² One *carga*, the equivalent of 100 kgs.

She no longer went to other places to buy seed because she was too old and couldn't walk as far as before. She no longer wove blankets either. She only cultivated her eight, mostly commercial, varieties, and grazed her animals.

Her children were not at all interested in "native" varieties. The only one (of five children) who still lived in Candelaria only cultivated *Waych'a* and *Toralapa* (one native introduced, the other improved). Another lived in Chapare and "does not understand, is not interested". The remaining three were merchants, "They do not want to work the land" she said. They spent most of their time outside Candelaria and "they only have small lands" she said, "perhaps that's the reason".

Dofia Constantina was the only other woman in the group of six "farmer conservationists". She was approximately 25 years old and had, at one time, cultivated with PROINPA, not only potato but also various types of oca and broad beans. During this time, she had come to know several varieties that she had not seen before. However she stopped working with PROINPA because the field staff no longer came with seed for her to plant. She and her family had eaten the seed of almost all the potato varieties that they had planted with PROINPA because, due to their limited amount of land, they could only plant a bit of each variety. They did not feel that it was worthwhile to keep small quantities of many different varieties.

Don Romel Vargas, the last of the six "conservationist farmers", had also stopped working with PROINPA. At the time of the interview, he cultivated 15 potato varieties (6 native non-commercial, 2 native introduced, 3 native commercial, and 4 improved), but only for home consumption. He was concerned about the gradual loss of "native"

varieties from the area. He said: “we are worried for that. It’s from our grandfathers.

These potatoes have more nutrition... now those potatoes, the recent, more better ones, to eat, they don’t have nutrition... they don’t have taste”. However like the other farmers, he said that many of the native varieties did not produce any more. He said, “If people don’t take care of them, they will get lost”.

There are several interesting observations to be made about these six farmers. The first, and perhaps most evident is that only two of them continued their work with PROINPA. This was at least in part because of the production, economic, and time constraints that they had. All of them mentioned the difficulty and the challenge of maintaining “native” varieties. As I will discuss below these are the same constraints that many other farmers in Candelaria have, and are important factors in their waning interest in cultivating “native” varieties. These farmers’ withdrawal, and/or their inability to continue working with PROINPA is at least in part what led PROINPA to abandon the idea of “farmer conservationists”, and to concentrate on other ways of introducing genetic material, and ensuring that it is maintained in Candelaria.

It is also an indication that the labeling of individual farmers as “conservationists” or “stewards of biodiversity” as has been done in many projects and at times in the literature is at best a tenuous practice. These farmers (with the exception of Alberto and Tomás) do not seem to be very different in the numbers of varieties that they manage, and in their views and perceptions, to the farmers whom I interviewed in Pie de Gallo and Pie de Gallo Alto. This might suggest that all farmers in the area are “stewards of biodiversity” but that this quality is not determined by each farmer’s cultivation of

numerous varieties. This seems to be understood by PROINPA staff who, tracking the varietal dynamics (of Oca, Papalisa and Isaño) of 12 families in Candelaria, write “What is really interesting is the *aggregate diversity* of the ...families” (Terrazas and Valdivia, 1998: 14, my emphasis).

What is important about the withdrawal of four of the “farmer conservationists” is that it represents a sort of resistance on the part of these farmers to their enlistment as “farmer conservationists”. This is not an organized and vociferous resistance, but an every day form of resistance (Gregory, 2001: 98 citing Guha, 1989) whereby local people go about living their lives in ways other than those prescribed, or desired by governments and institutions. It is also important because it has encouraged a change in PROINPA’s discourse in Candelaria evidenced by the foundation’s abandonment of the concept and strategy of working with this type of farmer.

Another important observation stemming from this discussion of “farmer conservationists” is that four of the six farmers obtained most of the varieties that they cultivated from PROINPA. Several of the farmers whom I interviewed in Pie de Gallo and Pie de Gallo Alto said that they had obtained seed from PROINPA and that some of this seed had been unknown to them until it was introduced by the foundation. In addition, as part of its work with APROTAC, PROINPA has encouraged the creation of a community gene bank, or “garden of varieties” by which a range of varieties is cultivated by individual members of the association, on a rotation basis. This “garden of varieties”, and other channels of varietal reintroductions serve as a source of materials for farmers, and as a site for PROINPA’s research on local varietal management practices. More than

one PROINPA staff confirmed that many of the farmers with whom they worked did not know some of the varieties that they re-introduced. (I will return to this question of varietal re-introductions in the next chapter). What is important to note here however is the role of this practice in making these people “stewards of biodiversity.”

The work of Alberto and Tomás, the two farmers who did continue with PROINPA, consisted mostly in cultivating a much larger number of varieties than most other farmers in the area (who cultivate an average of 8 or 9 varieties per family), and in presenting their collections at the annual biodiversity fair organized by PROINPA. Several of the other farmers whom I interviewed (including one of the other “conservationists” mentioned above) did not believe that anyone could cultivate that many varieties. Moreover, both Alberto and Tomás indicated to me that they cultivated, harvested and stored each of the varieties in separate rows, piles and storage bags. Several other farmers in the area however told me that “native” varieties are normally mixed, in fields and rows, and particularly in storage. Both the number of varieties that these two farmers cultivate, and the way in which they cultivate them are quite unusual for people in Candelaria, and seem to be more the prescription of PROINPA than their customary agricultural practices. The two farmers’ comments with regards to their motivations suggested that they kept these varieties, at least in part because they were either responding to an expectation, or were under some form of agreement with PROINPA whereby they exchanged labour and land for seed and fertilizer. All of this raises questions as to whether these people were genuinely “stewards of biodiversity” (if

such an individual even exists), and to what extent they were ‘made’ to be such rather than already so when PROINPA arrived in the area.

The main difference between the six “farmer conservationists” and the farmers whom I interviewed in Pie de Gallo and Pie de Gallo Alto was that the latter had not previously worked with PROINPA. They were not considered “conservationists”.

Nevertheless they had very similar rationales, sentiments and concerns regarding their cultivation of “native varieties” in Candelaria.

In the Andes, it is often reported that farmers cultivate diversity in order to take advantage of a diversity of microclimates, and to avert the risks associated with pests, diseases and extreme climatic events, such as frost and drought. Needless to say, these rationales do form part of many or most farmers’ decisions and confirm the utility and instrumental value to farmers of a diverse collection of varieties. However, when I asked the farmers in Pie de Gallo and Pie de Gallo Alto why diversity persists in the area, their responses were quite varied and question what is often stated in the mainstream literature. Only 10% of the responses had to do with soils and access to soils. According to most of the responses given by the research participants, a diversity of “native” non-commercial varieties persists in the area because the people “like” their “native” non-commercial varieties (30% of responses, see Figure 5). They like their tastes, textures, colours, shapes, cooking qualities. They also value these potatoes as part of their custom, history, and their identity.

One woman whom I interviewed described nostalgically the variety that was her favourite when she was a child, *Khunurana papa*. She said it was very tasty, floury

Figure 5 Percentage of Total Number of Responses Regarding the Persistence of Diversity in the Area (total number of responses = 20)

Source: Interviews conducted in study communities, 2005

(*harinosa*), and when cut in cross-section, had a flower-shaped, pink zone in the pulp. She said that she had looked for it but could not find it. Another farmer who had previously told me that she and her husband were only interested in “*productive varieties*”, said that it was really only the older people who like to keep these varieties, “for tradition, because they have an appreciation for them (*un aprecio*), a taste (*un gusto*). They keep them to prepare special dishes. They don’t care if it doesn’t produce” she continued “as long as it produces something, it’s ok. People our age lose the varieties if they do not produce well, but we always have our potatoes to eat”. When I asked why,

she said, laughing, as if she were revealing a personal secret, “because they are good to eat in *papa wayk’u* (boiled with the skin), with cheese, with *yajuita* (a hot sauce made with *locoto* peppers)”. Yet another farmer spoke fondly and also nostalgically of *Pali papa*, which seems to have been “lost” from the area. He lamented what he perceived as a gradual decline of all the “native” varieties. When I asked why there was still a diversity of these varieties in the area, he said: “Yes, [the varieties] exist. You know why? Because we LIKE them; and even if it produces little, we always plant ourselves some. Well, it’s still enough for us to eat, but to sell, there is not enough... Just to taste them, we only plant a little, to eat.” They’re good to eat, I agreed. “That’s the detail” he responded.

Interestingly, some of these types of responses, as among the “farmer conservationists”, came from interviews with people who thought that it was inevitable that the “native” varieties eventually disappear from the area, and that they themselves were the culprits of their loss. Many expressed frustration at the lack of productivity and the disease susceptibility of the “native” varieties. For several of these people it was practically not worth planting any of these varieties at all. Often they would sow the varieties and barely harvest anything. One respondent said “For what will [I] plant? [I] lose the time, invest money, work...”. Another said “It’s not a matter of sowing for sowing’s sake. We plant what *produces*”. Several other participants asserted that losing the varieties was a deliberate choice of theirs (due to the low yields). “We don’t worry about [the potatoes that might be disappearing]” one said, “Because they do not produce. When a new variety appears, then we worry about how we are going to get it”. Yet another said, “What can be done? It’s us who made them get lost because they did not

produce well...I don't worry. It's us who have made them disappear". When I asked if something should be done to stop the erosion and/or disappearance of local varieties, most of the participants (63%) responded negatively. While some of these respondents did so because they did not believe that the varieties were threatened to begin with (an issue that I will come back to in the next chapter), others responded negatively because they thought that it was inevitable.

Given these responses it is easy to conclude, as does the mainstream agrobiodiversity erosion narrative, that local diversity is being replaced by modern varieties that are scientifically bred to yield more. A personal conversation with one of PROINPA's breeders confirmed that the "yield potential"¹³ of the local ("native" non-commercial) varieties could never equal that of the "improved" varieties. Not surprisingly, among the reasons given by the participants who thought that "native" non-commercial varieties were being lost, was their replacement with higher yielding materials (Figure 6). There is no doubt that some replacement is taking place. This is mostly due to the extraordinary take-up of the "native" -commercial variety *Waych'a* introduced from other parts of Bolivia, and which is used both for home consumption (replacing some "native" non-commercial varieties) and for market sale (replacing, in some instances, the "native" commercial variety *Imilla Blanca* that has been cultivated in the area for decades). *Waych'a* is a very attractive variety for farmers in the area because it tastes good, yields well, will grow in a range of soil and climatic conditions, and is

¹³ 'Yield potential' is used to express the maximum yield that a genetic material can produce (its potential) if cultivated in 'ideal' conditions.

Figure 6

Reasons Given by Research Participants for Why Varieties are Being Eroded from Candelaria (n=13)

Source: Interviews conducted in study communities, 2005

resistant to late blight and potato weevil. Few other varieties in the area combine these traits, which is why this variety is cultivated by 84% of the study participants, and alone accounts for 24.5% of all the seed they planted. However the story behind the apparent replacement of native varieties for improved varieties is more complex.

If the “native” non-commercial varieties have never yielded as much as improved varieties do, if they are cultivated almost exclusively for home consumption, and if their culinary qualities are not even distantly matched by modern varieties, it seems improbable that farmers would so simply compare their productivity to that of the modern varieties’ and replace them. Rather, many of the participants’ responses to my

questions about their varieties were about land. Some said that they had too little land; others said that they no longer had lands in the *phuruma* area. Still others mentioned that they had purchased lands in the lower altitude areas such as Corani and Cayarani (communities in the slightly lower elevations along the road to the Chapare) where they were busy planting commercial varieties. Many of the farmers with whom I spoke were not only saying that the “native” non-commercial varieties were not productive (enough), they were saying that these varieties “do not produce *here any more*” (my emphasis).

When I asked if they produced anywhere, several people explained that they do produce “in other places”, most notably in the higher altitude zones, *en las puntas*. This was confirmed by two of the PROINPA staff who work in the area. One said that in order to cultivate “native” non-commercial varieties, “farmers need to have access to adequate lands”. The other emphasized that it was “not in the whole area that people were having problems with low productivity”. Most of those who said that the “native” non-commercial varieties did not produce *here any more* were referring to the flat lands and the slopes. One elderly woman whom I interviewed said that before, these varieties used to produce also in the flat lands; but that now they only produce in the *puntas*. Another participant said:

Most of the native potatoes are cultivated in *barbechos* [rested lands], in the *phurumas*. And in this time, as there are no more lands, as there is not enough, then you have to plant like this, in the *q'allpas* [non-rested lands] only then. ...Of course, we can't, there is not enough [land] any more; so many people, then there are no more *barbechos*. That is why; it's for that reason that the native potatoes want to get lost... (Interviews conducted in study communities, 2005).

I asked several people if there were not enough lands in the higher altitudes for everyone to use, and all of them said that there were enough lands. Many even said that they had lands there that they did not use because they were too far away or too difficult to get to (without horses)¹⁴. This suggests that when some of the research participants said that there were not enough *barbechos*, they were not necessarily talking about lands in the high altitudes, but about rested, or fallowed land, on the slopes and perhaps even in the flatter areas. According to the farmers with whom I spoke, the reason why the “native” non-commercial varieties do not produce in the slopes and flat lands any more is because the soils are *tired*. They produce less and are infested with pests and diseases. This is most probably due, as the farmers say, to the fact that they are not allowed to “rest”, or go fallow, any more but are rather cultivated intensively season after season.

Several forces have encouraged, and led to, the over-exploitation of these lands. During the agrarian reform the *hacienda* that occupied the Candelaria valley was dissolved, and the land was given to those who had worked there. Each family received roughly 20 hectares of land¹⁵. Since then, however, the hereditary division of family landholdings among the children of each household has rendered smaller and smaller landholdings for each generation. Many families have struggled in vain to subsist on insufficient amounts of land and, not having enough money to buy or rent land in the area, have seen themselves forced to cultivate intensively and to minimize or eliminate

¹⁴ People from Pie de Gallo also complained that there was no road, only a footpath, from the community to the higher altitudes.

¹⁵ There is a pronounced inequality in landholdings both in quantities and qualities of lands in the area. This may be because even before the revolution, some peasants had already bought and/or rented lands from the hacienda owners so that at the time land was redistributed there was already an inequality in access to and ownership of land that has been exacerbated by the privatization of lands.

fallows. When this is still not enough, or when the soils lose their fertility and get infested with pests and pathogens, like much of Candelaria's lower lying areas, families are obliged to seek other sources of income, migrating to the Chapare or to the major Bolivian cities. This is a problem that is not only found in Candelaria but is prevalent throughout the valleys and plains of Bolivia. It is also prevalent in other parts of the Andes, particularly in Ecuador and Peru. According to Urioste, who writes extensively on land issues in Bolivia:

Since 1990, the third generation – the 'grandchildren' of the agrarian reform – cannot access lands in sustainable quantities. This is why they migrate more frequently to cities or they look for land in other parts of the country (Urioste, 2003: 6).

One of the Candelaria farmer "conservationists" who had worked with PROINPA for several years said that her children were not even interested in working the land any more, let alone conserving "native" varieties, because their plots were too small. They, like many other Candelaria residents (particularly the youth), found waged labour and other trades to work at instead. Many join the ranks of the thousands of highland and valley farmers that migrate to the Chapare to cultivate coca and other crops.

Other possible factors that encouraged the overexploitation of land in the lower-lying areas of Candelaria are government agricultural policies and international development aid. Since the Bolivian revolution and agrarian reform in 1953, successive governments, both in desperate and in relatively prosperous economic climates, have striven to "modernize" the agricultural sector, and particularly to increase potato production in the country. These efforts have been stimulated by foreign, mostly US, aid, in the form of funds and modern agricultural packages, of which Bolivia has been one of

the greatest recipients on the continent (Healy, 2001: 19). Needless-to-say, the lands most suited for modern agriculture, in terms of accessibility by paved roads, slopes, and importantly climate were the flatter and lower slope areas of the valleys. Although productivity was increased in many areas, particularly in the valleys of Cochabamba, and presumably in Colomi (and Canderlaria), government economic policies have caused a continuous decline in the terms of trade of rural food production. This, coupled with a growing rural population, rising input costs and progressively degraded soils, has led many Bolivian farmers to intensify production by increasing the use of fertilizers and by reducing fallows (Sanabria, 1993: 128-129).

Paulson's study in the province of Carrasco (2005) explains that nongovernmental organizations' agricultural development interventions in Cochabamba department have tended to focus on the spaces, crops, and activities that they interpret as productive. These projects have often led to the intensification and expansion of the area dedicated to commercial agriculture. Meanwhile they have tended to neglect higher lying areas and hillsides that have complemented those areas in providing a number of other products and services not considered commercial, or productive, but that are all the same, essential to the quality of life, nutrition, and well being of the local people:

In terms of the spatial organization of the landscape, this project (and, more importantly, the regional historical process of which it is but a minor part) motivated and facilitated expansion of the agricultural frontier, impelling farmers to open larger fields on increasingly steep slopes, which displaced and degraded the communal spaces that women and poorer families had been using for multiple purposes. ... As green areas are degraded and eroded with the expansion of commercial agriculture, women have to take their herds longer distances to find forage...(Paulson, 2005: 184).

It is possible that something similar to what Paulson observes in the arid highlands of Cochabamba happened in Candelaria just kilometres away. According to Almanza's study of Candelaria in the early 1990s (1994), one of the first PROINPA studies in the area, the number of commercial varieties in Candelaria rose in the 1980s due to the introduction of high yielding commercial varieties such as *Waych'a*¹⁶, *Lunka Imilla*, *Azul ñawi* and *Yuraq Toralapa*. The number of farming families also increased, due to population growth. He also observes that there weren't any more lands to put into production at that time. It seems unlikely, given this scenario, that there was not an intensification of production (as he reports p.95) in the lower lying areas. Additionally, according to the farmers he interviewed, the average quantities of seed planted of the "native" non-commercial varieties had not decreased (in the period between 1988-1993 p. 90) (only yields had decreased) (Almanza, 1994: 83).

Two ways in which these things could have been accommodated are by a shortening or elimination of fallow periods, and/or by a reorganization of the agricultural system. It seems entirely possible that rather than being replaced, "native" non-commercial varieties, may have been increasingly displaced from the parts of the lower areas and slopes that they occupied, to the higher altitudes. As commercial agriculture was intensified and expanded in the late 1980s, the areas on the flatlands and slopes that might have been dedicated to "native" non-commercial potato varieties might have been overtaken, and the frontier with the "green areas" that are left to these varieties and to a number of complementary activities as Paulson describes was pushed further and further away.

¹⁶ According to my informants, *Waych'a* may have been introduced before the 1980s.

This would explain in part why the farmers whom I interviewed found it too far to go there to cultivate their “native” non-commercial varieties. While I was in Candelaria, the community of Pie de Gallo had begun to expand the footpath that leads up to the *phuruma* lands in their area but had stopped due to a lack of funds to rent the tractor that was clearing the area. Several farmers told me that if there were roads to go up to the *phurumas*, many more people would use them. At the time of the research, many said that it was too difficult and too dangerous to go up to those areas with horses on the existing footpath because when it rains, the animals carrying heavy loads of potato seed, manure, or the harvest, slip and fall.

It would also explain why PROINPA, and Candelaria farmers, say that “native” non-commercial potato varieties are (almost exclusively) cultivated in the higher altitude agro-ecological zone. As I have alluded to in this section, and will argue in the next chapter, my observations suggest that this is not, and has not always been, completely so. The division of Candelaria into three distinct agroecological zones in PROINPA’s literature, may be a normative description and/or an aspiration given the ecological deterioration of the lower lying areas.

In sum, farmers in the two study communities revealed that their relationships with the “native” potato varieties of conservation interest, far from being straightforward and homogeneous, are complex and ambiguous. Like the “farmer conservationists” they are not simply and unproblematically “stewards of biodiversity”. While some, indeed most, expressed a strong attachment to these varieties because of their superior organoleptic qualities, others, and in several instances the same people, expressed a deep

frustration with their lack of productivity. This is not enough to explain either the gradual disappearance or the persistence of these varieties in the area. Instead, it is crucial to look at the question of overall land use in the area, a factor that is closely connected to the history of agricultural development policies and aid in the area based on modernizing and anti-indigenous world views such as those discussed in the introduction of the thesis. These policies have been an important part of the cause of soil erosion and displacement of “native” varieties to higher zones. As I have discussed, this history, associated with previous, and to some extent modified, configurations of the agro-biodiversity network, is erased by PROINPA’s “purifying” description of Candelaria, denying the possibility that current interventions also promote a situated understanding, or knowledge regarding the organization of agriculture, and in so doing extend some of the power relations already in place.

Commercialization of “native” varieties

In addition to being portrayed as “traditional” and “native”, Candelaria is also shown to be poor, or in need of some form of agricultural development and commercialization assistance to raise productivity and incomes. The use of the concept of food security in describing Candelaria and the role of potatoes in the population’s diet suggests that if “native” potato varieties were to be lost from the area, Candelaria’s population might not have access to enough food:

Andean tubers are essential in Candelaria’s farming families’ *food security*. The potato is the basic food as it is consumed two to three times a day, year round (Terrazas and Garcia, 2003: 4. my emphasis).

In the crop production system, *a large part of the productive activities of the family* are occupied by Andean tubers, which are *fundamental for their survival* and for the generation of incomes (*ibid*: p.6. my emphasis).

Food security, diversity and local knowledge

...Use of cultivar diversity contributes to the *farmer's goal to safeguard the harvest and make it plentiful* based on the available resources such as soil, genotype diversity and basic knowledge (Terrazas and Valdivia, 1998: 11. my emphasis).

In a range of microclimatic conditions, such [variety] mixtures are needed to *reduce the risk of cultivar and harvest loss because of frost, hail, drought or other climatic and biotic stresses* (*ibid*. p.12. my emphasis).

Local cultivation of “native” potato varieties is set in the context of a struggle for survival, of assuring a harvest in face of adverse conditions (see also Cadima et al., 2003: 51), and of making the best of the less than ideal situation of an extremely diverse, changing, and unpredictable environment. This is the main rationale that PROINPA highlights for local people’s cultivation of diversity.

PROINPA’s aim is to make diversity more than a survival strategy. It proposes that the commercialization of “native” varieties can become an important source of income, and a rationale for conservation for local farmers. As discussed in Chapter IV, this approach is characteristic of the globalocentric position of the agro-biodiversity network, which sees local people as “reservoirs of value” through which economic value is created out of their biological diversity with the help of modern science. Accordingly, an important part of PROINPA’s conservation narrative and strategy is to increase the use of “native” varieties by marketing and selling them to the populations of Bolivian

urban centers. It has helped Candelaria's farmers to establish the Association of Andean Tuber Producers of Candelaria (APROTAC), which, with heavy support of PROINPA staff, searches, creates and fosters market contacts for the sale of a select group of "native" potatoes and other Andean roots and tubers. PROINPA's idea is that increased demand for these varieties, and the increased income for farmers from their sale, will encourage more farmers to continue to cultivate, and hence conserve "native" varieties.

APROTAC has helped some farmers in Candelaria to access markets for "native" varieties and to sell them at higher prices. Other farmers, who are not members, and who, for a number of reasons, are not interested in becoming members, have made arrangements with the member farmers whereby they supply them with "native" potatoes to sell. I spoke with two APROTAC members who were receiving substantial quantities of *Pinta Boca* and other "native" commercial varieties from farmers who live in the higher altitude areas of Candelaria, to sell through the association. To the extent that this is happening, commercialization has indeed been an important way of increasing the production, use, and conservation of some "native" varieties by some farmers.

In my study however, only 5% of the reasons given by the participants for the persistence (to date) of diversity in the area had to do with market opportunities (Figure 5 p. 176). This response does not augur very well for such a conservation strategy and leads to the following questions: Will the marketing of a select group of "native" varieties be sufficient incentive for farmers to keep cultivating them? Will this motivation help them to overcome the obstacles that they face in continuing to cultivate and to conserve them?

If the selected “native” varieties are successful, will this provide stimulus to maintain the many other “native” varieties? And finally, will this strategy actually have the intended outcomes of increasing incomes *and* conserving agricultural diversity?

When I asked the participants in the two study communities what they thought of commercializing their “native” potato production through a Native Potato Growers’ Association, most of their responses were negative. Some were sceptical that such a strategy would truly assure a high price; others said that they only plant “native” varieties for home consumption and are not interested in commercializing them. Still others were not keen on going to meetings and paying a membership fee. Most of the participants also said that a rise in prices of “native” non-commercial varieties (independently of whether or not they were commercialized through an association) would not stimulate them to plant much more of these varieties (in quantities and/or in number of varieties) than they already do (Figure 7). The main reasons given were that they did not have rested soils (or horses to access these soils in the higher altitudes) to plant these varieties, and that “native” varieties do not produce enough (two crucial issues which I have already addressed above).

This resistance to commercialization by most farmers may actually be favourable for potato diversity in the area because a large-scale participation in APROTAC, or an increased production of the “native” varieties commercialized through this association, may eventually cause more damage than it reaps benefits. At present, APROTAC only commercializes five of the 91 “native” varieties cultivated in Candelaria. At least two of these varieties were already quite popular, locally and in urban markets, before

Figure 7

Farmers' responses to hypothetical rise in prices of "native" varieties (n=19)

Source: Interviews conducted in study communities, 2005

APROTAC began to promote them – meaning that their risk of erosion and disappearance was minimal. In a personal interview, one PROINPA staff member expressed concern that “perhaps we are only causing more genetic erosion because we are only prioritizing five varieties” (Personal communication, 2005). The staff member was concerned that the increased attention on these varieties might be leading to a neglect of the others. While the association has been testing other varieties for their suitability for commercialization, until now only three other varieties seem promising candidates for commercial production which requires a set of characteristics including: an adequate

degree of uniformity among tubers, stable and satisfactory yields, adequate disease resistance, and the ability to withstand washing, packaging and transportation.

A related concern is that increased earnings from the commercialization of these varieties may lead farmers to shift more lands into producing these varieties to the detriment of other “native” varieties, which are cultivated in the same areas, and which may be of equal or greater conservation interest. It may also lead to an intensification of production of these varieties in the higher altitudes, where they presently perform best due to the availability of rested lands there. In an interview with the president of APROTAC, I learned that the Association was not only targeting national markets, but also hoped to commercialize “native” potatoes internationally and that in that case, the demand would be in tons, and not 100kg bags as is usual in national markets. Such an extension and intensification could ultimately lead to a limited availability of rested lands in the higher altitudes, and to a decline in the numbers and quantities of varieties cultivated there. This is not currently a concern either of PROINPA or of the APROTAC members with whom I spoke. They assert that there is no shortage of lands in the higher altitudes.

An increase in the use of the higher lying areas may, however, be a concern for local people who are not benefiting from the commercialization of these “native” varieties, and who have witnessed the ill effects on the soil of intensification in the lower lying areas. One of my informants from Pie de Gallo was a member of APROTAC. He had bought lands in the higher altitude zone from other farmers, and most of his land was there. However, he was being criticised by his neighbours because of his use of these

lands, and had apparently become somewhat of a “black sheep” in the community. He explained that the people in Pie de Gallo did not use their *phuruma* lands very much and that neighbouring communities were beginning to encroach on these lands. He told his neighbours that it was cheaper and easier to cultivate in this area because there were neither pests nor weeds. He told them that rather than tell him not to plant there, they should reproach the neighbouring communities, and that they, the people of Pie de Gallo, should all go plant there instead. He convinced some 15 people and they had made arrangements to go plant in the “green area” together that year. It was not clear exactly why his neighbours were upset that he was cultivating in the higher altitude areas, but it is possible that they disapproved of his use of these lands for commercial agriculture, since he was the only person in the community who was producing large quantities of “native” varieties commercially there. It is also possible that they were suspicious that he might be encroaching on their *phuruma* lands while they were not tending to them due to their migratory absences.

This suggests that an increase in commercial use of *phuruma* lands might cause inter and intra-community conflicts over the uses of these lands. It also suggests, taking Paulson’s (2005) study as indicative, that this may also cause changes in gender relations and in gendered agricultural practices and spaces. Although the interviews that I conducted do not provide answers to these questions, they are definitely interesting and important areas for future research.

In spite of APROTAC’s relative success in commercializing some “native” potatoes, the association is not as large and well functioning as PROINPA hoped it would

be. One of its major challenges, according to PROINPA staff in the area, is the farmers' lack of time to attend the obligatory bi-weekly meetings, which can, at times, extend to over two to three hours. Selecting, washing, drying, weighing and packing the potatoes into 2 kg bags also requires a time commitment that many farmers in the area cannot make. In spite of PROINPA's relative silence on the issue of farmers' time allocations to commercial and non-commercial potato production, it is evident that those who participate in APROTAC do so at odds with, or in competition with, their other duties and obligations. The president of APROTAC admitted that since he had held this position, he did not have any time to tend to his own crops. Regular members also do not have much time to spend on these activities. On one occasion while I was there, the association had committed to providing a certain quantity of "native" potatoes to a client in Santa Cruz. The day before, some members of the association brought their share of the supply, and left it at the door of the packing plant hoping that the president, or another member, would wash and pack the potatoes for them. The creation of income generating activities, such as APROTAC, which require a substantial time commitment from farmers, assumes that there exists a labour surplus in the area, or that many of the society's members are underemployed. As Sanabria (1993: 139) argues, this is a common but erroneous assumption about rural areas in Bolivia.

Many of the farmers in the Candelaria area have very little time to dedicate to these income-generating activities in their area, particularly (but not only) because they migrate "seasonally"¹⁷. Many go to the Chapare tropics where they cultivate cash crops

¹⁷ Sanabria explains that seasonal migration has always been common in the Andes as farming communities have set up reciprocal labour and product exchange mechanisms with kin groups in different

such as coca, rice, cassava, and tropical fruits. Sanabria argues that migration associated with coca cultivation has squeezed an already tight labour situation even further (1993: 129). As he shows in his study of Pampa, the labour shortages associated with this type of migration, which began in the 1980s, had serious consequences on local potato production (*ibid*: 117)¹⁸. Many migrants either sold their lands in Pampa altogether, or left them mostly idle (or sown with only enough potatoes for subsistence), while they were in the Chapare. Because of this intense migration, many non-migrant households had “severe difficulties recruiting labour” (*ibid.*) at crucial times in the agricultural cycle and were unable to sustain production. Given the low prices of potatoes in national markets, the increasing costs of agricultural inputs, and the decreasing yields due to soil degradation, and the high value and agronomic benefits of growing coca, it is no wonder that many farmers (still) prefer to migrate seasonally (or for extended periods) rather than to stay in Candelaria continuously and grow potatoes. Even the higher prices for “native” potatoes commercialized through APROTAC do not compare to the incomes that these farmers can generate in the coca fields.

Another activity competing with APROTAC for Candelaria farmers’ time is their cultivation of “improved” and “native” introduced varieties (and other Andean tubers and crops) in areas such as Korani that are located between the tropics and Candelaria’s lower zone. An increasing number of farmers in Candelaria are buying lands in these areas.

ecological areas seeking the benefits of different growing environments. Migration associated with coca cultivation however has been on a larger scale, for longer durations, and takes place in a different historical, social and economic context (1993: 140).

¹⁸ He does not distinguish which types of potato production have been compromised, because in his study area the farmers presumably only plant two (“native” commercial) varieties. He does however assert that although migrant farmers have been increasingly disinterested in producing potatoes, and that non-migrant farmers have been obliged to reduce their production due to labour shortages, most farmers still cultivate enough potatoes for their subsistence needs.

Because the lower altitude allows them to sow potatoes earlier there than in Candelaria, these farmers harvest earlier and take advantage of higher off-season prices (before the markets are flooded with the regular potato harvests, dragging the prices down again). Many farmers have actually sold their lands, or again, left them “fallow” in the higher altitude zones of Candelaria in order to purchase these lower-lying plots.

Apart from benefiting from early harvest prices, farmers who cultivate in Korani and other such areas also have the benefits of easier transportation and lower production costs. The lower lying areas are well articulated with the main Cochabamba-Santa Cruz road while the *phuruma* areas, where they would most probably be cultivating the APROTAC “native” varieties - are difficult to access with vehicles because of the steep slopes and unpaved roads that get extremely slippery in the rainy season. In the case of Pie de Gallo, there is no road leading from the flat zone of Candelaria, where most of the people live, to the higher altitudes. In the case of Pie de Gallo Alto, the expansion of the Corani reservoir and the farmers’ consequent relocation to its north-western side made it easier and faster for them to reach the lower lying areas like Korani, than to go around the reservoir, cross the Chimpa Rancho river, and then climb the hill to the higher zone. Production costs are also possibly lower in Korani because the price of seed of improved and of “native” introduced varieties is cheaper than the seed of the “native” varieties commercialized by APROTAC. In addition, although more chemical inputs are needed in the lower areas, there are fewer climatic risks such as frost and drought, which are common in the higher areas.

Although the commercialization of “native” varieties has been considered one of the most promising avenues for ensuring their conservation – both because of their increased use and because of the increased incomes generated for farmers – my interviews with farmers in Pie de Gallo and Pie de Gallo Alto question the viability and effectiveness of this approach in this area. Given the existence of alternative income sources that are more lucrative, and that occupy the time that farmers’ would otherwise have to cultivate “native” varieties commercially, the limited membership in APROTAC is not surprising. The reliance on commercialization of “native” varieties also brings up the crucial question of which varieties, and how many varieties such a strategy can “save”. Most of the varieties that are of conservation interest, and that are in most danger of erosion and/or disappearing, are not commercial, and do not seem to have high prospects for commercialization. And most importantly, many farmers keep them for home consumption and do not appear to be interested in commercializing them. This reiterates the tension between PROINPA’s norms and expectations with regard to local people, and their current livelihood strategies created from a combination of their aspirations, opportunities, and constraints. This is, again, their trajectory, and their cultivation of “native” varieties cannot be understood, and addressed outside of this trajectory.

Conclusions

This chapter analysed three ways in which PROINPA interprets and mobilizes Candelaria’s social world. It explained that the naturalization of the people, through the

use of the term “traditional”, while enabling PROINPA’s establishment of its *in situ* conservation pilot site in Candelaria, cannot be upheld as a description of their society. Likewise, although they maintain a large number of “native” potato varieties local people were not simply “stewards of diversity”, nor were they simply “reservoirs of value” in the sense of being vehicles through which local varieties would be turned into economic profits and “development”. In all three cases, the existence of elements of Candelaria’s society that could be mobilized, in the way that PROINPA does, is not negated. Rather, it is argued that they could/can be understood differently: instead of “traditional”, thoroughly hybrid; instead of “stewards of biodiversity”, people struggling to maintain their varieties in face of degrading soils, diminishing crop areas, rising production costs and chronically low potato prices; instead of “reservoirs of value”, people with aspirations which include far more than access to markets. What emerges from these differences is a view of Candelaria not as a “blank page” (Massey: 2005, 121) on which PROINPA now comes to inscribe its view of the world, but as a place that is constituted by a multitude of interacting relations, with which PROINPA now also comes to interact. This presses, not for a defence of these people’s purity and “traditional” way of life, and definitely not for a “defensive enclosure of [their] essentialised space” (Massey, 2005:8), as PROINPA’s discourse seems to suggest is necessary, but for an opening in which the ways in which these “things” (in this case the people that inhabit Candelaria, and the concepts about them) are enrolled, the ways in which Candelaria’s people come to form part of the agro-biodiversity network, are seen both as political, and as unfinished business.

Chapter VI.

CANDELARIA: A “PLACE OF ORIGIN”?

Introduction

The questioning of environmental crisis narratives, and of the scientific basis of their claims, is a key element of political ecology. This questioning stems from the belief that crisis narratives are not always based on “good” or sound science and that they are usually articulated such that they lead logically to a set of interventions that serve certain interests, and perpetuate certain configurations of societal power relations. In becoming dominant narratives, they not only simplify reality, they also override other ways of reading and interpreting nature and humans’ interactions with it, interpretations that may lead to different ways of addressing the issues at hand. The actual accuracy or inaccuracy of environmental discourses may be impossible to determine, as what is accurate, or true, is not universal. Even so, some widely accepted environmental degradation discourses, having important consequences for the people who maintain and depend on the resources in question, have been shown to be inconsistent even within their own epistemic and ontological settings (see for example Fairhead and Leach, 1995: 1027, and Blaikie and Muldavin, 2004: 522). It is crucial therefore to question dominant environmental narratives.

PROINPA ’s *in situ* conservation work in the Candelaria area takes as given that the “native” potato varieties in this area are disappearing, or that they are threatened. This is a very important claim because it affords PROINPA access to the area, its people (their labour and their knowledge), its soils and heterogeneous growing conditions, and its

genetic diversity both cultivated and “wild”¹. It vests the institution with a certain scientific credibility, or authority, to recommend ways and implement programs that have the goal of reversing and/or avoiding genetic erosion and its negative consequences.

What is ironic about Candelaria is that it has enough Andean tuber diversity to earn itself the title of “biodiversity micro-centre”, in spite of the existence in the area of most of the factors that are often cited as the main threats to agricultural diversity. These include proximity to markets and major cities, the introduction of “improved” and commercial varieties, and the adoption of exogenous foods such as rice and noodles by the local population². This suggests that the threats cited might not outweigh farmers’ rationales for growing a diverse array of potato varieties. Research in other parts of the Andes has insinuated that this is entirely possible. For example, Brush’s (2000) research comparing potato varieties grown in two Andean valleys in Peru, one with a longer record of adoption of “modern” technology and greater integration into regional and national commercial networks than the other, shows that farmers in the more “modernized” valley do not grow fewer varieties than those in the less “modernized” valley. If this is so in Candelaria, it may be that potato diversity is not as threatened as PROINPA’s narrative leads us to think. Another possibility (discussed to some extent in Chapter V) is that there are other factors causing a reduction in the cultivation of diversity that have not been considered in the narrative, or in its proposed solutions.

Yet another possibility is that only a part of the diversity that is claimed to be cultivated in (and/or native to the area) is actually from the area. Several of my

¹ It also, albeit in a more indirect way, brings funding and institutional clout to the organization.

² This is part of the biodiversity loss narrative told by PROINPA and other institutions.

informants commented that “the scientists made these varieties appear in the area”

(*los ingenieros hicieron aparecer esas variedades, aqui no había antes*) or that they themselves had only recently come to know a variety at the biodiversity fair organized yearly by PROINPA in Colomi. Adding to this, Terrazas’ recent research shows that the only social variable (among those he tested) which is positively correlated with the number of varieties planted by families in Candelaria is the degree of farmers’ interactions with outside institutions such as PROINPA (Terrazas, 2003)³. All seem to suggest that PROINPA’s construction of Candelaria as a biodiversity “micro-centre,” is not only verbal. It is an attempt to remake Candelaria in the image of a “place of origin”, the places where *in situ* conservation, according to its proponents, is supposed to occur place. This chapter looks closely at both the concept of a “place of origin”, and the discursive practices through which PROINPA works to reconstitute Candelaria as such a place.

In situ conservation is explained as the conservation of diverse landraces in their “natural habitats” or in their “places of origin” (Maxted et al, 1987). While the idea of “origin” suggests the beginning of time, or at least the lifetime of the landraces, the idea of “natural” habitat appeals also to an origin. It is the home, the birthplace, the natural dwelling of these landraces. Both of these terms suggest that the places where landraces are to be conserved are in some way constant or fixed. In the previous chapter I discussed how the people who live in these places, by virtue of their being considered “traditional”, are implicitly taken to be part of nature, also untainted by time and by modern society.

³ This could be interpreted either as these farmers’ receiving varieties from PROINPA or as PROINPA working specifically with farmers who plant a greater number of varieties.

Their elimination from the realm of society allows the designation of places as “natural” habitats. Likewise, a “place of origin” is a place where modernity (society and time) has not interfered.

In her account of the nature of place, Massey (2005) explains that places cannot stand still. They cannot be constant or fixed. She recounts an anecdote of going back home to visit her parents and looking forward to eating the chocolate cake that her mother often baked when she was young. She arrived home and all seemed the same except her mother had found another chocolate cake recipe (which incidentally Massey did not like as much). This made her realize that the home that she thought she was returning to, had moved on, had continued along its trajectory in her absence. To complement this anecdote Massey recounts another story, this time of how her imagination was “reworked” when she began to think about Skiddaw, a mountain that stood over 3000 feet high just outside the town that she was visiting one weekend in the northern Lake District of north west England. At first glance the mountain seemed to have been there forever, to be timeless; however as she investigated, she learned that this mountain was made by the emergence of volcanic rocks from the sea bottom 400 million years ago and by their later plastering by the debris left by the retreat more than 10,000 years ago of ice age glaciers. Nature then, even the most apparently static nature, also seems to continue along its way. Massey recounts these stories to stress the impossibility of going back to places:

Immigrant rocks: the rocks of Skiddaw are immigrant rocks, just passing through here, like my sister and me only rather more slowly, and changing all the while. Places as heterogeneous

associations. If we can't go 'back' home, in the sense that it will have moved on from where we left it, then no more, and in the same sense, can we, on a weekend in the country, go back to nature. It too is moving on (Massey, 2005: 137).

As society moves on, so does nature, and so, importantly do their interrelations and associations with other things, continuously making up new places. This understanding of place, negates the possibility of going to, or of protecting a "place of origin". Following Massey's argument, we can go back to the locations where it is thought that landraces originated, but we cannot go back to their "places of origin" (unless, of course, we travel back in time).

Now this poses an interesting conundrum for *in situ* conservation: How are landraces to be conserved in their "places of origin", if these places cannot exist, if both their "traditional" societies (as we saw in Chapter V), and their natures have been moving on? This chapter explores this conundrum with regard to Candelaria's description as an *in situ* conservation site. Through an analysis of Candelaria's landscape, and of the questions regarding the presence and the erosion of diversity in the area, I show that PROINPA's discourse simplifies nature, overlooking the history and the movements that characterize the place and its relationship with diversity. As in Chapter V, PROINPA's representation of Candelaria's nature (this time) can be understood as a "purification", a maneuver that allows its "translation" into the agro-biodiversity network as a "place of origin". However, as was demonstrated in Chapter V with Candelaria's society, the history and movements that characterize Candelaria and its relationship with diversity, suggest that there is a tension between Candelaria's reconstitution as a "place of origin",

and these movements either becoming evident and requiring a change in PROINPA's position (as a condition of Candelaria's enrollment), or causing a rupture of the relationship between Candelaria and the discourses of *in situ* conservation. The outcome is, again, an effect of power.

Producing the Candelaria Landscape

PROINPA's description of Candelaria's biophysical environment centers on the delineation and characterization of three altitudinal floors: the relatively flat valley lands (between 3270 and 3310 masl), the slopes (3310-3600 masl) and the high altitude mountaintops (3650-4200 masl) (Gonzales et al., 2003: 2). The institutional literature describes the distinct climatic conditions, soils, water availability, predominant crops, pastures, agricultural practices (including crop rotations), planting seasons, biotic and abiotic disturbances, labour allocation, and importantly, the groups of varieties planted and exchanged in each of the three zones (*ibid*, 2; Terrazas et al. 2003: 41, 42). The biophysical characteristics of each zone seemingly *determine* local people's land use, and thus constitute "agro-ecological zones":

Each altitudinal floor presents particular climatic and biotic risk characteristics due to the presence of plagues and diseases. This *determines* at once *certain management practices* that are also different in each altitudinal floor (Terrazas and Garcia, 2003: 3. my translation, my emphasis).

Linked to the idea of altitude based production zones is the notion of the formation of microenvironments with highly localized characteristics. As discussed in

Chapter V, PROINPA's main explanation of farmers' rationales for growing a diversity of potato varieties is their catering to the specific adaptations of the varieties to these microenvironments (Terrazas and Valdivia, 1998; Cadima et al. 2003). My conversations with PROINPA scientists confirmed that "native" varieties are mostly planted in the higher elevations: that is, in the hilltops and the "transition" zone which cover roughly the upper half of the slope area mentioned above.

This description is not completely at odds with local people's descriptions of their agricultural landscape. Farmers in the area distinguish between the flat lands, slopes, and hilltops. As discussed in Chapter V, many of the farmers with whom I spoke said that their "native" non-commercial varieties only produce in the hilltops and not so much in the flat lands and slopes. However, their remarks suggest that they used to cultivate these varieties also in the lower lying areas, and that some people still do.

There are also indications in the PROINPA literature that "native" non-commercial varieties have not always been, and are not presently, completely relegated to the slopes and hilltops. In his 1994 study, one of the earliest PROINPA documents on the Candelaria area, Almanza describes the three agroecological zones. The "lower agroecological zone" he writes:

is located below 3250 masl of altitude, with soils that contain a lot of humidity and considerable organic matter, 6.08% high percentage, excess water in the rainy months (December-March), flat plots with little slope, very short resting times from 1-3 years, existence and management of various cultivars such as: Imilla Blanca, Waych'a, Yuraq Runa, Puca Q'oyllu, Yana Q'oyllu, Holandesa (alpha), Sani Imilla, Llusta, Pali, Puca Toralapa, Yuraq Toralapa, Machu Wañuchi, Azul ñawi, Kataw, Canastillo, Americana, Wawilu, Phureja, Saululu, Amajaya, as well as accelerated growth of the vegetation and greater incidence of

plagues such as llaja (*epitrix* sp), piquipiqui (*trips* sp), yurah khuru (*prenotryppes* sp) and diseases such as llupi, kanura (late blight) (Almanza, 1994: 50. my translation).

Among the 20 varieties that he mentions are cultivated in the “low zone”, eight are “native” non-commercial varieties. In addition, of the seven “native” commercial varieties that he mentions are planted here, only two - *Waych’a* and *Sani Imilla* – were introduced from other parts of Bolivia whereas the other five are considered “native” to the Colomi area. This means that the majority of the “native” varieties that he found in the lower zone during his research in 1993 were “native” varieties that today are said to be mostly cultivated in the slopes and high lands.

Almanza mentions that the intermediate and high zones are “preferential” for the cultivation of the majority of the “traditional varieties” because of the existence of areas that are protected from frosts (this would be specifically in the slopes), and because of the existence of “favourable microclimates” and lands that are rested for many years. However, he does not state, or even insinuate, that “native” varieties are mostly or exclusively cultivated in these areas (Almanza, 1994: 54). He describes the highest zone like this:

The high zone considered by the farmers is of an altitude higher than 3450 masl where plots with more resting time called phurumas exist, where they cultivate especially varieties that are resistant to frost such as the *Lukis*, differing from the other zones because of the low temperatures (5 degrees above zero), the existing vegetation which is mostly straw (*Stipa ichu*) and the precipitations of rain that are greater than 900 mm (Almanza, 1994: 52, my translation).

Further along in his text he observes, “all the potato varieties adapt, or have an ample range of ecological adaptation” (*ibid.*: 54). A close read of the institutional literature demonstrates that there is still substantial confusion and contradiction as to which varieties are planted in which areas. Part of this confusion arises from the fact that different groups of varieties have different ranges of adaptation and that the landscape is not so simply defined by agroecological zones. Moreover, farmers’ land use does not conform to the same principle of yield maximization that modern breeding (and conservation) programs take as given.

It cannot be argued that PROINPA scientists do not recognize that there can be a range of conditions within each of the altitudinal floors that it distinguishes in the Candelaria landscape. However, their description of the landscape rests on an ecological theory that sees Andean landscapes as regularly patterned mosaics, whose environmental features vary with altitude (Zimmerer, 1998: 265; 1999). Other studies have questioned this vertically defined zonal approach characteristic of received wisdom on Andean resource use. Without denying the obvious importance of elevation-based climatic factors in enabling certain agricultural activities and inhibiting others, these studies show that the Andean landscape, and its use by farmers, is not so neatly organized. Sanabria (1993), whose fieldwork was based in Pampa, a community not far from Candelaria but at a slightly lower altitude, takes exception to the neat delineation of altitudinal floors and their association with distinct agricultural conditions (1993). He describes three crop

zones⁴. However the actual elevations at which the zones apparently begin and end in his study are not the same as those in Candelaria. After outlining the three areas, he explains that they are not “perfectly demarcated zones” but rather that the boundaries blend into one another. “The mountainous topography” he writes, “rule[s] out such a neat categorization of the landscape” (Sanabria, 1993: 121).

Zimmerer (1996) also observed that the elevation limits of the production zones outlined by farmers in the area he studied overlapped markedly (1996: 123, 242), meaning that production spaces – the constructed “agroecological” zones consisting of numerous farmers’ plots demonstrating similar crops and farming practices - could span more than one of the vertically defined production zones. Conversely, the number of production units (or distinct plots) within production zones was extremely small compared to the actual heterogeneity of environments within them. This means that land use did not consistently match the normative production zones or the agroecological conditions said to be contained within them, but rather extended over elevation gradients in a “seeming crazy quilt” defying the natural limits they were thought to impose (Zimmerer, 1996: 123).

An important finding that correlates with this one is that many potato landraces are highly versatile, performing well under a variety of conditions, rather than being specifically adapted to soil conditions (Zimmerer, 1998). Importantly, the common practice of moving diverse collections between plots in different altitudinal zones, and the common overlapping of plots and zones, suggests that genotypes are not matched one

⁴ The differences between PROINPA’s altitudinal zones and Sanabria’s vary from 70meters to 220meters. The zones that Sanabria describes in Pampa are from 3050 to 3380 masl for the lowest zone, 3255-3530 for the middle zone, and 3570-3850 for the highest (Sanabria, 1993: 121)

by one to specific microenvironments (*ibid.*; Zimmerer, 1999). The explanation for this seeming contradiction is that farmers in the region do not generally see the cultivation of diversity as a strategy to combat biotic stresses as has been commonly thought (Brush et al. 1995: 1191), and as I have shown in Chapter V is central to PROINPA's explanation of Candelaria farmers' rationales for maintaining diversity. Instead, Andean farmers, having many other factors to consider in their land use practices, prioritize adequate - rather than optimal - yields for their crops (Zimmerer, 1996). Adequate yields can be achieved throughout a wide range of elevations, and not only in specific production zones.

Research in the Paucartambo Andes suggests that the altitude based production zones were actually "the creation of Quechua peasants' labouring" (Zimmerer, 1996: 117). Guided by the typical range of biophysical conditions in the four production spaces that characterize the area that Zimmerer studied, local farmers' organization of labour revolving around irrigation and the protection of their crops from livestock grazing led them to coordinate their land use practices within production zones, creating what to many scientists have appeared to be production zones based solely on altitude. He also explains how the landscape was changed by Spanish colonial policies requiring Indian peasants to carve new production zones to plant wheat and barley for tribute, and forage for the thousands of horses, mules, and donkeys introduced in colonial times and popularized thereafter. The farmers' frequent need to defend their lands that were customarily in a range of agroecological conditions also led them to define their land use

in the widely recognized altitude based categories (Zimmerer, 1996: 121). In practice however, land use was, and is, quite a bit messier.

As PROINPA's emphasis is on the distinct biophysical conditions of the three agroecological zones it delineates, and on how local farmers use their traditional knowledge to match their activities to heterogeneous growing conditions, it appears that its description of the landscape is the "natural" order of things, that this is how agriculture in Candelaria is, and has always been, organized. However, like their description of the people of Candelaria, and of their agricultural practices (discussed in the Chapter V), this description of Candelaria's biophysical environment does not quite tell the full story of the place. The location of "native" non-commercial potato variety cultivation is not only a symptom of biophysical conditions. The agricultural landscape of Candelaria, like that of Paucartambo, has been actively shaped, and continues to be so, by biophysical and social relations.

As discussed in Chapter V, several decades after the introduction of the "Green Revolution" agricultural model, with its agro-chemical inputs and its "improved" and productive potato varieties, to the flat lands and slopes of Candelaria, and after decades of unfavourable rural development and agricultural produce pricing policies that stimulated the intensification of production in these areas, the soils are *tired*. They have lost their fertility, and are infested with a host of pathogens that inhibit the cultivation of "native" non-commercial varieties. This is the reason why many of the farmers in the area say that they only grow these varieties in the hilltops, and also the reason why PROINPA advocates this through its literature and its discourse on the area, in the interest of

biological conservation. As discussed in Chapter V however, local farmers explain that it is this state of affairs that is limiting their ability and their desire to continue cultivating many of their potato landraces.

Again, as I have argued throughout this thesis, PROINPA's representation, this time of Candelaria's landscape, amounts to a "purification" of nature, an erasure of its becoming in relation to the society that lives and interacts with it, and which in turn is also constituted in this relationship. Depicting the landscape as simply a topography and an ecology that Andean farmers cultivate, and which has forced them and enabled them to maintain a diversity of landraces, erases this relationship of mutual becoming. Coupled with the erasure of the people's history, and their consequent naturalization as well, this renders a pure nature, a "place of origin", that is ready and apt for conservation.

As with the case of the "traditional" society discussed in Chapter V, some of the evidence and literature cited here disputes that Candelaria's landscape can be reduced to topography and ecology. It is important to ask why, and with what effects, PROINPA reinforces an Andean landscape discourse that seems to be at odds with Andean farmers' land use practices and with more recent understandings (such as Zimmerer's 1996, 1999 cited above) of how farmers organize their landscapes. As Ferguson (1990) writes in his book, *The Anti-politics Machine*, these seeming conceptual errors are not, by any means, an indication that PROINPA has substandard or second-class scientists within its ranks. This is not so.

These misrepresentations are rather a product of the discursive world, or the position in the agro-biodiversity network, within which PROINPA operates. This

discursive world sets the bounds of what is and is not “relevant” or “important” to the issue at hand. Importantly, as discussed in Chapter IV, it bases its interpretations of social and ecological issues in a technocratic worldview in which nature and society are separate; nature is “natural” and not also social. It is in this vision that Candelaria’s “natural habitat” is being re-made.

De-linking place and diversity

The establishment of a conservation *area* for potato landraces, which is central to PROINPA’s *in situ* conservation strategy, specifies and demarcates a place where it is thought, implicitly, that the diversity in question was domesticated and maintained, i.e. where it originates. In this sense, the meaning of the word “native” as commonly used in the Andean biodiversity literature to establish that potato landraces are from the Andes and the Andean peoples in general is easily confused with meaning of a nativity to the protected area *per se*. Thus, a link is made between the genetic materials of conservation interest and the specific place (and people) that are designated as *genetic reserves*.

This link is problematic because it specifies a place and its people, to the exclusion of other places and peoples (outside the boundaries of the protected area), where the presumed link between place and biodiversity is operative. This puts the onus of conservation on the people of that area, and gives PROINPA, the designer and expert on the area, the power to suggest how it should be managed, while letting the surrounding areas “off the hook”. The link is also problematic because there is no clear evidence that there exists such a link between Candelaria and (all) the potato diversity being

“conserved” there. The social, cultural and biophysical dynamics of varietal diversity in the area seem to extend beyond Candelaria.

Candelaria was selected among a number of candidate sites in the department of Cochabamba to be PROINPA’s *in situ* conservation pilot area. The selection was based firstly on the analysis of secondary information, such as production statistics and physiographic and ecological maps. The aim was to find an area that had good production potential for Andean roots and tubers. Another source of secondary information was the writing of earlier Andean explorers and researchers. Among these, the writings of Martín Cárdenas (1989), one of Bolivia’s most renowned explorers and botanists, are most cited in PROINPA’s literature with respect to his description of Candelaria/Colomi as a diversity micro-center. According to PROINPA, he wrote of Colomi as a place with much potato diversity, and as a traditionally Oca producing area (where he collected as many as 8 cultivars of this Andean root crop). However more specific references about Martín Cárdenas’ alleged singling-out of Colomi/Candelaria as a diversity spot are not provided. The references that PROINPA gives in its documents – particularly Cárdenas’ 1989 work *Manual de Plantas Económicas de Bolivia* - do not corroborate its claims.

It has been argued that potato landraces are highly endemic to the localities where they are grown (Brush et al., 1995⁵). This is because of the isolation of agricultural valleys by large, high-altitude expanses, and because of the limited amount of inter-valley exchange of potato landraces. Various researchers, myself included, have found that Candelaria farmers’ main sources of seed for “native” non-commercial varieties are at

⁵ Brush later corrects this in his 2005 book in which he explains, using various case studies, that “indigenous” crop varieties actually have a broader distribution than was thought earlier

limited distances from the area where they live and farm (Gonzales, 2003; Almanza, 1994). Most of the participants in my study said that they use their own saved seed to plant each season, and when they exchange seed, it was mostly with family or friends. Most of the discussion of seed flows in PROINPA's publications is about the vertical movement of seed among family plots, and between families (and oftentimes communities) in different altitudinal floors within Candelaria, a practice that is common and necessary for the control of diseases and the maintenance of productivity (Terrazas et al., 2003). Several PROINPA documents also say that people get their seed "from the area", implying that in terms of "native" seed, Candelaria is somewhat of a closed system. These findings may lead us to conclude that much of the diversity in Candelaria is in fact endemic. However there is some contradicting evidence.

Data from PROINPA's gene bank suggest that a sizable portion of the materials collected in and/or reported as cultivated in the area, are not necessarily endemic, or unique to the area. At the time of my research in Candelaria, only 15 of the 32 varieties that had been collected by PROINPA in the area had been characterized by/for the gene bank. Of these, 5 (33%) have been characterized as being similar enough to materials collected elsewhere in Bolivia to merit their assignation to the same accession group as these other materials. Similarly, from the list of 29 varieties that I selected from those that have been listed in PROINPA documentation as being cultivated in Candelaria⁶, 13

⁶ This selection was done for the "potato variety knowledge test" that I conducted with farmers.

(45%) have a name similar to that of materials in the gene bank that have been collected from other parts of Cochabamba and of Bolivia⁷. Almanza writes:

The best known and diffused potato varieties in the potato growing regions of Bolivia (altiplano and meso-thermic valleys), belong to the species *Solanum Tuberosum* which correspond in turn to the *Andígena* and *Tuberosum* subspecies. The *Andígenas*, which are the most spread out in the Andes, include varieties such as Sani Imilla, Yuraq Imilla, Runa, Waych'a, Yana Imilla, Phurja, Ajawiri and some Qoyllus such as Puca Qoyllu, Yana Qoyllu, Canastillo, Amajaya, Icari, Llusta, Wawilu and Kuchi Aquita (Almanza, 1994: 6. citing Ochoa and Hawkes, 991).

All of the materials listed here are also grown in Candelaria.

The literature on seed systems in the Andes also questions the idea that varieties are endemic to the places where they are cultivated. Villarroel (2002) asserts that seed flows among farmers in the Andes can cover large distances, and he argues that enabling these flows may be a key to conservation:

There exists a constant movement of biodiversity at the micro, regional and in the whole Andean eco-region. ...It has been demonstrated that there existed interconnections between different micro-centres of biodiversity that are or were situated throughout the length and breadth of the Andean region, which permitted a permanent flow of species and varieties through the exchange of seed. [A] real local management of biodiversity may depend on the reconstruction at micro and macro levels of these interactions (2002: 26 my translation).

Oviedo (2000) explains that varieties were distributed broadly in the Andes since the times of the Incas. He writes that in the Andean cosmovisions potato seeds:

⁷ Here there is the possibility that only the names coincide and not necessarily the variety. However as names are often given according to morphological and agronomic characteristics, different varieties with similar or the same name, may also be genetically similar.

are not sedentary rather they “walk” through different towns, and in some they stay for prolonged periods while in others they are only “temporary visitors”. In this process potatoes have conquered wide geographical regions for their survival and in this way became a vital element for the Andean inhabitant because it allows [him] to eat (Oviedo, 2000: 178 my translation).

Seed movement, even over long distances, is not unheard of in the Andes.

Even if potato landraces were shown to be endemic to inter-Andean valleys, there would still be a question regarding the specificity of the territory of Candelaria as a chosen genetic diversity protected area. This is reflected somewhat in PROINPA’s interchanging use of Colomi (the municipality) and Candelaria (a district of the municipality) as the unit for the biodiversity micro-center in its literature. The question centers on the limits of the area (of Candelaria), and the important sources of diversity observed outside these limits. The communities located on the hilltops along the mountain range to the west of Candelaria are common sources of “native” non-commercial varieties. During my conversations with farmers in Candelaria the names of two in particular - Pisli and Palca - came up very frequently. Gonzales writes:

“[Some] Candelaria farmers explore regions, zones and/or communities that are renowned for their management of a broad diversity of ‘native’ potato varieties.... this is the case of the zones of Pisli and Palca, located in the North West of Candelaria, and considered continuous sources of renovation for ‘native’ potato varieties” (2003: 59. my translation).

He also mentions the communities of Atoj Wachana and Pico Central, both also in the higher altitudinal zone, and also not part of the district of Candelaria, as important sources of seed for “native” non-commercial varieties.

During the time of my field research, the community that won the potato diversity competition held as part of the annual biodiversity fair in Colomi was Liriuni, a community located in another district of the municipality of Colomi, around 10 kms outside of Candelaria. When I asked one of my participants about this, he laughed it off saying “but they came here this morning trying to buy some of those varieties”. The conclusion to be drawn from this is not (only) that Liriuni has greater access and more money and motivation to buy the numerous varieties that are supposedly endemic to Candelaria, but importantly, that the borders of the micro-centre – established by PROINPA mostly for programming purposes - do not accurately reflect the dynamics of seed movement and biodiversity conservation by farmers in the broader area.

A final indication that there may not be as strong and exclusive a link between the designated micro-centre of diversity and the potato diversity that is grown there are the results of the “potato variety knowledge test” that I conducted during the research. As discussed in Chapter III, the purpose of this “test” was not to compare farmers’ knowledge to that of scientists, but to get an idea of how well the farmers knew the varieties that were supposedly native to their place, as an indicator of whether the varieties were actually native to the area, and if so, how long ago they might have been lost from the area.

Assessing local people’s potato variety knowledge

For the “potato variety knowledge test”, each participant was asked if they knew each of a list of varieties selected from those that PROINPA reports are cultivated in the

area. If the participants said they knew the variety, they were asked to describe it. If they did not know it, they were asked if they knew or had ever heard the name. In this way, a variety that is known by the participants is taken to be one with which they have a level of familiarity that suggests that the variety is presently cultivated in the area or has only recently been lost. A variety that is known only by name (ie the participant cannot describe it) is one that might have been lost from the area in the more distant past or one that had not been cultivated in the area but had been talked about⁸. The relation of the knowledge of potato varieties to the age of the participants can shed light on the time scale of varietal loss. For example, if a variety is not known, even by name, to some of the older participants, it is unlikely that that variety was cultivated in the area in their lifetime. In this case, claims that this variety is native to the area would have to rest on historical accounts (many of which are not sufficiently specific about which varieties were cultivated in which areas).

The results of the potato variety knowledge test indicate that more varieties on the list are not known to participants, or are known only by name, than those that are known (Figure 8). If the varieties on the list are native to – meaning they were domesticated, or originated there - and/or cultivated in the area, either currently or in the recent past, one would assume that most farmers in the area would know the varieties, even the rare ones, at least by name. This is because Candelaria is not a very large area and many of the people belong to more than one community and/or have family and friends in other communities within the valley. The opportunity is present for them to see and speak to

⁸ Here it is assumed that even varieties that are ‘rare’ or cultivated by a small percentage of the population are known, at least by name, by most farmers of the area.

Figure 8 **Percentage of All Responses on Potato Variety Knowledge "Test" in "Known", "Not known" and "Only name" Categories (n=697)**

Source: Interviews conducted in study communities, 2005

one another about what others plant and harvest. Parents speak to their children about the varieties that they cultivate, and about varieties that they used to cultivate. Moreover, although most of the varieties of conservation interest are not commercial, they do appear every so often in the market when farmers sell excess seed they may have. Because of this, people in Candelaria generally know what others are planting and can be expected to be at least somewhat familiar with varieties that are grown in the area.

If one looks more closely at the results regarding the knowledge of individual varieties, it is evident that there is a large difference in the number of people who know

the various varieties (Figure 9). Some varieties, such as *Phureja*, *Yana Qoyllu*, *Pinta Boca*, *Canastillo*, *Puka Qoyllu*, *Pali*, *Puka Wawilu*, and *J'hose Papa*, are known and/or recognized by most of the participants. Some of these varieties have been commercialized by APROTAC and/or they are cultivated by more than 30% of the participants in the study. With the exception of *Pali*, these are common varieties in the area and there can be little doubt concerning their probable persistence in the area. The exception, *Pali*, is known by most but not planted by anyone in the community. This suggests that it is very probably native to the area and/or has only recently “disappeared”.

Other varieties in the Potato Variety Knowledge test, such as *Suta Mari*, *Puka Mamita*, *Lila Papa*, *Waca Lorun*, *Ajarwiri* and *Saululu*, are not known by any of the participants and the names are only recognized by a few others. Another four varieties *Waca Chilena*, *T'anta Wawa*, *Pinkilo*, and *Moyonqoyllu*, are each known by only one person and are recognized by name by a few others; none of these varieties are cultivated by any of the participants in the study. Given that the local seed system does not seem to be sufficiently restrictive to prohibit people having access to most varieties, the virtual lack of knowledge about these varieties raises questions as to how recently they may have been lost or significantly reduced, and possibly about the claim that they are native to the area.

One way of exploring the previous existence in the area, of the varieties on the list, is to compare the number of varieties that the participants know, to their age. If the

Figure 9 Percentage of Participants Who Know Each of the Varieties (n=19)
Source: Interviews conducted in study communities, 2005

varieties are native to the Candelaria/Colomi area, and/or were once cultivated in the study communities, then the older participants would be the most likely of the three age groups to know them. This is because their longer experience as farmers would have afforded them the opportunity to come across them in the area, or to have cultivated them prior to their alleged disappearance from the area. Figure 10 shows a very gentle upward trend in the number of varieties known by individual participants ordered by increasing age. A regression analysis shows however that there is no association between the two factors⁹. Although it must be recalled that the numbers with which this analysis was done are very small, this might be interpreted to imply that many of the varieties on the list might have never been cultivated in the area.

When knowledge of individual potato varieties by age *groups*, rather than by individuals, is investigated, some nuances appear. Figure 11 shows that some varieties do in fact show an incremental knowledge by age group (ie a greater percentage of the older groups know the variety). It is probably these varieties, and not all of those listed, that are endemic or “native” to the area.

To summarize, various elements, including Martín Cárdenas’ texts on Candelaria, the grouping and naming of materials in PROINPA’s gene bank, literature on the extra-local movement of potato landraces, the importance of places outside Candelaria as sources and conservers of potato diversity, and finally the results of the potato variety “knowledge test”, all lead to a questioning of the presumed link between Candelaria and all the potato diversity that is being conserved there. Although all landraces are called “native” varieties, not all of them are “native” to, nor do they all appear to have been

⁹ Regression analysis, $r^2 = 0.005$, varieties = $11.86 + 0.02 \cdot \text{Age}$; $t = 0.31$, $df = 17$; $P = 0.76$.

Figure 10 Linear Fit – Varieties Known and Age of Participants
 Source: Interviews conducted in study communities, 2005

cultivated in, Candelaria in the past. There is then no clear and simple relationship between *this particular* place – Candelaria the biodiversity micro-center, and the diversity that is being conserved in the conservation area. The diversity found in the Candelaria area rather has traveled extensively and continues to do so.

In addition to conserving local genetic materials in their natural, social, and cultural context, PROINPA is introducing other “native” materials to the area from its gene bank, in the hopes that they might also be conserved there. Part of PROINPA’s conservation strategy in Candelaria is a series of activities that it labels “promoting *in situ-ex situ* linkages” (PROINPA, 2003: 21). An important element here is the “re-

Figure 11

Percentage of Participants in Three Age Groups Who Know the Varieties

Source: Interviews conducted in study communities, 2005

introduction” from the gene bank of materials presumed to be native, or at least adaptable to the area. This is done in a number of different ways. In one instance, a duplicate of the gene bank collection of *oca* and *isaño* (two other Andean root crops) was taken to Candelaria to be “conserved” in farmers’ fields (Cadima et al., 2003: 60). During my field research I spoke with more than one farmer who was cultivating, or had previously cultivated, seed of these Andean root and tuber species brought in by PROINPA staff. They had entered into a traditional Andean labour relation called *compañía* whereby one party provides land and labour and the other seed and fertilizer, and the harvest is split half-ways between the two parties.

Numerous potato varieties are also brought into the area (Gonzales, 2003: 40, 67). These materials are maintained in Candelaria, according to PROINPA’s guidelines, by individual farmer “conservationists” partnered with PROINPA (discussed in Chapter V), and by representatives of APROTAC (the Association of Producers of Andean Tubers of Candelaria) designated yearly on a rotation basis. This last mechanism allows farmers to access materials that they perhaps want, and do not have, and it serves PROINPA as a vehicle for varietal “re-introductions” to the area.

Although there is a logic in wanting to introduce, or (re) introduce to the area, new varieties or ones that are thought to have been cultivated previously, this practice also contradicts the idea of *in situ* conservation. It gives the area more of a role as a botanical garden, where a wide array of varieties from different places are grown and displayed, for scientific, educational, and touristic purposes, than as an *in situ* conservation site, or a genetic reserve, in which local diversity is maintained in its social,

economic, political and cultural context. More than simply describing and protecting Candelaria as a microcenter of diversity then, PROINPA is actively making it one.

Signs and perceptions of genetic erosion and/or persistence

In trying to gain an understanding of varietal dynamics in Pie de Gallo and Pie de Gallo Alto, I asked farmers if they thought that “native” varieties were disappearing from the area. Surprisingly, thirty-one percent of the farmers interviewed said that they did not think so. An additional fifteen percent say that they were being lost, but that they would not be lost completely because even if one family stops planting a variety, or loses it, there was always another family that continued, or began to plant it. These two groups make up almost half of the population studied. The remaining 52 percent do think that native varieties are being lost (Table 4).

When asked which varieties, if any, are being lost from the area, farmers named 19 (mostly “native” non-commercial) varieties (Table 5). However, over half of these varieties were each only mentioned by one participant, while only 2 varieties was mentioned by almost 50% of the participants¹⁰. Evidently, there is not a consensus among the participants in my study on whether or not, and which, varieties are disappearing.

A basic tenet of conservation biology is that a small population, particularly when relatively isolated from other sources of like members, has a high risk of extinction. This is in part the reason for concern over some of the “native” non-commercial potato varieties in Candelaria. As we saw in Chapter V, the relative weight in seed of “native”

¹⁰ Interestingly, just over half of the varieties mentioned as disappearing are currently planted by one or more of the participants in the study.

Table 4 **Participants' Perceptions
on the Loss of "Native"
Varieties from
Candelaria**

Will the Varieties by lost?	Percentage of Participants (n=19)
NO	31.6 %
YES, but will not be lost completely	15.8 %
YES	52.6 %

Source: Interviews conducted in study
communities, 2005

Table 5 **Varieties Listed by Study
Participants As
Disappearing and
Frequency of Their
Mention**

Variety name	No of times mentioned (n=19)
Pali Papa	10
Imilla Blanca	9
Sani Imilla	5
Holandesa	4
Runa papa	4
Condor Imilla	3
Canastillo	2
Puka Papa (qoyllu)	2
Puka Qoyllu	2
Amajaya	1
Chola Imilla	1
Kara Wallaku	1
Khunurana papa	1
Llusta	1
Luk'I	1
Phúreja	1
Puka ñawi	1
Waych'a criolla	1
Yana Qoyllu	1

Source: Interviews conducted in study
communities, 2005

non-commercial varieties planted in the study communities as compared to “native” commercial and introduced varieties is extremely small. However considering that “native” non commercial varieties are only cultivated for home consumption (and for gifts and special occasions), it is not surprising that the quantities planted and hence the area dedicated to these varieties is considerably smaller than those of the other classes of varieties that are sold in the markets (hence requiring a much larger production). Whether this has always been so, and the rate, degree and direction of change in the quantities and areas planted to “native” non-commercial varieties is impossible to know definitively without more detailed historical data, which is unlikely to exist.

From conversations with two of the oldest Candelaria residents, it became clear to me that in the time of the *hacienda* (before the 1952 revolution) most of the land in the valley, from the flat lands and the slopes up to the hilltops, was planted with the “native” commercial variety *Imilla Blanca* (improved varieties did not exist, and other “native” introduced varieties such as *Waycha* and *Sani Imilla* had not been introduced yet). Labourers were allowed to plant small plots on the slopes around their houses for their own consumption. They also used parts of the *hacienda*’s pasture lands to plant potatoes; and those who had large families were allowed to plant plots on the hilltops for their family consumption. In these areas, the local inhabitants planted a mixture of mostly *qoyllus*, “the same *qoyllus* that we plant today” one farmer said, and oca. Although this does not allow for an estimation of whether the area and quantities planted to the “native” potatoes have grown or diminished in recent history, it does suggest that the land in the area during the *hacienda* was also disproportionately used for commercial mono-crops

rather than for “native” non-commercial varieties, and that these varieties were cultivated, at least since then, in relatively small quantities. Therefore the quantities of “native” varieties may not have been reduced significantly in the past 50 – 60 years, when most of the genetic erosion is thought to have occurred¹¹.

The survival of a number of “native” non-commercial varieties in the area may suggest that the small population of these varieties, existing as such even during the *hacienda* times, does not make them as vulnerable to extinction as conservation biology theory predicts. This is at least in part because they are cultivated populations that are cared for and protected by local people whereas conservation biology theories are applied mostly to “wild” populations. Tunstall et al. (2001) argue that the deliberate actions of farmers cannot be overlooked in assessing the risk of loss of landraces. These actions have a strong bearing on population size, patch occupancy and spatial distribution, the major risk factors considered by ecological theories.

One of the conundrums of varietal dynamics in Candelaria is the periodic disappearance and reappearance of “native” non-commercial varieties in farmers’ collections. Terrazas and Valdivia explain that farmers’ germplasm structure is continually changing (1998: 15). They observed that in one time period, 30% of the farmers that they interviewed lost or eliminated 1-5 cultivars, while 40% added 1-3 cultivars (either new, or previously abandoned) to their collections¹². Given the

¹¹ Given the causes of genetic erosion listed in the environmental narrative (for example, the spread of modern improved varieties), it is implicit that most of the loss of genetic diversity is thought to have occurred in the past 50-60 years approximately.

¹² Writing about another Andean tuber cultivated in a similar area, in Peru, Hellin and Higman comment: “Some varieties appear only very rarely in individual farmers’ fields, perhaps only once every ten years. Then they disappear again. ...[W]hen asked where the rare varieties come from, farmers nonchalantly say,

dynamism of family varietal collections, assessment of the rates of actual abandonment and recovery (and possible future recovery) of individual varieties, may shed some light on the question of whether or not, and to what extent genetic diversity is being lost from the area.

Among the 15 “native” non-commercial varieties cultivated by the study participants, 5 (33%) were newly (re-)introduced by farmers to their fields in the year the data were collected. These (re-) introductions were made by 6 of the 19 informants (31%) incorporating between 1 and 2 “native” non-commercial varieties to their collections. All five of these re-introductions may have also been re-introductions to the two study communities, because no other of the study participants were planting these varieties at the time they were re-introduced. Meanwhile, participants from the two study communities report having abandoned, or are no longer planting, 13 “native” non-commercial varieties that they used to plant. However more than half of those who abandoned these varieties say that they would eventually plant them again, that they know someone who is currently planting them, and that they could get seed if they wanted to.

When we look more closely at the case of each of the 13 abandoned varieties, again nuances appear. Table 6 shows that almost half of the 13 varieties *do* seem to be in danger of disappearing from the area for a number of reasons including that those who

‘they just appeared’, or, ‘we bought them in the market’ ”(2003: 7). While the scientist in this latter case believes, even in the absence of “hard” data, that the area’s genetic diversity is being conserved, PROINPA, even with estimates such as Terrazas and Valdivia’s, which seem to indicate that there are not clear signs of genetic erosion, asserts that there is an impending loss of diversity.

Table 6 Varieties in Danger of Disappearance from Study Communities

Varieties Abandoned	<i>f</i>	Would you plant it again?		Do you know if anyone is planting?		Can you get seed?		Variety currently planted in community		Kgs planted in study year	Change in quantity planted from year prior to study	Number of people who re-introduced the variety
		Yes	No	Yes	No	Yes	No	# of Participants (n=19)	KGs			
Pali	3	1	2	1	2	2	1	No		0		0
Phùreja	3	2	1	3		3		Yes	6	148	0	0
Lonca	2	1	1	2		2		Yes	5	286	124	1
Runa Papa	2	1	1	1	1	2		Yes	1	60	60	1
Algo Pichilo	1	1		1		1		No	0	0	0	0
Condor Imilla	1	1		1		1		No	0	0	0	0
José Papa	1		1		1		1	Yes	3	100	-100	na
Khunurana	1	1			1		1	No	0	0	0	0
Kuchi aca	1	1		1		1		No	0	0	0	0
Llusta Papa	1	1			1	1		No	0	0	0	0
Puka Qoyllu	1		1	1		1		Yes	5	274	24	2
T'anta Wawa	1	1			1	1		No	0	0	0	0
Wawilu Morado	1		1	1		1		No	0	0	0	0
TOTAL	19	11	8	12	7	16	3					

Source: Interviews with study communities, 2005

abandoned them would not plant them again (many, for the reasons discussed in Chapter V). In addition, nobody in the community currently plants them and, those who abandoned them, do not know where to get seed. On the other hand, there are varieties such as *Phúreja*, *Lonca* and to a lesser extent *Puka Qoyllu* that seem to have an acceptance or a higher degree of permanence among farmers as several people do maintain them while others drop them, and those who abandoned them can conceive of re-introducing them to their collections.

Yet another way to try to substantiate (or test) claims of the loss of genetic diversity is to classify and rank varieties according to their abundance and frequency in a system. This is also done to assess the risk of further, or future loss, and to monitor actual disappearance of genotypes. Terrazas et al. (2005) use a scale that calculates and ranks the percentages of families sampled that plant a variety. These authors establish that varieties planted by more than 75% of the families are “dominant”, varieties planted by 41-74% of the families are “frequent”, those planted by 11-40% are “infrequent”, and those planted by less than 10% as “rare”. Brush et al. (1995) use a slightly different scale. Rather than report the percentage of families who plant each variety, they look at the percentage of a collection of tubers that is of each variety. In this scale, a variety that represents more than 10% of the tubers collected in the sample are considered “abundant”, while varieties that represent between 5 and 10%, 2 and 5% and less than two percent are considered “common”, “rare” and “very rare” respectively. Kent and Coker (1992) present yet another rating method¹³, which categorizes as “dominant” all the varieties that are planted by at least half of the people who plant the most frequently

¹³ This one is not specific to the potato crop as are the two rating systems already introduced.

planted variety, as “abundant” those that are planted by at least half of those who plant the dominant varieties, and so forth through categories of “frequent”, “occasional” and “rare”. Tunstall et al. (2001) use yet another rating system that combines three factors (relative abundance, relative density, and patch occupy) to arrive at the vulnerability to loss ranking.

Table 7 lists the varieties planted by the participants from the two study communities and the number and percentage of participants who plant them. Various lines separate the list of varieties according to three¹⁴ of the four rating methods described. When all three of these methods are applied to the data collected in the study communities, some important differences emerge in the classification of individual varieties¹⁵. For example, differences among the ratings of the varieties that are cultivated by only one person in the community can be important. These varieties appear as “rare” if classified according to Terrazas et al (2005), “occasional” if using Kent and Coker’s (1992) scale, and “common” according Brush et al.’s (1995) ranking. This indicates that different rating systems, based on different approaches to quantifying population abundance and frequency, give different assessments of the risk of loss of the same variety.

Zimmerer argues that the present ways of quantifying the risk of loss of genetic diversity do not take seriously enough the spatial distribution of varieties, and the scale at which risk of loss is measured (1998). This is an important limitation to Terrazas et al.’s and Kent and Coker’s rating systems. Brush et al. (1995) do address spatial scale, as well

¹⁴ The data available do not permit a proper use of Tunstall et al.’s (2001) method here.

¹⁵ While Brush uses the percentage of number of tubers collected from farms and markets, I use the percentage of the weight in seed planted.

Table 7 Three Different Varietal Rating Systems Applied to Varieties Cultivated in Study Communities

Varieties Cultivated	Participants		Rating Systems		
	# (n=19)	%	Terrazas et al. 2005	Kent and Coker, 1992	Brush et al. 1995
Waych'a	16	84	Dominant		
Puka Toralapa	13	68			
Yana Qoyllu**	11	58			
Kori Songo	10	53	Frequent	Dominant	
Azul ñawi	9	47			
Doble H	8	42			
Canastillo**	7	37			
Pinta Boca**	6	32			Abundant
Puka Qoyllu	5	26		Abundant	
Phúreja	6	32			
Candelero**	5	26			
Lunca	5	26			
Rosita	5	26	Infrequent		
Sani Toralapa	4	21			
Imilla Blanca	4	21			
J'hoseña	3	16			
Puka ñawi	3	16			
Chuisillo	2	11			
Churku runa	2	11			
Puka Wawilo**	2	11			
Lunca Pintada	2	11		Frequent	
Yungay	2	11			
K'atawi	1	5			
Runa Papa	1	5			
Monte Phúreja	1	5			
Waca Q'allu	1	5			
Amajaya	1	5	Rare		Common
Liust'a	1	5		Occasional	
Sani Imilla	1	5			
Desiree	1	5			
Runa Toralapa	1	5			
Bola Toralapa	1	5			
Jucuta papa	1	5			
Other varieties cultivated in	0				Rare
Candelaria	0			Rare	Very rare

Terrazas et al., 2005
By # of families who plant the variety

Dominant varieties: >75%
Frequent varieties: 41-74%
Infrequent varieties: 11-40%
Rare varieties: <10%

Kent and Coker, 1992
Factor of two system

Dominant varieties: 42-84%
Abundant varieties: 21-41%
Frequent varieties: 11-20%
Occasional varieties: 5-10%
Rare varieties: 0-4%

Brush et al., 1995
By % of tubers in a sample (1)

Abundant varieties: >10%
Common varieties: 5-10%
Rare varieties: 2-5%
Very rare varieties: <2%

(1) As the sample is small, and the lowest possible value is 5%, I have pushed those values that are on, or near, the boundaries to the lower class

Source: Interviews conducted in study communities, 2005

as the type of diversity (genotype or allele) that is of conservation interest. An important limitation of this approach however is that it depends on the number of varieties planted. In this way, a community that plants a smaller total number of varieties might have most of its varieties above 10% whereas a community that plants a larger total number of varieties might have more varieties under the 10%. There can thus be many different rating systems, each with its advantages and disadvantages. Which of them is applied makes a difference to which varieties and how many varieties are considered to be in danger of erosion.

In sum, assessing genetic erosion is far from straightforward. As I have shown, the signs and local perceptions of genetic erosion in Candelaria do not lead to a definitive answer. It seems, given PROINPA's efforts to concentrate diversity in the area, perhaps replenishing what is thought to have been lost from there, that the presence of diversity is only expected to move in one direction (down). There is no room in this understanding for its comings and goings. However, as the previous section showed, "native" varieties seem to do precisely that, come *and* go. While these observations may seem to deny erosion, that is not my intent. As I have shown, certain varieties do seem to be gradually eroding from the area. What I want to argue rather is that the assumption of genetic erosion represents and enables a particular configuration of power relations. It enables PROINPA's enrollment of Candelaria into the globalocentric position of the agrobiodiversity network. As is increasingly being argued in the plant genetic resources literature (see Brush 2005 for a recent overview and discussion) however, genetic erosion is a global assumption based on few empirical cases. Many other cases show that it is

either not occurring, or not occurring in the ways and to the degrees that have been observed in those cases. While the threat of genetic erosion has not been shown in Candelaria, its presumed occurrence elsewhere, and everywhere, legitimizes a conservation program here.

Conclusions

This chapter explored the process of Candelaria's becoming a "place of origin" through the analysis of three aspects of PROINPA's representation of the place's nature. The first section addressed how landscape is "naturalized", denied of its history, through its description of farmers' cultivation of diversity as a function of topography, and of their detailed knowledge of it. Picking up and extending the discussion opened in Chapter V about where people in Candelaria plant which varieties and why, I explain that Candelaria's landscape is made of much more than topography. It has a trajectory, a history of movement, like Massey's (2005) migrant rocks, closely intertwined with that of the people, varieties, animals, technologies and discourses that interact with it.

The second part of the chapter addressed two (somewhat contradictory) aspects of the presence of a diversity of potato landraces in Colomi/Candelaria: their erosion, and their exclusive link to the area. Like the topography of the area, both enable the establishment of an *in situ* conservation pilot site in Candelaria. However the signs and local perceptions of genetic erosion in the area lead to a confusing picture as to whether diversity is diminishing or just changing hands, and which varieties in particular are most vulnerable or affected by genetic erosion. Similarly, the evidence from various sources,

including my interviews with farmers in the area, suggests that the diversity in the area is not exclusive to here but rather has traveled extensively, again, like Massey's (2005) migrant rocks, except a little faster, and continues to do so. Like the "history" of Candelaria discussed in Chapter V (and indeed, as part of this history), these three movements, that of the trajectory of landscape, and the ups and downs and travels of varieties to and from Candelaria, make it impossible that Candelaria be a "place of origin", a still place, a nature and society without history.

If we can't go back to a "place of origin" then, as Braun (2002) argues, our protection of the places, named or labelled like this, must rather be understood as the *production* of these places (p. 256). Ironically, *in situ* conservation does allow for the conservation of landraces and wild relatives in restored and "human" made habitats. However the purifying impulse of the "moderns" is too strong. It does not recognize that even the places that are classified as "natural habitats" or "places of origin" (and also *because* or *through* their designation as such), are already hybrids. They are already heterogeneous associations.

Whether it is in the production of places of origin, or in the making or selecting of restored habitats (Katz, 1998: 56-57 about restoration more generally), the scientific discourses of *in situ* conservation do not problematize their making. They do not ask: Who is making these places? Based on what visions or idealizations of original nature? Which other visions of nature and of society are being marginalized, and ultimately, what social relations are being re-entrenched in the process?

Chapter VII.

SYNTHESIS AND CONCLUSIONS

When *in situ* conservation was first proposed as an alternative, or as a complement, to *ex situ* conservation, scientists dismissed it as both “unscientific” and unable to guarantee the preservation of the valuable germplasm that was in the hands of the millions of farmers of the Global South. While a substantial reason for this rejection was a general lack of belief in the value of the local knowledges and agricultural systems, much more was involved. Numerous important questions sprouted around the idea of “encouraging” farmers and indigenous people to continue cultivating, and thus to conserve, the genetic diversity on which global food security depends (Brush, 2000). How could scientists indeed ensure that farmers continued to cultivate and breed landraces? Given the situation of poverty in which many farmers in the Global South live, how could the global community expect them to continue living and farming as they did? What types and degrees of “encouragement” would work? What guarantee was there that national policies, or multinational interests, would not overrun these peoples’ lands and livelihoods, doing away with the world’s valuable germplasm? These, and other questions, made *in situ* conservation, politically, a “hot potato”.

The gradual acceptance of *in situ* conservation was an echo of the inching recognition among many scientists and “development” practitioners that not only are farmers and indigenous people extremely knowledgeable about their crops and their environments, their management practices have, in many instances, proven to be more

sustainable and more conducive to the conservation of genetic diversity than Western ways have been. It was also a sign of mounting concern on a global level about habitat loss, and the consequent danger for the loss of the “wild relatives” of cultivated plants. *In situ* conservation also won approval as the shortfalls of *ex situ* conservation became evident. These shortfalls were particularly problematic for root crops such as the potato. Today, for these reasons, and others, *in situ* conservation is widely accepted, and implemented as a complement to *ex situ* conservation.

Many of the questions that delayed and complicated *in situ* conservation's acceptance have either been addressed, are currently on the table, or have been found to be unfounded. Acceptance in scientific circles has come mainly because of recognition that conservation is improved by maintaining *in situ* as a complement, rather than as a replacement, for *ex situ* conservation, and because of the former's promise for overcoming the latter's technical limitations. Assurance that landraces are being conserved *in situ* came, in part, as scientists and field staff began to work closely with farmers who were motivated to participate through their own desires to conserve their crop varieties, and through their recognition of benefits associated with conservation projects. The support of national governments has been obtained by a variety of different means, but mostly through conservation programs backed by international funds and financiers, centers of scientific knowledge, and mainstream discourses of “environment” and “development”. Issues of property rights and access, albeit far from resolved, are being vigorously debated and worked on. Similarly, the issue of poverty, far from being resolved, and arguably further from being adequately conceptualized, is targeted by some

elements of *in situ* conservation strategies. Most of these questions fit into the now expanded repertoire of technical, scientific, managerial and economic issues that are being addressed by scientists and technocrats concerned with the challenge of conservation coupled with “development”.

While many *in situ* programs, including that of PROINPA in Candelaria, have shown many interesting and positive results, the most important and most pressing political and conceptual issues facing *in situ* conservation programs are not being addressed. These revolve around the uneven power relations perpetuated by this approach to conservation, and the conceptualizations of nature and society that at once enable these relationships, and hide them. It is these issues that are addressed in this thesis, through an investigation into how Candelaria, the pilot site of PROINPA’s *in situ* conservation program, comes to be a “place of origin”. The thesis draws on recent poststructuralist theorizations of society, nature and place, which are informed by Actor Network Theory’s strengths in explaining identities as heterogeneous associations, and on Foucault’s (1980) notion of power/knowledge which I take as underemphasized among his concepts applied in ANT, but crucially important to understanding the political significance of the ways in which networks are assembled.

The argument forwarded in the thesis is that Candelaria’s becoming a “place of origin” is the effect of a confluence of “things”, ordered in a particular way. The “things” are of all sorts: people, farm animals, land, topography, diverse potato varieties (“native” and “non-native”), soil pathogens, fertilizers, local knowledge and scientific knowledge, gene bank collections, biodiversity fairs, viral cleaning of potato seed. The “order” comes

from a particular position within what I have called (after Escobar, 1998) the “agro-biodiversity network”, which gives meanings and roles to all these things by enrolling them into the network, in ways that reflect the understanding of the world embodied in this position. This ordering is an exercise of power that has profound effects on the constitution of the spaces where it is performed. It is through this process that Candelaria is becoming a “place of origin”.

This does not mean that the *in situ* conservation discourse, or the “order” that is given to the “things” that make-up Candelaria, is an omnipresent or dominating power. As has been shown by post-colonial scholars, colonial power is never complete. It is necessarily drawn into a reciprocal, albeit uneven, relationship with its subjects, who also play a role in the constitution of the new realities, and hybrid identities, that emerge from the encounter. Many of the people in Candelaria willingly lend themselves to the cause of *in situ* conservation. As discussed in Chapter III, I also lent myself to this worthy project. The other ‘things’ apparently also “agree” to their enlistments. However, the local people do not all always agree on the terms of their enrolment, in the roles and meanings that they are given in the collective. They continue to cultivate and behave in ways that do not quite fit into the roles that they are dealt (those of “traditional”, “steward”, or entrepreneur). Likewise, in not conforming to the identity given to me by the *técnico*, his organization, and PROINPA in Llalagua, I also did not agree to the way I was enrolled there. Finally, the apparent agreement of the “things” may be only because they don’t have any one else with a strong enough voice to speak on their behalf, or, as Latour and his colleagues would say, to “translate” their desires. As I have shown, there are alternate

discourses of Andean landscape ecology, and on the locations and movements of genetic diversity; however these do not (yet perhaps) have a place in PROINPA's discourse.

This is precisely the importance of Foucault's concept of power/knowledge: other voices are silenced and made to seem irrelevant. However this does not mean that these other voices do not exist, and that they cannot articulate the resistance of the 'things' to their enrolment, or perhaps more importantly, to the *ways in which* they are enrolled. An important part of the work of this thesis has been to show that the order given to the myriad "things" in this collective is not objective and self-evident, and it does not go unchallenged.

In the worldview of this position, which is shared by dominant environment and development oriented institutions and programs today, nature and society exist in separate realms. Paradoxically, nature is viewed as part of both the "modern" and the "post modern form of ecological capital" (Escobar, 1996). It is valued both as a natural resource, and as an embodiment of an "original purity", or a "reservoir of value" in which both the genetic material and the local knowledge associated with nature should be protected and safeguarded from society's encroachments. Both these views play significant roles in the selection and "enclosure" of Candelaria as an *in situ* conservation space, and in its classification and naming as a "microcentre of diversity". I argue that, through this act of selection and naming, Candelaria is inserted into the specific cultural narrative of the "globalocentric position" of the agro-biodiversity conservation network.

As such, it is “symbolically conquered” (Escobar, 1996), and the doors are opened for the implementation of a series of conservation activities there.

Through a careful study of the *in situ* discourse of the conservation program implemented in Candelaria, and through its contrast with data collected during my research experience in Bolivia, and with information found in the literature on agriculture in the Andes, the study questions some of the taken for granted assumptions and knowledges that enable PROINPA to get a foothold in Candelaria. The description of local people and their agro-ecosystem as “traditional”, key in the selection of Candelaria as the site for the program, does not hold in face of evidence that they are just as much a contemporary and post-colonial society in terms of the numbers and of types of potato varieties that they cultivate, the other crops and the animals that form part of their system, and the evolution of “traditional” labour sharing arrangements. The description of local people as “stewards of biodiversity”, key in the establishment of what appear to be field gene banks, does not hold either in face of the many challenges and other preoccupations, which farmers have in cultivating potato diversity. This is evidenced by several of PROINPA’s “farmer conservationists” dropping their activities with the foundation, and in PROINPA’s eventual dropping of this label in its discourse. It is also evidenced in many of the Pie de Gallo and Pie de Gallo Alto farmers’ claims summarized so well by one of them when she said that, “it’s not only [a matter of] planting [“native varieties”] for planting’s sake”. The rationales for local people’s cultivation of diversity are also questioned. Whereas it is assumed that they do so principally as a matter of survival in the heterogeneous and unpredictable conditions in which they live and work, as a matter

of the application of their traditional technical knowledge, their practices and their direct responses to questions in this regard suggest otherwise. Finally, the effort to commercialize “native” varieties, a strategy for generating value from diversity and thus ensuring its continued cultivation, does not seem to interest many of the farmers interviewed, and is problematic because it risks the overuse of lands in the *phuruma* areas.

With regard to Candelaria’s nature, the explanation of the landscape as a direct function of topography, the insistence on altitude-based cropping zones, again, key in the establishment of Candelaria as a conservation site, does not hold in face of local farmers’ cultivation of “native” varieties in locations where it is presumed that they don’t (or shouldn’t). This is corroborated by research in other parts of the Andes that highlights that these landscapes are as much socially constructed as they are a function of altitude (Zimmerer, 1996). The presumed presence and erosion of diverse potato landraces in the area, albeit somewhat contradictorily, also justify the need for a conservation site in Candelaria. Ironically, a closer look at both leaves one wondering where exactly varieties are going. Are they all really disappearing from the area? Were they ever really “native” to, or originally from, Candelaria?

All of these elements weave the web that is called “Candelaria, the microcenter of diversity”, which is taken as synonym of “place of origin”, a place to be conserved. The research presented here questions the nature of some of the threads that tie this web together, in the way that it has been woven. What emerges from the analysis is a questioning of the given-ness of this place (Massey, 2005). It is a questioning that urges a

reflection on whether, as Braun (2002) argues, we are protecting this place, or producing this place. My analysis suggests that the answer is the latter. Candelaria *is* not a place of origin; it is *becoming* a “place of origin”. Therefore, what goes into the making, not only the “things” as components, but much more importantly, the order that they are given, who is doing the ordering, and what is left out of the order, the discourse of *in situ* conservation, need to come into question as a matter of politics.

In illustrating the importance of this, I want to pick up on a moment in the beginning of Chapter VI, where I suggested, after Massey (2005: 124-125), that it is impossible to go back to a “place of origin”. I added, knowing of course that this is impossible, “Unless one travels in time”. Let’s say for a moment that we had a time machine, and decided that we did want to travel back in time to encounter a “place of origin” where we would establish an *in situ* conservation site. Let’s say also, that once we got there, we could hold time still, because, if not, no sooner had we arrived than, time would tick and the place would be remade, this time with us and our time machine in it.

Before setting off on our journey, we would ask “who wants to come?” Let’s say several of Candelaria’s farmers decided to come (we only have room for a few), among them Don Alberto and Don Tomás, the two “farmer conservationists” working with PROINPA, and few of the more willing farmers from Llallagua. Let’s say also that they brought with them, as many farmers are known to do when they travel, a few seeds of their favourite potato varieties, and of their other crops: fava beans, barley, oats, tarwi, oca... . Perhaps they would also want to bring a couple of their healthiest sheep to breed, and a cow or two for milk. When all are aboard, we would need to decide which way to

go. How to go to the past? Perhaps the best way, or the only way is to retrace our history. We would fly over Candelaria, or wherever it has arrived to until the day we left (Massey, 2005), we would wave as we would fly past Doña Gloria grazing her sheep in the *phuruma* lands, and Don Ernesto a little further away sowing his batch of “native” commercial varieties to the disapproval of his fellow community members. And we would wave again when we would recognize Doña Gloria reappear, only now younger and cultivating numerous varieties accompanied by the enthusiastic PROINPA staff (also now younger). We would wave again when we would realize that we were so suddenly flying over a number of “peasants in blue overalls driving tractors” (Healy, 2002:14) planting “improved” varieties for the first time on the land redistributed by the land reform, and only just now learning how to apply fertilizers. Perhaps at this point Don Estensoro, who has been sitting silently in the corner will decide that this is where he wants to get off. “These were definitely the best days” he might argue, “the land still produced then, the soils weren’t tired, and the *ingenieros* were so keen to help us increase our production”.

Perhaps a discussion would ensue and several of the other farmers would convince Don Estensoro to stay with us a little longer. “We haven’t reached our place of origin yet,” they might say. And we would continue flying, and passing historical moments and each of us would wave as we recognized different “things” and places from our pasts: the tin mines outside Llalagua, the miners protesting on the streets, the military repression, the break up of the Ayllus, further and further and further past. Until at one point, the sheep would begin “baa baa baa”. They want to get off here. They see

their ancestors arriving to the Andes and have no desire to go any further; they'd rather go to their own "places of origin". At this point, a few of the farmers on board would interject saying, "this way, this way, you missed a turn" and the driver would disagree and pull out a map that nobody can understand. Alas, we would realize we were lost. And more than that, we would realize that we had different visions, different directions to the "place of origin". We would have to negotiate where to go, and the outcome, the decision of which way to go, which place of origin, whose place of origin, would ultimately be a question of power.

The findings of this work have important implications for both the space and the time of the conservation of genetic diversity. The challenges are conceptual, emotional and political. Much has been written about the "nostalgia" of conservation, the yearning for returns to purity, and much of the thesis has turned on this theme. Recent theorizations of nature and society, used in this thesis, have critiqued and questioned common conceptualizations of society and nature. They explain the impossibility of a nature without society, and of a society without nature. They also question the possibility of a place that stands still (Massey, 2005). The question emerges: how can *in situ* conservation proceed to do the worthy work that it intends, without the nostalgia that feeds the urge to isolate and protect what we think we're losing. It is evident given the discussion in the thesis, that even the more recent "nature/culture hybrid" (Zimmerer, 2000) forms of conservation spaces are problematic. The suggestion is that perhaps "spatial separations" do not provide the solution to our socio-ecological problems as has been thought (Murdoch, 2006: 126). But, how do we conserve genetic diversity, without

bounding its space, without capturing its time? The answer perhaps is to recognize that both what gives rise to diversity, and what is causing its erosion happens everywhere, in real time. This poses the challenge of looking not only for technical and economic solutions, but also more broadly at agricultural and development policies, at issues of land access and use, at migration, at poverty, ...at all the relations that make us, here, now.

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APPENDIX 1

Interview 1

WR_____

1) Name _____ Community _____ Age _____

2) **Affiliation:** Sindicato _____ Other Sindicato: _____

APROTAC _____, CIAL or FFS _____

Other local organization _____

Position(s)(present or prior) _____

3) FAMILY

Do you have family in this community, or in another in Candelaria? (*name and community*)

Relationship	do you live w/him/her	Name	Community
Mother/Father		- -	-
Son/Daughter		- - - -	-
Brother/Sister		- - - -	-
Cousins		- -	-
Spouse's family		-	-
Others		-	-

4) What varieties of potatoes did you plant this year? How many 'cargas' of seed did you plant? How much did you plant last year? (include even the most minimum quantities planted)

#	Native Potatoes	Cargas	Last Year	Potato (improved varieties)	Cargas	Last Year
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

5) Which varieties of potato (native or improved) have you stopped planting? Do you think that you will plant it again some day?

Variety Name	Reason(s) for stopping to plant	Do you think you will plant it again some day?	Do you know someone who still plants it? Who? (<i>name and community</i>)	Can you get seed from this person?	Terms	If no, why?	Where else could you get seed?
Native Potato							
Improved varieties							

6) Which varieties would you like to have? (ones that you do not currently plant)

If none, explain

Variety	Why would you like it	Do you know someone who plants it? Who? <i>(name and community)</i>	Can you get seed from these persons?	Terms	If no, why?	Where could you get seed?
Native Potato						
Improved Varieties						

7) Where (or from whom) do you normally get seed? (*terms?*)

Native Potato:

variety	source	terms

Improved:

variety	source	terms

8) Do you give or sell seed to anyone? To whom? Terms?

Native Potato:

Variety	Persons	Terms

Improved Varieties:

Variety	Persons	Terms

9) In your family, what is the role of women in potato cultivation?

10) Are there any varieties that are managed only (or more commonly) by women? Which? Any varieties that women prefer? Which? Why?

APPENDIX 1.1

POTATO VARIETY KNOWLEDGE "TEST"

List of Varieties	I plant		Planted	YES	NO	ONLY NAME	Form of Tuber	Color of Skin	Color of Pulp	Eyes	Type of Soil	Size of Plant	Use(s)
Native APROTAC													
Canastillo													
Candelerio													
Pinta boca													
Wawilu													
Yana Qoyllu													
Non-commercial 'native' varieties													
Ajarwiri													
Ch'aska imilla													
Ch'uisillo													
Churku runa													
Huaca Q'allu													
Ikari													
J'hose papa													
K'ara walluk'u													
K'atawi													
khachun papa													
Khuchu Akita													
Lila papa													
Llogallitu													
Luk'i													
Machu wañuchi													
Monte phureja													
Moyonqollu													

List of Varieties	I plant	Planted	YES	NO	ONLY NAME	Form of Tuber	Color of Skin	Color of Pulp	Eyes	Type of Soil	Size of Plant	Use(s)
Pali												
Papa rosa												
Phureja												
Pinkilo												
Puka mamita												
Puka ñawi												
Puka Qoyllu												
Puka Wawilu												
Runa papa												
Saululu												
Suta mari												
T'anta wawa												
Waca Chilena												
Waca luron												
Yana imilla												

APPENDIX 1.2

Guide for Interview Three

(almost all these questions need to be explained further to the respondent)

- 1) Some people plant some varieties and others plant others. Most people plant five, six, seven, but they are not always the same ones. Why is this? How do you explain this difference between families?
- 2) Is it true that some varieties are difficult to get? If yes, which ones. and why? Are there varieties that some people get (have access to) and others cannot get? How does this work? Why? How/Where do you get the varieties that are difficult to get?
- 3) a) Do you ever receive seed from farmers that work with PROINPA or other organizations?
b) Do you ever receive seed from farmers who plant many varieties but do not work with an institution (independent conservationists)
- 4) How do you decide which varieties to plant each season? What effect does the market have on your decisions of what to plant?
- 5) What would happen if the market price of Qoyllu varieties rises drastically?
- 6) Do you know APROTAC? What do you think of the idea of commercializing native potatoes through a grower's association?
- 7) How do you explain the persistence/ existence of so many varieties in the area? (Where do they come from? How do they persist if the market only asks for a few and there are varieties like Waych'a that produce so much and are more resistant to diseases. Why do the people here not only plant a few varieties?)
- 8) How do you explain that in the potato variety knowledge test almost everyone knows more varieties than those that they plant? Where do they know them from?
- 9) Do you think that native potatoes are disappearing (yes/no)? Which ones? Do you worry or think about this? Why?
- 10) Do you think that some potato varieties need to be protected? Why? By whom?
- 11) Who do native potatoes belong to? not the seed, but the variety as such.