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On the edge of an open pit: Access to land & natural resources in Tundayme, Ecuador

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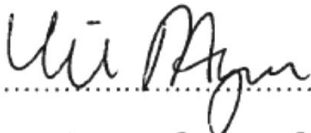
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MSc Thesis in International Development Studies

December 2015

Declaration

I, Elaine Benham Hogan, declare that this thesis is a result of my research investigations and findings. Sources of information other than my own have been acknowledged and a reference list has been appended. This work has not been previously submitted to any other university for award of any type of academic degree.

Signature..... 

Date..... November 29, 2015

*For the people of Tundayme,
que sigan luchando...*

Acknowledgments

I would like to thank my family for their love and support during the past two years of graduate school. I could not have done it without you!

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And finally, to the people of Tundayme, who shared their stories with me and asked me never to forget. My experience in Ecuador left a lasting impression on me.

I will surely never forget.

List of Abbreviations & Translations

CASCOMI	Comunidad Amazónica de Acción Social Cordillera del Cóndor Mirador - Amazon Community of Social Action in the Condor Mirador Range
Campesino	Rural peasant population made up of <i>colono</i> or <i>mestizo</i> people of mixed Ecuadorian and indigenous origin
Colonos	People of mixed Ecuadorian and indigenous origin who expanded the frontier rapidly beginning in the 1960s, clearing land for cattle ranching and agriculture. (See also <i>mestizo</i>)
CODENPE	Counsel of the Development of the Nationalities and Peoples of Ecuador Consejo de Desarrollo de las Nacionalidades y Pueblos del Ecuador
CONAIE	Confederation of Nationalities of Indigenous People of Ecuador
ECSA	Ecuacorriente Resources, S.A.
FDI	Foreign Direct Investment
ILO 169	International Labour Organization (of the United Nations) Convention No. 169 regarding indigenous people's rights to free and prior informed consent of development projects which impact them
INREDH	Regional Advisory Foundation on Human Rights
Mestizos	People of mixed Ecuadorian and indigenous origin who expanded the frontier rapidly beginning in the 1960s, clearing land for cattle ranching and agriculture. (See also <i>colono</i>)
MAE	Ministry of the Environment
NMBU	Norwegian University of Life Sciences
OBSA	Observatory of Social-Environmental Conflict at the Technical Particular University of Loja, Ecuador
Shuar	Indigenous people from the lowlands of the Amazon and mountainous Andes region of Ecuador and Peru who were never colonized by the Inca or the Spanish.
Título Global	Global or collective title to land held by indigenous groups in Ecuador, based on territories they traditionally occupied before colonization
UTPL	Universidad Técnica Particular de Loja (Ecuador) - Technical Particular University of Loja
VAT	Value Added Tax

Abstract

This research will explore how the presence of the Mirador open pit copper mine has altered access to land and natural resources in Tundayme, Ecuador. The mine is located in southern part of the country along the border of Peru in a rural region of the Ecuadorian Amazon known for its exceptional biodiversity. Ecuador's economy is heavily dependent upon income from petroleum extraction but the present administration plans to significantly increase mineral extraction. The Mirador project is slated to become the nation's first large-scale open pit mine. Extensive changes to mining laws have been made in order for the state to accumulate more revenue from extraction. Mirador is one of five strategic mines that will be exploited in order to foster national development.

Tundayme is home to the indigenous Shuar who had little contact with mestizo settlers from other areas of Ecuador until the 1950s. Similarly, they were never conquered by the Inca or Spanish. Large-scale, open pit mining represents a significant change in land use from traditional farming and subsistence practices of the Shuar and mestizo populations. Processes of land acquisition for the mine have been irregular and marked changes in water quality have been observed during the initial construction phase.

Qualitative methods of observation and interviewing were used to explore residents' experiences related to environmental change and access to natural resources. Identified factors affecting access include direct accumulation of land and natural resources, as well as dispossession by contamination from perceived mining pollution. Ribot & Peluso's *theory of access framework* is used to identify a variety of broader mechanisms affecting access and obtain a comprehensive view of the complex local context. Local responses to the mine's direct appropriation of land and natural resources are examined. Growing concerns of dispossession due to contamination from the mine are explored by examining people's perceptions of environmental change and their adaptations.

Table of Contents

Declaration	i
Dedication	ii
Acknowledgements	iii
List of Abbreviations & Translations	iv
Abstract	v
Table of Contents	vi
Chapter 1: Introduction	1
Background	1
Geographic Location & Environmental Attributes.....	1
Migration & Changes in Land Use	2
Rights to Land & Natural Resources	4
Post-neoliberalism, Extractive Industry & Development	6
Current Situation	10
ECSA & Social-Environmental Conflict	10
Local Responses.....	11
Thesis Objective	13
Chapter 2: Methodological Approach	15
Situating the Qualitative Research	15
Methods	16
Fieldwork & Data Collection.....	16
Sampling	18
Coding & Analysis.....	19
Challenges & Limitations	19
Ethical Considerations	21
Concepts Defined	21
Political Ecology	22
Access	22
Accumulation by Dispossession	27
Dispossession by Contamination	28
Chapter 3: Findings & Discussion	30
Access to Land & Natural Resources in Tundayme	30
Applying the theory of access framework	30
Accumulation by Dispossession	47
Dispossession by Contamination	51
Local Responses to Changes in Access	54
The case of CASCOMI.....	54
Direct Action.....	56
Chapter 4: Conclusion	58
References	61

Chapter 1: Introduction

Background

Descriptions of the study area and historical changes in population, migration and land use help situate further chapters. These historical shifts are discussed in relation to rights over land and natural resources. A brief overview is given of the extractive industry's importance to Ecuador's national economic and development strategy.

Geographical Location & Environmental Attributes

Tundayme is a small rural parish of about 1,000 people located in the municipality of El Pangui in south eastern Ecuador in the province of Zamora Chinchipe (see Figure 1). With a total area of 25,127 hectares, Tundayme is part of a sub-range of the Andes called the Cordillera del Cóndor, within a tropical rainforest rich in biodiversity and verdant mountains (Gobierno Autónomo Decentralizado Parroquial Rural de



Figure 1. Map of Tundayme. (Huachos 2015).

Tundayme 2014). The rivers Tundayme, Wawayme and Quimi pass through Tundayme and join the Zamora River along the western border of the parish, forming part of the Santiago-Zamora river basin. To the north of Tundayme is the neighboring province of Morona Santiago and to the east is the national border with Peru.

A total of 16 different ecosystems exist within the Cordillera del Cóndor along with many ecological niches, making it apt habitat for a variety of flora and fauna and a hotspot in terms of endemic species and biodiversity (Özkaynak et al. 2012). It is estimated that over 4,000

different species of vascular plants exist in the area, including many endemic species unique to the region (Neill 2007). In addition, over 600 species of birds can be found within the Cordillera del Condor, 14 of which are in risk of extinction (Sacher et al. 2015). Along with 120 different species of amphibians, 59 species of reptiles and an average of 220 different species of trees, this area is of great ecological importance (Neill 2007; Sacher et al. 2015).

Migration & Changes in Land Use

While the population of Tundayme is about 1,000, the municipality in which it is located, El Pangui, has a population of about 8,600 people. About 24% self-identify as indigenous and 74% are *mestizo* or of mixed decent (INEC 2010). Historically, the indigenous Shuar people inhabited this region of the Amazon and had little contact with Ecuadorians of European decent before the 1890s. They sustained themselves by hunting and gardening while living in acephalous societies loosely organized by kinship rather than political hierarchy (Rubenstein 2001). Settlement of what was traditionally indigenous territory has changed the social structure of the Shuar and altered the natural landscape. New actors have come to occupy the same geographical space, bringing with them different ways of using natural resources and engaging with capital markets. These shifts have brought the region into a market economy increasingly influenced by global fluctuations in commodity prices which has altered the way in which natural resources are used.

The first wave of settlement was initiated after oil and mineral discoveries combined with a lack of human settlement along the Peru-Ecuador border caused Ecuador to grant control over the southern Amazon region to the Salesian Catholic order (Rubenstein 2001). This brought many mestizo settlers (*colonos*) to the Shuar region of the Amazon. By showing they were using the land for economic production, colonos were able to gain legal title to

extensive area. They cleared vast tracts of land for cattle ranching and expanded over what had been Shuar territory used for subsistence. This informal process of land appropriation continued for decades and was legally legitimized in 1964 when Ecuador passed land-reform legislation granting land to those who used it for economically productive activities (Lu & Bremner 2006; Rudel et al. 2002).

In response to significant land loss and growing pressure to incorporate the Shuar into the Ecuadorian state, the Salesians encouraged Shuar to alter their social and physical organization by grouping themselves into small settlements called *centros*. This allowed government services to reach them and made them less vulnerable to continuing land appropriation by colonos. The Shuar organized themselves in the *Federación de Centros Shuar* and gained global titles to land based on their ethnicity and ancestral claims to territory. Continuing traditional settlement patterns and social organization became risky, especially with continued encroachment from colono settlers. Since entitlement to land was gained as part of membership in a centro, incorporation into centros was a rapid process. By 1988 the Federación de Centros Shuar represented over 260 centros (Rubenstein 2001).

These developments formally changed the social and spatial organization of the Shuar. Similarly, the way in which the Shuar used natural resources was altered as they began to clear small tracts of land for cattle ranching in order to further legitimize their claim to land. Although many Shuar are now involved in income generating activities such as cattle ranching, small scale mining and agriculture, the adoption of such practices is largely the result of changing relationships to land and natural resource access wherein legitimate claims to occupy and utilize land were based on economic productivity (Rudel et al. 2002). Access to land and natural resources has formed a vital part of social identity in Tundayme, where

most inhabitants of the rural parish, whether Shuar or colono, are now involved in small-scale agricultural activities such as the cultivation of yucca and corn and cattle-raising. Access to land and natural resources is a defining issue due to its direct effect on inhabitants' livelihood. Historical conflict over land usage between the Shuar and colonos has subsided as mining is seen as a threat to all rural peoples dependent upon agricultural production.

Rights to Land & Natural Resources

During the 1980s indigenous peoples from Ecuador and other areas of Latin America engaged in social-mobilization to gain political recognition of their collective rights to self-determination and their ancestral territories. With about 45% of Ecuador's population represented by the Confederation of Nationalities of Indigenous People of Ecuador (CONAIE), indigenous rights were officially recognized in the Ecuadorian constitution reforms of 1998 when Ecuador declared itself a multi-ethnic and multi-cultural state (Chuji et al. 2009). Ecuador also ratified parts of the United Nations' International Labour Organization's convention 169 (ILO 169), which focuses on the rights of indigenous peoples to be consulted when proposed development would impact them. The central tenants of ILO 169 are based on prior consultation as well as free and informed participation in the decision-making process. In the case of indigenous peoples, establishing rights to land and natural resources is based upon traditional occupation of ancestral territories and use of all resources there within (with the exception of subsoil resources, over which the state claims autonomy). Although receiving collective titles is not a requirement, governments must identify and protect indigenous rights to land and natural resources traditionally occupied.

The provisions of ILO 169 are identity-based in that ones indigeneity provides inclusion and special recognition of historically unobtainable legal protections. It is however, important to

note that ILO 169 does not advocate for a set of rights more ample than those which are already granted to non-indigenous citizens. Its goal is to simply include indigenous peoples in socio-political processes of which they have traditionally been excluded. In 1989, the Shuar of Tundayme received legal title to 797.8 hectares (1,971 acres) of land, held collectively by the Centro Shuar Churuwia. In other indigenous areas of Tundayme, such as Numpaim San Carlos and Yanua Kim, no official legal title has been granted although the arduous bureaucratic process has been underway for some time. It is uncertain whether collective title will be granted given that most of Tundayme's land has now been concessioned for large-scale mining. Whether by extractive industry or individual colono settlers expanding their cultivation area, indigenous communities outside of globally-titled Churuwia are more vulnerable to continued encroachment on their traditional territories.

Historically, mestizo or colono settlers were largely able to gain rights to land by obtaining legal individual titles from the municipality. This process was encouraged by land reforms in the 1960s whereby legitimate title was gained by demonstrating economically productive use such as the clearing of forest land for cattle grazing or farming. Shuar inhabitants often directly allowed new settlers access to land in exchange for household goods such as radios or machetes. Since a linguistic and cultural barrier existed, concepts of ownership and trade were misunderstood on both sides. Whereas the Shuar concept of ownership is based on the management of resources within a territory, colono concepts of ownership are based on securing legal title with full rights through purchase (van Teijlingen 2012). The Shuar may have understood these exchanges as a sort of reciprocity while mestizo settlers considered them a binding contract and full exchange of rights. This has led to a contradictory historical recollection in which many original settlers and/or their descendants claim they legitimately bought the land from the Shuar while the Shuar consider the land to have been obtained

through trickery or stolen outright. Irrespective of varying perceptions, the Shuar in Tundayme soon found themselves without access to the vast areas of forest they had traditionally used for subsistence agriculture and cultural practices. The struggle to re-gain access to ancestral lands is ongoing and has been confounded by the presence of large-scale mining, which requires expansive access to land and natural resources.

While Shuar claims to territory are based on their social identification as original inhabitants, colono rights-based claims to land and natural resources are based on utilization which creates economically productive commodities. This was historically how colonos gained legal title to extensive land in Tundayme. However, it is important to note that many colonos do not currently have legal title to land they occupy. It is estimated that in the Amazon region of southern Ecuador, only about 34% of rural farmers have formally titled land (USAID 2011). There is significant backlog in titling, with an estimated 60% of titles out-of-date (USAID 2011). The acquisition of new title to a 1 hectare (2.47 acre) property can last well over a year (USAID 2011) and that presumes there is no existing conflict in use or ownership. These circumstances mean that people are living and working land to which they officially have no legally-recognized claim. With no legal title, land is easily designated as "unoccupied" or "barren" thus leaving it open to concession for large-scale mineral extraction.

Post-Neoliberalism, Extractive Industry and Development

Ecuador is largely dependent upon the exportation of non-renewable natural resources (see Figure 2) such as petroleum, copper and gold along with the \$252.9 billion USD in Foreign Direct Investment (FDI) that flowed into the mining sector in 2013 (International Business Publications Inc. 2015). In 2013 about 67% of all exports were non-renewable natural resources, with unrefined petroleum making up the vast majority (International Business

Publications Inc. 2015). Although petroleum still represents the bulk of exports, the Mirador project is slated to become the nation's first large-scale open pit copper mine and is a crucial part of Ecuador's strategic development plan (SENPLADES 2013). President Rafael Correa has embraced *extractivism* to exploit Ecuador's mineral and gas reserves in order to alleviate poverty and foster development.

Extractivism is a process whereby natural resources are exploited for economic gain. Although typically referred to in academic literature as solely pertaining to natural resources

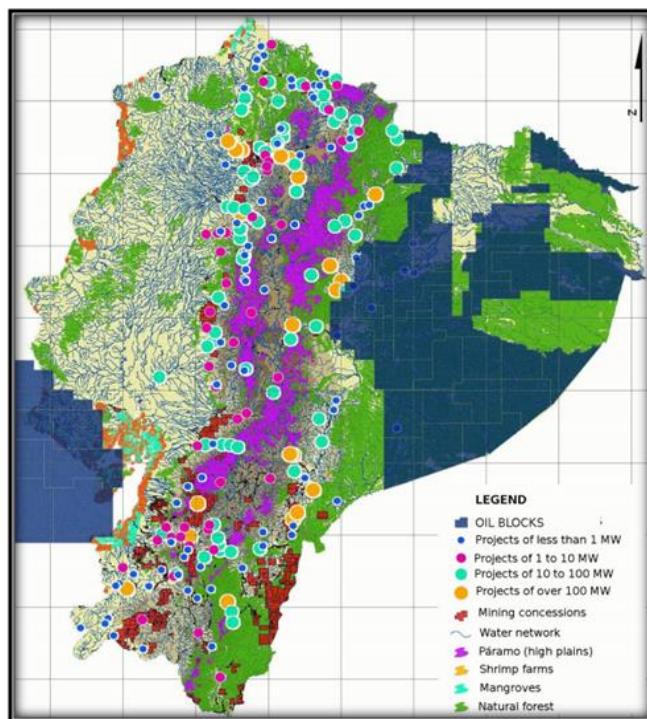


Figure 2. Map of Ecuador's Extractive Industry. (Acción Ecológica 2009).

such as oil and minerals, extractivism can also be used to describe large scale agriculture and forestry practices typical of the global economy (Acosta 2013). Extraction of different natural resources are linked by the common way in which they process raw materials and contribute to the global economy. Namely, they are extracted from resource-rich and economically poor countries either minimally or totally un-processed and exported to a

country where value is added and profit begins to accrue, with the originating country left out of the value-added profit margin. Because of these dynamics, extractivism plays a large role in the so-called *resource curse* or *paradox of plenty* phenomena in which natural resource-rich countries holding large reserves of highly desirable commodities such as diamonds, oil, gold or copper, are also the poorest and most under-developed nations on Earth (Acosta

2013). Correa's government seeks to change that by adopting what has been called a "post-neoliberal approach" whereby the national coffers take a much higher percentage of revenue from extractive sectors.

Having revamped the nation's constitution upon election in 2008, Correa's government significantly changed the National Mining Law in 2009 in order to provide the state with the majority of revenue from mineral and gas exploitation. With a 12% VAT (value added tax), 5% sales tax, 12% utilities tax and a 25% rent tax, Ecuador retains about 54% of mining revenue (Presidential Decree No. 045). Ecuador's overall revenue share becomes even greater if the mining company sells extracted minerals above the price agreed upon in the contract (Presidential Decree No. 475). This would mean Ecuador receives a 70% windfall tax on extraordinary profits after the company has recouped its initial exploration investment costs. In addition to taxes, the contract for exploitation of the Mirador project requires an advanced royalty payment of \$100 million to be paid in three installments before exploitation begins. While Correa's government has been hailed as "post-neoliberal" for obtaining a larger share of mining profits, the drive to exploit Ecuador's natural resource base has been backed by the criminalization of dissent and a strong political discourse which touts mining as the only way to reduce poverty (Bebbington & Humphreys 2011; Yates & Bakker 2014).

During his first presidential campaign, Correa received strong backing from indigenous and *campesino* (rural peasant) populations based on his ideas of a citizen's revolution in which wealth is more equitably distributed and social services are provided to all citizens irrespective of their economic income. The new constitution of 2008 legally codified the concept of "el buen vivir" (*sumak kawsay* in Kichwa or *living well* in English) which is a central idea to Correa's development model. Adapted from indigenous culture, *sumak kawsay*

describes a way of living that views all entities as essential parts of a web of life, functioning symbiotically, each contributing to the flourishing of the other. The indigenous definition of *el buen vivir* remains far different from its reality as a political tool. Correa has used the concept to promote a more equitable distribution of wealth from extractive industry in order to lift the poorest citizens from poverty. Many are quick to hail Ecuador's move toward post-neoliberalism as an all-encompassing diversion from capitalism with high hopes for improved resource distribution and an escape from the resource curse that plagues resource-rich countries in the global South. However, although Ecuador now retains a higher percentage of profits from extractive industries, transnational companies dependent upon global markets still hold significant influence, which undermines attempts to improve public participation in development and transparency within industry and government.

Many envision post-neoliberalism to mean a more equitable distribution of resources, local control and participation. However, Correa has used the rhetoric of *el buen vivir* to open the country to large-scale mining development in ecologically fragile environments which has caused significant unrest, especially since these areas are populated by rural and indigenous peoples who depend upon the land for survival. Large-scale mining development puts all rural peoples at risk due to diminished physical access to land and natural resources through processes of accumulation and dispossession by contamination. Whether or not the state retains higher portions of revenue from extractive industry development, as with post-neoliberal policies, it has a direct negative impact on rural peoples surrounding the mine that isn't easily mitigated. *El buen vivir* continues to be a focus of national development rhetoric while simultaneously disappointing rural and indigenous groups in its implementation.

Current Situation

Current local context is described, accounting for the presence of the Mirador mine along with sufficient information so as to situate the following chapters.

ECSA & Social-Environmental Conflict

Recently, the discovery of copper and the subsequent concessioning of large tracts of land to the Chinese-owned mining company Ecuacorriente, S.A. (ECSA), has altered social and environmental relationships in Tundayme. In 2012, ECSA, a subsidiary of Tongling Non-Ferrous Metals and China Railway Construction Corporation, signed a contract with Ecuador's Ministry of Non-Renewable Natural Resources granting permission for mineral extraction. About 9,000 hectares (22,000 acres) have been concessioned for the Mirador project (Corriente Resources Inc. 2008) which aims to extract 60,000 metric tons of rock daily for the 30 year life of the mine (see Figure 3). Currently about 6,000 hectares of the concession have been successfully appropriated by the company and about 700 hectares are in dispute (Cardno 2014).

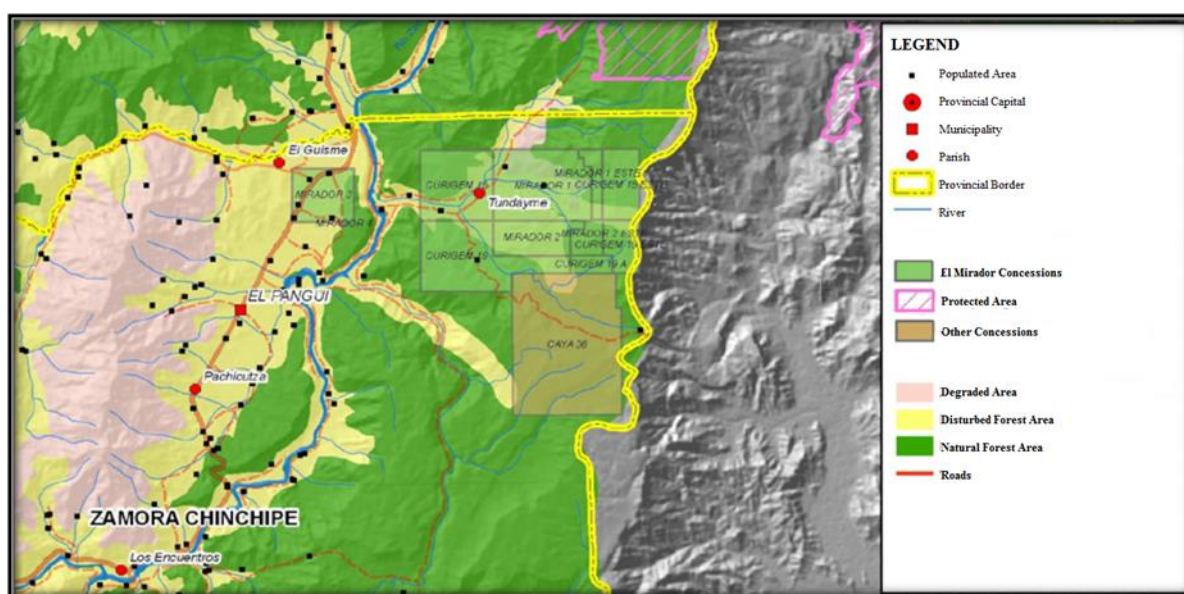


Figure 3. Map of El Panguí with Concessions. Adapted from "Intervención Minera a Gran Escala en Ecuador y Vulneración de Derechos Humanos: caso Corriente Resources Inc." (CEDHU 2010, p.10).

The presence of ECSA has caused significant division within the community regarding who has legitimate claim to exploit natural resources, in what way and who benefits from such use. Promises of regional economic development are juxtaposed against the threat of irreversible environmental damage. Individual titles held by colonos and Shuar ancestral claims to land and natural resources are contested as ECSA appropriates land utilizing a variety of tactics. Meanwhile, the state claims universal rights to subsoil resources and has granted ECSA permission to exploit its concession in Tundayme. The fact that the copper and gold to be extracted lies under land owned by individual property owners and communal users means the company is responsible for negotiating surface land appropriation. The process of acquiring land has been highly irregular, leading to increased conflict within the community.

Local Responses

In response to the social-environmental conflict created by the Mirador project a variety of actors have invoked a rights-based discourse to defend what they see as violations of human rights, rights to employment and development funds, as well as the rights of nature itself, as codified in the national constitution ratified in 2008. Local governments both inside and outside the zone of direct influence assert their rights to revenue from the mine in order to complete local development projects while a newly created national development agency claims autonomy over how mining revenue will be used. People who have been displaced from their land as a result of ECSA's irregular land acquisition process have initiated legal processes alleging human rights violations. Shuar and colono populations have formed a somewhat loose coalition of diverse interests to oppose the mine with limited technical and financial assistance from both national and international NGOs. Their reasons for opposing Mirador's development vary from concerns over environmental damage and the rights of

nature itself, to small scale miners concerned about competition and the ability to continue operations in the shadows of large-scale extraction. At the same time, the national government claims inalienable rights to exploit subsoil resources in order to benefit the population as a whole and provide money for development. Questions of rights are central to all arguments both for and against the Mirador project.

In addition to a rights-based discourse, direct action has been used in response to the advance of the mine, which is nearing the end of the construction phase (at the time of writing, October 2015). In August 2015, a national mobilization beginning in Tundayme and culminating in Quito, brought thousands of people to Ecuador's capital to protest environmental damages and violations of human rights caused by the Mirador project, along with other concerns regarding the nation's development under Correa's administration. In Tundayme, in an effort to reclaim land now appropriated by ECSA, indigenous and campesino farmers have attempted to resettle the area by building houses and planting crops. These houses, some of which were still under construction, were recently destroyed using heavy machinery. Inhabitants were displaced with the help of ECSA's private security guards who were accompanied by military police. Those displaced claim they did not receive any official letter advising them of the impending eviction, nor were they given more than a few minutes to gather their belongings and vacate the premises. Apart from direct action to draw widespread attention to damages allegedly caused by the presence of the mine, less visible adaptations have been utilized by local residents.

Concerns over visible changes in the river turbidity have led residents to change how they use the water. Whereas previously the river was used for irrigation, household consumption, recreation and subsistence fishing, practically all uses have ceased in response to marked

perceived changes in quality and quantity. Many residents attribute frequent flooding of the river banks and subsequent destruction of their gardens, to a small dam placed upstream to channel water away from the mine's perforation sites. Animals no longer choose to drink from the river and fish are seldom caught but have been known to wash ashore dead. Water for household consumption is now diverted from streams that originate in the mountains and never pass by the mine. There is no doubt among informants as to who is responsible for increased sediment in the river; all state it is due to the construction of the mine. However, some mine employees are quick to blame frequent rains as the culprit, saying there is no way to control the sediment from ending up in the river.

These social-environmental conflicts are occurring in a region between the Andes and the Ecuadorian Amazon that is rich in biodiversity. Decades of cattle ranching, artisanal mining, declining forests and a lack of proper waste disposal (among other factors) have caused environmental changes. Land use change is one of the main factors contributing to declining biodiversity. The province of El Pangui is estimated to have lost about 43% of vegetation coverage since 1990 (GeoPlaDes 2010). Although water is abundant due to Tundayme's location in a tropical rainforest endowed with several rivers and numerous streams, access to clean water is a growing concern, especially with the impending threat of large-scale mining. The outcome of debates regarding the Mirador project has important implications for different actors' access to land and natural resources which directly affects their livelihood.

Thesis Objective

The objective of this research is to further explore how the presence of the Mirador open pit copper mine has altered access to land and natural resources in Tundayme, Ecuador. The study is justified due to the mine's alteration of significant areas of land traditionally used for

agriculture and subsistence practices. Identified factors affecting access include direct appropriation of land and natural resources, as well as dispossession by contamination from perceived mining pollution. Ribot & Peluso's (2003) *theory of access framework* is used to discuss identified factors affecting access as a result of the Mirador mine. Processes of direct appropriation of land and natural resources are explored by examining ECSA's land acquisition and responses to its irregularities and changes in access. Growing concerns of dispossession due to contamination from the mine are explored by examining people's perceptions of environmental change and their adaptations.

Chapter 2: Methodological Approach

Epistemological and ontological considerations, which form the basis for the methods used for data collection and subsequent analysis, are described. A definition of concepts utilized in the Findings & Discussion chapter help establish a common language. The challenges and limitations of the fieldwork experience are also discussed along with ethical considerations.

Situating the Qualitative Research

The main goal of this research was to examine the ways in which the presence of the Mirador copper mine has altered access to land and natural resources. People's perceptions of environmental change were also explored. Qualitative methods were selected based on their applicability to the goals of the research. Social science utilizing qualitative methods concerns itself with the study of people and their environments "...and how inhabitants of these settings make sense of their surroundings through symbols, rituals, social structures, social roles, and so forth" (Berg 2009, p.8). Although supporting numerical data regarding the demographics of the target population area helped situate qualitative primary data contextually, quantitative methods were not used as a form of primary data collection. This was a conscious choice partly due to social-environmental conflict surrounding the mine. By not reducing social relationships to numbers and statistics, different actors' experiences could be further explored. The qualitative design allowed detailed narratives to tell the story rather than relying on numbers and statistics from fixed surveys. The decision to use qualitative methods is based on certain epistemological and ontological foundations which form the basis of how the research is approached.

The proper selection and application of a method "...embodies a variety of assumptions regarding the nature of knowledge and the methods through which that knowledge can be

obtained, as well as a set of root assumptions about the nature of the phenomena to be investigated" (Bryman 2008, p.593 as cited in Morgan & Smircich 1980, p.491). Ontology concerns itself with the nature of reality while epistemology delineates how reality may be studied and what type of knowledge is considered valid (Bryman 2008). For this research an ontological position based in *constructivism* has been adopted. Constructivism "...implies that social phenomena and categories are not only produced through social interaction but that they are in a constant state of revision" (Bryman 2008, p.19). Thus, nothing exists without being interpreted or socially constructed. There is no absolute observable truth as objectivism and its related quantitative methods seek to obtain. Approaching research with this ontology and epistemology means that all knowledge is indefinite. Viewing reality with a constructivist lens necessitates an *interpretivist* epistemological stance since if reality is socially constructed, it is done so through individual interpretations. Subjective interpretations are considered valid knowledge since everyone constructs their own version of reality. Inherent within this viewpoint is the fact that even the researcher is incapable of designing or carryout completely objective research. Instead, any potential bias or predisposed views must be presented and accounted for when defending the research design.

Methods

Fieldwork & Data Collection

This research is part of a collaborative project between The Norwegian University of Life Sciences (NMBU) and the Universidad Técnica Particular de Loja (UTPL) entitled "Extracting Justice? Exploring the role of free, prior and informed consent, consultations and compensation payments related to socio-environmental conflicts in Latin America". Fieldwork was conducted in Ecuador from March - June 2015. This time was fairly evenly split between residing in Loja in order to be close to team members at UTPL that were part of

the Observatory for Socio-Environmental Conflict (OBSA), and Tundayme in order to be close to the site of mining activity and collect first-hand data from interviews, community meetings and observation.

Data was primarily collected through semi-structured and unstructured interviews. Interviews generate a detail-rich data set which tells informants' stories and allows their perceptions and opinions to come out (Berg & Lune 2012). While the semi-structured interview method was used most often in later stages of fieldwork, unstructured interviews were useful in the beginning. Unstructured interviews were helpful in the initial stages of fieldwork because I was becoming familiar with the local context. The flexibility of this interview technique enabled me to converse with people, establish rapport and gain an understanding of their lives. As fieldwork continued, I was able to move into a more structured form of interviewing. Semi-structured interviewing was used in order to make use of pre-defined questions but have the ability to probe further and divert from the original plan. This was the most appropriate technique for gathering the bulk of the data since the goal was to learn about people's access to land and natural resources and their perceptions of environmental change. I developed a list of questions and specific themes of interest to guide interviews. I asked open-ended questions about people's lives that allowed them to elaborate within themes I had identified as useful in order to answer the research questions. Interviewing proved to be a useful technique but was not without its challenges. It is a skill requiring practice. I had to be ready to ask probing questions to get more information when the planned question either didn't elicit a significant response or when I realized that more useful information could be gained from further inquiry. I also needed to be ready to redirect informants to relevant topics if the conversation went astray.

Data was organized daily while in the field either by transcribing recorded interviews or detailed note-taking during and directly after the interview. Field notes provided significant context to interviews. Detailed observations from community meetings and interactions with people in town were helpful in recalling circumstances after fieldwork had been completed. Several hours of audio recorded interviews from Tundayme, completed by a team member of OBSA in 2012, were useful in understanding recent history and its effect on the current context encountered during fieldwork. In addition, hours of informal conversations with OBSA team members proved invaluable in learning the history of the mine with regards to socio-environmental conflict.

Sampling

Informants for semi-structured interviews were selected using non-probability sampling techniques such as purposive sampling and snowball sampling. These techniques were selected because data collected did not need to be mathematically representative of a larger population, as with large quantitative surveys (Berg 2009). Therefore, results of the study are situated in time and place and not applicable to other situations. With purposive sampling, informants are selected by the researcher because they have certain characteristics that will help answer the research question. Due to the objectives of the research, the sample population included people who lived in the parish of Tundayme because their close proximity to the mine meant they were likely to have witnessed changes since the mine's formation. Snowball sampling was useful in order to gain access to more rural populations living in the Shuar collectively titled lands of Churuwia. Also known as referral or respondent-driven sampling, snowball sampling "...is sometimes the best way to locate subjects with certain attributes or characteristics necessary in the study" (Berg 2009, p.51). This was especially true when trying to locate people in Etsa, a sub-community of Churuwia.

Since many of them work in the mine they were often not available and I had to arrange meetings with them through mutual contacts. These sampling techniques provided sufficient data to answer the research questions within the given timeframe allotted for fieldwork.

Coding & Analysis

Data collection from fieldwork resulted in a dataset of transcribed interviews and detailed summaries of conversations, meetings and interviews with informants. Analysis was necessary in order to recognize recurring themes and summarize findings. Qualitative research has no set method for analyzing data (Berg & Lune 2012). Data was analyzed through a process of color coding certain themes that were relevant to the research objective and condensing them into detailed summaries. This was helpful in identifying and organizing patterns related to the mine's effect on access to land and natural resources as well as people's perceptions of environmental change. Clear patterns emerged from the data which made it possible to identify processes of appropriation and dispossession, as well as perceptions of environmental change due to the mine.

Challenges & Limitations

As with any project, available resources such as time and funding limit the scope. In this case, conflict in the study area also delimited the research objectives. The availability of data and probability of collecting it had to be considered within the local context. Tundayme has experienced fluctuating degrees of socio-environmental conflict since the Canadian-based company ECSA began mineral exploration over a decade ago, which added another dimension to fieldwork challenges. Now that Mirador is Chinese owned and in the construction phase, conflict continues to polarize residents as they debate the mine's effects

on society and the environment. Coming into this situation, especially as a foreigner, took special care.

Several trips to Tundayme were made before I began living there steadily and beginning primary data collection. Since Tundayme is a small rural community, logistics such as housing, transportation and communication had to be carefully considered beforehand. These visits helped me gather preliminary data through observation and participation in community meetings. It also allowed for residents to see me as a somewhat familiar face by the time I approached them individually to further discuss their experiences. Preliminary field visits allowed me to gather basic information about the situation without having to ask informants and contribute to research fatigue. Research fatigue can be especially prevalent in smaller communities because there are not many people for researchers to choose from and residents end up becoming disillusioned and frustrated by constantly being asked similar questions (Clark 2008). For the most part, everyone I talked to was willing to share their story, although several people mentioned they had already spoken to other researchers and wondered if I knew them or if our projects were the same.

Data collection continued after fieldwork due to my continued contact with OBSA team members still involved in the project. This was helpful in gathering details of events that occurred after I had left the country. However, it also presented a challenge, as data continued to come in even at advanced stages of thesis writing. Since the case of Mirador is ongoing it is constantly evolving and subsequent research could continue almost indefinitely as the situation progresses and new questions arise. I had to further delimit my scope and realize that the results of the study are a snapshot in time and space and will never be a complete picture of the situation.

Ethical Considerations

Great care was taken to emphasize my neutrality in conversations with informants because of the conflictive nature of the mine and extreme polarization of the local population. Interview questions and informal conversations with people focused on issues surrounding land and natural resource usage as well as perceptions of environmental change. This was a subtle yet effective way to engage people in discussion regarding their livelihoods, which inevitably lead to them addressing the presence of the mine and how it had affected them. This proved to be a valuable strategy, as I never asked anyone directly how they felt about the mine and my neutrality was thus preserved. However, with that being said, it is impossible to control people's perceptions of you, especially in a small town in rural Ecuador where your presence and identity as a foreigner is constantly identified and scrutinized. Many people assumed I worked for ECSA, the government or some foreign NGO, despite my insistence that I was a university student studying people's perceptions of environmental change and their livelihood activities. All participants were informed of the research aims beforehand and made aware of their voluntary and confidential status as participants.

Concepts Defined

Before fully delving into the results of this research, it is necessary to define certain concepts that will be used to explain happenings in Tundayme as a result of the Mirador project. Although a general familiarity with international development and social science is assumed, the concepts chosen for further explanation in this section require additional defining as they can have many meanings.

Political Ecology

The objectives of this research can be placed within the broad theoretical ideas of political ecology which concerns itself with "...the constantly shifting dialectic between society and land-based resources, and also within classes and groups within society itself" (Blaikie et al. 1987, p. 17). Political ecology allows for the examination of people's relationship with land and natural resources while accounting for historical, political, social and economic contexts (Blaikie et al. 1987; Peet & Watts 1996; Robbins 2012; Watts 2008). This places perceptions of environmental changes in Tundayme and issues of access within a wider context of social and political relations, allowing for the examination of these issues as they relate to current and historical events. Changes in access to land and natural resources are delineated within the local context. National and global socio-political contexts are used as background information to briefly situate local processes.

Access

One goal of this research is to examine how the Mirador project has affected people's access to land and natural resources in Tundayme. By defining *access* as "all possible means by which a person is able to benefit from things", broader mechanisms of how people gain and maintain access to land and natural resources can be explored (Ribot & Peluso 2003, p.156). This differs from defining access based on the concept of property in which legal mechanisms legitimize and dictate entitlement to benefits from land and its natural resources. Defining access in terms of the 'ability to benefit from use' allows for consideration of "...a larger array of institutions, social and political-economic relations, and discursive strategies that shape benefit flows" (Ribot & Peluso 2003, p. 157). The choice of Ribot & Peluso's concept of access is particularly useful in the case of the Mirador mine because legal rights to land and natural resources are not the only means by which access is obtained.

When using this definition of access, officially titled individual property becomes only one mechanism by which users benefit from natural resources rather than the sole means. This is particularly significant for examining different actors' access to land and natural resources in Tundayme due to conflicting and fluctuating ideas about what constitutes legitimate ownership and usage of such resources. Similarly, the fact that land titling in the area is highly irregular and contested necessitates the examination of access under a broader framework not limited to solely legal mechanisms. By not tying access to legal claims of property, different actors' ability to benefit from land and natural resources can be explored, independent of legality. This is important because “law (whether written or oral, formal or customary) can never completely delineate all the modes and pathways of resource access along complex and overlapping webs of power” (Ribot & Peluso 2003, p. 156). Ribot & Peluso’s (2003) expanded definition of access allows for the examination of all “means, relations, and processes that enable various actors to derive benefits from resources” (p.153). Although not a rigid and normative framework, Ribot & Peluso's theory of access is useful for its flexibility which permits analysis adapted to specific contexts. Especially in Tundayme, state-legitimated property rights are only one mechanism shaping the ability to benefit from resources.

In order to look at how the Mirador project has altered people's access to land and natural resources, several different types of access will be considered. These forms of access were chosen based on their applicability to circumstances in Tundayme as supported by data collected during fieldwork. They are not static in time or space, and change as global markets, national government economic and development policies and other macro-happenings shape the progress of the Mirador project and local reactions to its implementation.

The first type of access is termed *rights-based access* because it implies "...the involvement of a community, state, or government that will enforce a claim" (Ribot & Peluso 2003, p.162). In the case of Tundayme, this proves to be a type of access warranting further examination due to competing claims of legitimacy and the existence of multiple legal systems. Included within this category of rights-based access are both legal and illegal means of securing benefit from a resource, with the difference being largely based on opinion and one's situation within complex power relations. The reoccupation and cultivation of land that has been concessioned to ECSA is an example of a type of resistance or guerilla agriculture (Cavanagh & Benjaminsen 2015; Leifsen 2015) which is seen as illegal by some and legitimate by others. Aside from either legally or illegally obtaining access there are various mechanisms described by Ribot & Peluso which shape access either by serving as pre-conditions to its gain or by further facilitating the ability to benefit once possession has occurred.

Access to technology, capital, markets, labor, knowledge, authority, and social identity all influence the ability to benefit from a resource even after access has been obtained through legal title or illegal means. All of these mechanisms have affected access since the company's involvement in Tundayme. The ability to benefit from land and natural resources can be curtailed due to a lack of tools or technology that could be used to extract ground water or subsoil resources. Access to technology to exploit subsoil resources has become important as small scale miners continue working in the shadows of what will become Ecuador's first large scale open pit copper mine. Similarly, technology to pump and/or purify water from streams or springs that have not passed by the mine site is now necessary in order to benefit from access to clean water. As concerns over water and soil contamination grow, access to capital to invest in machinery, agricultural inputs, or additional land is becoming

crucial in order to mitigate environmental damages from the mine. Access to markets is another important factor shaping the ability to benefit from a resource. While both Shuar and colono residents in Tundayme engage in agriculture, cattle-raising and small scale artisanal mining, they do not benefit from collective sale of their goods like a larger company or cooperative would. They rely largely on middle-men who purchase the fruits of their labor at a low rate whereas large corporations are able to benefit from market access.

Access to knowledge is another critical mechanism shaping access in Tundayme. Many people do not have physical access to technical documents or the intellectual capacity to comprehend them. Therefore, there are many misconceptions and rumors regarding what is happening with the mine and what the company plans to do. Those who are able to obtain and comprehend legal and technical documents related to the Mirador project are better able to shape discourse and influence access to land and natural resources. When it comes to granting or maintaining rights, access to authority becomes an influential mechanism affecting access.

Those with preferential access to support from government ministries or police are in a better position to secure the ability to benefit from a resource. With various ministries and legal systems overlapping, the further examination of access to authority helps inform the local context. By aligning their stance on mining with different government agencies and NGOs, the leadership of Shuar communities and Tundayme parish have been able to leverage financial and technical resources. This access to authority directly influences development in each community. In the interest of national development, traditional rural land use is easily displaced as authorities prioritize large-scale mining. Land designated as unused or barren is easily concessioned to extractive industry despite the fact that it's utilized by rural people.

Historically, the Amazon was able to be colonized by colonos because the government didn't recognize the indigenous tribes' use of the land as valid. Preference was given to economically productive activity, which involved not only the destruction of biologically productive virgin rainforest, but also legitimated the destruction of Shuar culture. The authority to privilege economically productive usage of land, despite the ecological and cultural destruction it causes, still plays a large role in shaping access in Tundayme as small-scale rural livelihood practices such as agriculture are displaced in favor of large-scale mineral extraction.

Access can also be shaped by one's social identity. This is significant in Tundayme due to the presence of the Shuar indigenous group and the rural campesino mestizo population, both of whose social identity necessitates access to land and natural resources. The Shuar have a set of specific rights granted based on ancestral claims to territory and their historical subsistence use of natural resources. This gives them sovereign rights to collective or global title of about 798 hectares (1,972 acres) in an area of Tundayme called Churuwia. Although the recognition of their ethnicity has entitled them to land, social identity based on ethnicity can be inclusionary or exclusionary. Separation of society based on ethnicity is prevalent throughout Ecuador. While identification as Shuar may come with entitlement to collective ancestral land, it also hinders access to other societal benefits due to blatant and subtle discrimination throughout the country. The rural campesino population of Tundayme is made up of farmers and cattle-herders who expanded the frontier and claimed expansive territory for their livelihood practices. The history of their colonization of the Amazon in many ways necessitates access to land, which is built into the meaning of identification as campesino or colono. These mechanisms of access help give a broader view of relations to land and natural resources in Tundayme given its complex and interconnected circumstances.

Accumulation by Dispossession

Accumulation by dispossession is the process by which wealth, in its many forms, is accumulated, transferred and consolidated in order to facilitate capitalist production (Harvey 2003). This process takes on many forms, involving various levels of society and a variety of institutions and actors whether cognizant of their contribution or not. Accumulation by dispossession is a process which seeks to appropriate and consolidate wealth-producing forms of capital (i.e., land, natural resources, labor and mechanical or technological inputs). This is done by dispossessing the original owner of such means. In a remote area like Tundayme, dispossession directly affects rural livelihoods which significantly depend on access to natural resources. Often a public good such as water is appropriated for industrial production, contaminated during the process, and communal users are dispossessed of access due to changes in water quantity and quality. Land which is not privately held with individual title but is communally used through informal agreements is transferred to private ownership, which excludes traditional users.

These processes are occurring in Tundayme, with backing from the state, who legalizes such actions in order to facilitate the development of extractive industry. The goal is to increase profit by consolidating control over the entire process of wealth creation. Accumulation by dispossession involves processes originally described by Marx (1906) as "primitive accumulation", a necessary pre-stage of capitalism. This idea has been expanded upon by Harvey (2003) to encompass the type of ongoing accumulation seen in modern day circumstances such as:

the commodification and privatization of land and the forceful expulsion of peasant populations; the conversion of various forms of property rights (common, collective, state, etc.) into exclusive private property rights; the suppression of rights to the commons; the commodification of labour power and the suppression of alternative (indigenous) forms of production and consumption; colonial, neo-colonial, and imperial processes of appropriation of assets (including natural

resources); the monetization of exchange and taxation, particularly of land... (p.145).

In addition to these types of dispossession, a wider definition which includes "...the dispossession of health, habitat, way of life, and gain from resources within indigenous territories" (Acuña 2015, p.85) has been adopted in order to broaden the definition of dispossession to include cases that do not necessarily assume physical relocation (Bebbington & Humphreys 2011). Acuña (2015) describes a *dispossession of identities* where:

...the state embraces a modernising and developmental perspective on indigenous territories, and imposes on the people an identity to attach them to major developmental goals. This is a way to deny indigenous ontologies and one of the most profound and subtle kinds of dispossession directed to facilitating or legitimising material dispossessions (p.85).

Appropriation of assets and the resulting dispossession do not always involve physical displacement or relocation. These broader definitions of dispossession allow for an understanding of how changing relationships to land and natural resources have widespread effects on rural peoples.

Dispossession by Contamination

The concept of *dispossession by contamination* is not widely discussed in academic literature (Guerra & Skewes 2010; Perreault 2013) but it has evolved from descriptions of capitalist *accumulation by dispossession* discussed above. Dispossession by contamination describes a situation in which users are not directly impeded from accessing land and natural resources but are instead, indirectly affected by processes of industrial production which produce contamination (Perreault 2013). These processes effectively cause dispossession by rendering land and natural resources unusable due to contamination. The difference between accumulation by dispossession and dispossession by contamination lies in the fact that users are not dispossessed of access through direct appropriation of natural resources for capital accumulation. Instead, the land and natural resources affected by contamination are a

byproduct of capital production. The user is no longer able to benefit from these resources and they have effectively been dispossessed of access. Contamination is a byproduct of industrial production or resource extraction and is considered an economic externality unaccounted for in the cost of the final product. Instead of leading to capital accumulation, the burden of contamination from production is transferred to local ecosystems and people. With the unequal distribution of benefits and consequences associated with capital production, increased socio-environmental conflict results. Contamination of additional resources is an ongoing consequence with widespread effects as mining contamination spreads from its origin.

In Tundayme, even though the mine is still in construction phase, residents have noticed environmental changes, which have caused them to change the way in which they use resources such as land and water. Marked changes in water quality in the Quimi River have caused people to stop using the river as they once did. Dispossession by contamination is expected to further impact residents once the exploitation phase of mining begins. This type of dispossession has far-reaching effects outside the local population, as mining waste is not contained in a geographical location but travels, mainly through water, to other locations outside of the official "zone of impact". Therefore, parties not even considered stakeholders in decisions over the development of mines or in the mitigation of socio-environmental impacts, are impacted. Dispossession by contamination will continue to affect local residents and those outside the area as the mining "footprint" is ever expanding over time and space, long outliving the life of the mine itself.

Chapter 3: Findings & Discussion

Results of the study are presented in relation to Ribot & Peluso's (2003) concept of access by identifying and describing the mechanisms affecting access to land and natural resources in Tundayme. Local inhabitants' perceptions of environmental change help situate ongoing processes of dispossession by contamination due to the Mirador project. Accumulation by dispossession is addressed by exploring changes in land use and occupancy and legal plurality perspectives.

Access to Land & Natural Resources in Tundayme

Applying the theory of access framework

Access to land and natural resources is "...embodied in and exercised through various mechanisms, processes, and social relations...that affect people's ability to benefit" (Ribot & Peluso 2003, p.154). These will be explored with the understanding that access is largely a social relationship, "Some people and institutions control resource access while others must maintain their access *through* those who have control" (Ribot & Peluso 2003, p.154). Analysis of access is useful in the case of Tundayme because rights-based claims to land and natural resources are contested yet certain actors remain able to benefit. Ribot & Peluso (2003) identify certain mechanisms which affect how "...benefits are gained, controlled and maintained" (p.162). These form the following subcategories which are discussed in relation to Tundayme: access to technology, capital, markets, labor, knowledge, authority, identities, and social relations. These subcategories are not mutually exclusive and they greatly overlap, with one affecting the other but they are useful in attempting to organize an analysis of factors affecting access.

Access to Technology

Access to certain forms of technology is becoming increasingly important due to the presence of the Mirador project and its effect on the ability for residents to benefit from land and natural resources. The mine has both directly and indirectly affected access, making technology necessary in order to mitigate diminished access. Among all informants interviewed, both in the center of Tundayme and its more rural areas, there is a widespread perception of environmental contamination attributed to the mine. Water contamination affecting the Quimi River was most often cited, although several informants also discussed diminished soil quality and an increase in diseases affecting food-producing animals. These concerns have led those with access to technology to implement certain measures to mitigate the effects of contamination they perceive to be due to the Mirador mine.

Water from the river is largely no longer used for household consumption. Therefore, hoses have been used to divert water from mountain streams before it reaches the river. A Shuar man from the collectively titled lands of Churuwia said, "We had to pay for these long black hoses to bring us clean water from a stream that starts up in the mountains since the river is dirty now; no one helped us, we invested on our own." Those who still use water from the river must invest in settling tanks and filtration systems in order to remove debris if they are to continue benefiting from river water access. Even in the center of Tundayme, where two blocks of houses have municipal water service, residents note the debris and cloudy state of the water. A colono woman whose family settled in Tundayme in the 1980s notes, "Sometimes our washing machine doesn't work because little rocks block the hose and no water comes." Similarly, those who mentioned diminished soil fertility are attempting to mitigate changes by purchasing more agricultural inputs. This is necessary if they are to maintain current levels of production both for auto-consumption and market sale. Many

informants, both Shuar and colono, mentioned they have had to start fertilizing their crops in the last few years since yields have declined. One colono who lives in Tundayme's center and has a farm in the surrounding mountains states, "If I don't fumigate, all of the fruit is very small and I never used to have to do that, the ground was so fertile you just threw out a seed and it produced a lot." In addition to mitigating diminished access due to environmental degradation, access to technology can also be used to gain and maintain control over contested resources.

Although ECSA has received mineral concessions from the government, the company is responsible for negotiating land sales in order to obtain surface rights which allow access to



Figure 4. Picture of ECSA's Private Property sign near the entrance of Tundayme. (Photo by author).

subsoil resources. Some individual land holders have refused to sell their land to the company. Many who have sold their land still attempt to access it for various reasons. Some claim they were not fairly compensated or they were coerced into selling against their will. Since

ECSA is not currently utilizing all of the land it has obtained, former land owners frequently return to the area to collect seeds and harvest fruit. However, the company has employed several security guards which act as gatekeepers, protecting what is now ECSA's land. The security guards, their weaponry and equipment like motorcycles and cameras, used to follow and intimidate intruders, can be seen as a form of technology used to control access. Low-

cost technology like fencing and private property signs are also used by ECSA to enforce their claim to land which has been concessioned for mineral extraction (see Figure 4). Low-cost signage is also used by those whose access to land and natural resources is threatened by ECSA's plans for the Mirador project (see Figure 6, pg. 42). This type of symbolic contesting of authority is an example of low-cost technology utilized by Tundayme's rural population to display their presence and claim access to disputed land. All rural people in the area dependent on access to land and natural resources are affected by their ability to access technology.

Small scale mining is the second most common source of income in Tundayme, with about 10% of people employed in the sector (Gobierno Autónomo Decentralizado Parroquial Rural de Tundayme 2012). This industry, although small scale, provides significant income to many in Tundayme. Without technologically sophisticated equipment, small scale miners rely on crude and inefficient technology which hinders their ability to benefit from the extensive mineral reserves present in Tundayme. Large international companies are therefore placed in a better position to exploit the resources given their significant access to technology.

Access to these forms of technology, coupled with access to public authority, as discussed below, help the company maintain access in spite of ongoing conflicts over the legitimacy of their claims to land. In conflictive situations such as these, all forms of access discussed in this section help users gain, maintain and control access to land and natural resources.

Access to Capital

Capital is typically synonymous with money or any asset that can easily be exchanged or used to generate further wealth. In its many forms it serves as a pre-condition to gaining and/or maintaining access given the presence of the Mirador project. Capital facilitates the acquisition of the resources necessary to maintain access given diminished environmental quality and direct appropriation of land and natural resources. It can be used to purchase inputs to offset environmental contamination while maintaining production levels. It can also be utilized in order to acquire additional land not impacted by the mine. Those without capital are most vulnerable to diminished access to land and natural resources caused by the mine.

The Shuar living on collectively held land under global title in Churuwia are largely without capital as they are unable to use collectively titled land for collateral in order to obtain loans from financial institutions. This places them in a vulnerable situation in which they are unlikely to be able to relocate in order to deal with increasing levels of mining contamination. Similarly, they are less able to mitigate environmental degradation by purchasing technological inputs to purify water or increase soil fertility. Several Shuar informants in Churuwia mentioned having insufficient capital to purchase mechanized farming equipment and tools to improve their access to water. As one Shuar man in Churuwia states:

I went to the bank to borrow money in order to buy a tractor so I could produce more like they do in Europe or the USA but they said that I am not the owner of my land since it's a collective title and they refused to give me money. How can they say I am not an owner? The Shuar own all of this land, this is our ancestral territory where we have been for thousands of years.

While their social identity based on ethnicity (discussed below) is able to provide them with a certain amount of land tenure security, it also excludes them from accessing the capital necessary to improve their livelihood. Shuar living outside of Churuwia, in Tundayme's

communities of Yanua Kim and Numpaim San Carlos have even more insecure land title and are thus even more vulnerable to changes in access. Since many colonos also lack legal title to land, they are similarly unable to access credit in order to invest in equipment or land to improve their income and mitigate environmental damage from the mine.

Access to Markets

Apart from agricultural activities, small-scale mining employs the largest number of people in Tundayme, with around 10% of the population receiving income from it (Gobierno Autónomo Decentralizado Parroquial Rural de Tundayme 2012). Most small-scale or artisanal miners do not have legal concession to their mining claims. As one Shuar man notes:

We have been mining up there for many years but it's expensive to get a license and now ECSA has a concession on the land we mine, so the government would never give us permission to mine there.

Much of the land they mine has now been concessioned to ECSA however it has not been appropriated since the companies are not currently occupying the land for exploration or exploitation. Therefore, small-scale miners continue working the area. While they are able to benefit from illegal access to the land and subsoil resources, their lack of legal title, in part, prevents them from fully benefiting from their labor. This is due to the fact that they lack market access in which to sell the minerals they extract. An international company like ECSA is more able to benefit both because they hold legal title to their concessions and also because the national government has facilitated the export of mined minerals by creating supporting infrastructure. In contrast, small-scale miners, many of whom lack their own form of transportation, must sell extracted minerals to intermediaries in larger towns nearby. A Shuar farmer who supplements his income with small-scale mining states, "We have to travel to Gualaquiza to sell the gold we get; they used to give us \$50 or more per ounce but now it's

down to \$38." ECSA benefits from market access because of the large scale of extraction and governmental preference, while traditional small-scale miners are left unable to fully benefit from market access.

Access to Labor

ECSA has been able to secure sufficient labor to construct the mine by offering a steady, albeit temporary, salary of \$354/month, which is the nationally set minimum wage for 2015 (Enríquez 2014). In Tundayme, those who now work for the company have abandoned or reduced their traditional employment or subsistence practices involving agriculture, cattle-raising and/or fish-farming. While most positively acknowledge the economic contribution to their household income, there is a realization among informants that the work offered by the company is temporary and not sufficient for all members of the community. A Shuar woman whose husband and son work in the mine states, "It's good to have the money right now but what will they leave us with in the end?" Further, work conditions in the mine are challenging and employees have expressed safety concerns. When comparing the current Chinese ownership of ECSA to that of the Canadians, one Shuar informant who is skeptical of the company and the government's development strategy said, "While the Canadians gave health care to the entire family, the Chinese don't even have a full first aid kit."

During the construction of the mine locally sourced unskilled labor is mostly used. However, several informants expressed difficulty in obtaining work in the mine, even though they considered themselves qualified and had submitted their credentials to ECSA. There was a widespread perception that the company favored hiring contractors from other areas of Ecuador while leaving locals in Tundayme without work. As one colono informant states, "They come in with nothing but Chinese and people who aren't even from here, they take our

riches and leave us with nothing, not even the chance to work." These negative perceptions of available work opportunities are likely to increase since unskilled labor will most be utilized during the mine's current construction phase.

Higher-paid technical positions needed during advanced stages require university level education and will be unavailable to the majority of Tundayme's population since only about 1% have more than a basic level of education (Gobierno Autónomo Decentralizado Parroquial Rural de Tundayme 2012). Currently, Chinese laborers and more educated Ecuadorians from outside the area are used for more technical higher paying positions. Locals are employed in manual labor for infrastructure construction, driving, cooking, cleaning, and clearing land for what will become the open pit during extraction. Some also work as community relations officers or in the company gardens which are supposed to house a collection of plant species destroyed during the mine's construction. During the initial phases of planning and investigation local guides, many of whom were Shuar, were employed to collect data about the local environment for the environmental impact assessment. The company is able to benefit from their mining concessions in part due to their ability to access labor at a minimal price while providing few social services.

At the same time local labor is appropriated by ECSA, dependence on monetary income from outside sources increases and agricultural production decreases. Whereas rural people of Tundayme typically worked for subsistence and sold what excess they produced, their livelihoods are changing to include a greater share of income earned from wage labor outside the home. Although ECSA is not the primary reason for this change, it deserves mention since the presence of Mirador contributes to its increase. Outside wage-earning labor has a detrimental effect on subsistence agricultural practices and may leave families vulnerable to

food insecurity. Although they are earning money which can be used to purchase food and other household goods, a significant portion of the population has been taken out of agricultural production, which means there has been a decrease in local food production and food may need to be imported from outside areas at a higher price. Since labor opportunities offered by ECSA are temporary, diminishing local food production could have far-reaching effects once the mine moves into the exploitation phase and local unskilled labor is no longer needed.

Access to Knowledge

Access to knowledge becomes increasingly important in a conflictive setting like that of Tundayme. Government documents and technical reports which are supposed to be available to the public are often not widely disseminated. The withholding of technical documents and official information contribute to a situation in which those most directly impacted by the mine do not have accurate information regarding its construction or planned operations. The local people most affected by the Mirador project have little knowledge of what is happening with the mine other than what they hear from others in town. Misconceptions of land holdings are common. All informants, whether Shuar or colono, reported that the Shuar Global Title in Churuwia was 3,000 hectares (about 7,413 acres) but a copy of the original contract states 797.8 hectares (about 1,971 acres). Similarly, no informants knew exactly how much land had been concessioned to ECSA for the Mirador project. Some reported that all of the land in Tundayme had been concessioned while others stated numbers like 10,000, 4,000 or 6,000 hectares. Access to knowledge shapes people's perceptions of the project and their responses to its development.

Government agencies charged with keeping records of land titles, mineral concessions, and other information tightly control its dissemination due to concerns over clashes in interests. Those with such privileged information thus act as gatekeepers, granting access to some and denying it to others. This was evident in Tundayme and the municipality of El Pangui where repeated requests for public information such as maps of land holdings were met with scrutiny as to why the information was wanted and what was to be done with it. Even when physical access to information was obtained, documents were extremely lengthy and used technical language which is incomprehensible to the majority of the population. With 83% of Tundayme's adult population having either no formal schooling or only basic education levels (Gobierno Autónomo Decentralizado Parroquial Rural de Tundayme 2012), controlling access to knowledge in this manner creates a distinct separation which helps facilitate inequitable resource access.

In addition to withholding seemingly innocuous documents such as maps of land holdings, the dissemination of environmental impact studies assessing potential contamination is also tightly controlled. Data collected by the Ministry of the Environment (MAE) to measure contamination from the mine is not easily accessible to the public. When the rural setting of Tundayme is combined with the low education levels of its inhabitants, controlling access to potentially controversial information plays a key role in shaping access to land and natural resources.

Similarly, very few people know how to report socio-environmental inconsistencies they witness due to the mine. There is very little knowledge of which agency is in charge of regulating different aspects of ECSA's work and how to contact the appropriate regulatory body. Legal cases alleging human rights violations and inappropriate waste disposal have

been started by individual citizens with help from national and international NGOs who provide funding for legal fees. Although this has been an important outlet for local frustration, it too represents a separation of knowledge in which only those who are educated have the practical ability to advocate for the improvement of ECSA's operations. Those who are unable to advocate for themselves on an institutional level participate in road blocks and protest marches alongside those involved in legal advocacy in order to demonstrate their discontent by utilizing more direct means.

Control of knowledge enables the shaping of discourse, which helps mold resource access. On the national level, President Correa's support of large-scale mining has been accompanied by a discourse based partly upon a knowledge hierarchy in which those who oppose mining are publically deemed "infantile leftists and romantic ecologists" (Correa 2007, as cited in Bebbington 2012, p.12) in part because they lack knowledge regarding the supposed state-of-the-art technology to be used in extraction. This creates a knowledge hierarchy in which any opposition to extractive industry must be based on "...romanticisms, stories, obsessions, or who knows what" (Correa 2007, as cited in Bebbington 2012, p.12). Similarly, indigenous ontologies challenging natural resource extraction are vilified. In a country where there is still stark polarization based on ethnicity, presidential comments such as these further entrench existing prejudices which facilitate the extractive industry's domination over access to natural resources. By degrading alternative viewpoints, Correa's administration conveniently avoids a truly equitable national public debate over extractive industry and its contribution to development.

Access to Authority

Access to authority is vital when there is conflict over physical access to land and natural resources, as is the case in Tundayme with the Mirador project. Those who have access to authority, whether it be public regulatory agencies or the armed forces, can greatly control who is able to access natural resources. ECSA has appropriated (or is currently in the process of appropriating) around 9,000 hectares of land for the Mirador project. Even though the total area concessioned (see Figure 5) does not reflect the company's current land use, its designation implies future expansion of mining despite the existence of a rural population dependent on access to land and natural resources for survival.

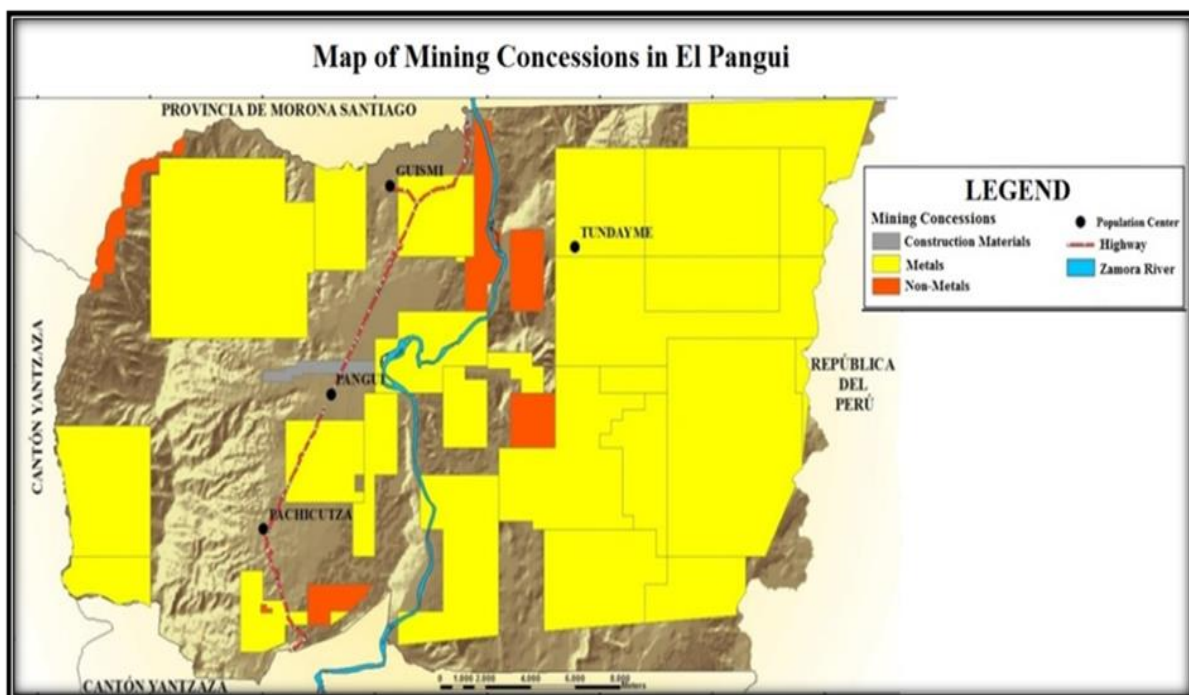


Figure 5. Map of Mining Concessions in El Pangui. Adapted from "Plan de Desarrollo y Ordenamiento Territorial 2012-2022" (Gobierno Autónomo Descentralizado Municipal del Cantón El Pangui, 2012).

In Tundayme, over 60% of inhabitants make their living by way of agricultural practices involving cattle and the production of staple crops such as corn, yucca and plantain (Gobierno Autónomo Descentralizado Parroquial Rural de Tundayme 2012). ECSA's appropriation of extensive area in Tundayme was made possible in part by the company's

access to authority through social and political relations with government regulatory agencies who can designate land that isn't economically productive as "barren" or "underutilized". When coupled with the fact that most rural campesinos and indigenous Shuar do not have legal title to the land they occupy, repurposing extensive area for mining concessions becomes an easily utilized political tool to promote development based on large-scale extraction. Access to public authority such as local police or the armed forces helps to enforce this politically-guided development agenda when met with resistance by the rural peasant and indigenous populations who are directly affected. Recently, local police have been used to forcibly evict people who refused to sell their land to ECSA in spite of ongoing legal battles contesting the legality of evictions and the mine itself. Examples such as these show that access to authority is a vital component of controlling how natural resources are used and who benefits.



Figure 6. Collective Property of CASCOMI Sign. "The person or company that enters or causes damage to this property will be legally prosecuted or subject to indigenous justice" (Translation by author).

In a plural legal system like that of Ecuador, overlapping legal regimes compete for power. Even though indigenous law is legally recognized in Ecuador's constitution, the national government retains supreme legal authority. Indigenous and rural campesino groups attempt to control access to the

concessioned area around the Mirador project by posting signs exerting their legitimacy over contested spaces (see Figure 6). ECSA also uses signage to display its claim to contested territory (See Figure 4, pg. 32).

Additionally, there are a multitude of public agencies and various levels of regional government who vie for authority over regulating the Mirador project. Association with different political parties and government agencies has powerful consequences when it comes to the delegation of resources for development. Tundayme's parish government does not share the same political party as the municipality of El Pangui and Correa's national administration. Since the parish government has been critical of ECSA and the national development strategy based on extraction, many within Tundayme's leadership and the local population assume that public development funds have bypassed Tundayme and been given to the municipality, leading to further discontent. El Pangui clearly aligns with Correa's national development strategy based on extraction and even has a large banner in the center of town thanking Correa for his administration's support of the mining industry.

In the Shuar collectively titled lands of Churuwia in Tundayme, the flow of development funds from the Mirador project has caused significant division. Those in favor of the mine have settled in a new area called Etsa, still within the global title of Churuwia. Etsa was able to obtain legal certification as a community from the municipality of El Pangui. Most of Etsa's population works in the mine. By identifying as pro-mining, Etsa's leader has been able to bring several development projects to the community using funding from the municipality and the company directly. He states, "All of a community's development depends on the work of its president, also you have to be legally recognized because if not, you can't directly solicit projects and sign agreements with the municipality or the company." According to Etsa's leader the community received electricity from Ecuador Estratégico, a new agency created by Correa's administration to directly channel development funds from mining revenue. Their alliance with ECSA has also helped them access clean water, as the company paid for hoses to divert water from a mountain stream and a settling tank for

storage. Other Shuar living in Churuwia who do not live in Etsa receive support from the provincial prefect and a variety of NGOs who identify as anti-mining. Access to authority plays a large role in facilitating access development funds.

Access to Social Identity

Despite ECSA's appropriation of extensive area, many current and former land owners are still able to access the land either by overt tactics such as resistance agriculture or daily negotiation with security guards. Many current and former property owners frequently visit disputed territory ECSA claims as part of its concessions. Some have even begun to resettle the area, planting long-cycle crops such as cacao in order to reclaim disputed territory. Those who must dialogue daily with security guards use a variety of approaches in order to gain access. One Shuar woman, whose parents have sold their property to the company, still returns frequently to collect fruit and seeds. When the guard questions her presence on company land, she frequently invokes an identity-based claim to access in which she states, "This is my ancestral territory and I have a right to be here." The guard sometimes challenges her claim and they discuss the issue at length, but usually the issue is not pressed and she is able to access her family's land. Another informant, a colono who settled in Tundayme during the 1980s and self-describes himself as "pro-minero" (pro-mining), gladly sold his land to the company in order to contribute to the national development of the country. He also still visits his land to collect seeds and fruit but his negotiation tactic with the guard is based more on cordial social relations than any rights-based claim to legitimate usage. When the company began purchasing land surrounding his former property, he suggested they hire a guard in order to keep out unwanted intruders. He is able to access his former property through polite conversation with the guard. Since the mine is in the construction phase, not all concessioned land has been appropriated for use. Even once

ECSA begins extraction there will be a buffer zone of unused land within the concession which many current users may continue to take advantage of. Currently, many former land owners and users are likely granted access because the land isn't being utilized by the company. In the future, social identity, whether based on identifying as a pro-minero colono or Shuar with ancestral claims to territory, is unlikely to foster access to appropriated land utilized for extraction.

Polarization along ethnic lines is a lingering consequence of the historical meshing of populations with different ways of utilizing land and natural resources. But with the presence of large-scale mining, another layer of already complex social relations has been added to Tundayme. The socio-environmental conflict resulting from the Mirador project has caused people in Tundayme to identify as pro or anti-minero. Describing oneself as pro or anti-minero has become a defining characteristic, creating separation and unity in an area where issues of race and ethnicity are divisive and serve as a basis for acceptance.

In Churuwia, where land is held under collective title, rights to inclusion are based on identifying as Shuar. Mestizo or colono campesinos must buy individually titled land elsewhere. At first glance, this provides the Shuar with an advantage. However, not all Shuar actually live within land under global title. Many have migrated in search of better opportunities for education and employment. At the same time access to a certain social identity affords particular benefits, it also promotes exclusion. It is assumed that the Shuar have their own social system which provides support to tribe members. Therefore, many municipal services are not extended into their territories. The reality is that the global title of Churuwia is simply rural land where some Shuar live, there is no set system of service delivery. Most people leave their land in order to find jobs and education in nearby towns

with larger populations which are able to provide more services. Social identification as colono or mestizo also affects access to resources.

Identifying as a colono or mestizo campesino in a rural parish such as Tundayme in many ways necessitates access to land and natural resources. Colono oral historical recollection regarding the settlement of Tundayme depends largely upon the image of valiant settlers conquering the natural world in order to make better lives for themselves and their families. As one colono informant whose family settled in Tundayme during the 1980s states, "When we came here there was nothing, nothing but jungle. We made everything that exists here." Similar sentiments were commonly expressed among first and second generation colono settlers in Tundayme. Association with these ideas formed a powerful social identity which was the basis for colonos receiving individually titled land when they began settling in Tundayme during the 1950s and '60s. Even today it is still expressed in documents from Tundayme describing the history of settlement in the area: "The years '50 and '60 began the colonization by brave men determined to fight against the harshness of nature in the jungle of the southern oriental Amazon...in search of refuge for the wellbeing and future of their children" (Gobierno Autónomo Decentralizado Parroquial Rural de Tundayme 2014). Accessing this social identity denies the existence of indigenous cultures inhabiting the area prior to colonization and at the same time provides a basis for land appropriation and utilization based on economic production.

Campesino identity is based more on the conquest and utilization of natural resources for economic gain, while the indigenous way of life takes a more holistic approach which aims to maintain balance and satisfy subsistence needs. However, extractive industry puts all rural peoples, irrespective of social identity, at risk for increased impoverishment by diminishing

access to land and natural resources upon which they depend. The irony is that the small-scale rural campesino production which colonized the Amazon two generations ago is now giving way to mega-mining which promises even more profit. Instead of being carried out by rural campesinos encouraged by state policy, transnational mining companies are now implementing a national development strategy based on mineral extraction. Large-scale mining in Tundayme therefore now threatens the social and cultural identity and well-being of all rural peoples, regardless of ethnicity, due to the fact that they equally depend on access to land and natural resources for their survival (Hilson 2002; O'Faircheallaigh 2013).

Accumulation by Dispossession

Changes in land designation in Tundayme have repurposed vast areas which have traditionally been (and largely still are), used for farming, cattle-herding, forest gathering and small-scale mining. Land and water are the two natural resources most needed for large-scale mining. Although at first access is appropriated through the granting of mining concessions, these changes "on paper" eventually take a direct form as companies physically begin appropriating land and natural resources, displacing traditional uses. After some 9,000 hectares were granted to ECSA through concessions, full access to land was not imminent due to the fact that people still owned and used the concessioned land. While the state maintains authority to grant concessions over subsoil resources, it was the company's responsibility to negotiate with individual owners in order to receive full access to their concession. The process of land accumulation was highly irregular and is still unresolved. It is an ongoing process with significant push-back from existing users who have different ways of utilizing land and natural resources. Even though ECSA is now the largest land holder in Tundayme with a concession of around 9,000 hectares, they have only been able to appropriate about 5,284 hectares through direct purchase and *servidumbre minera* (discussed

below); some 709 hectares are still in dispute (Cardno 2014). Land accumulation has been ongoing since the contract for exploitation was signed in 2012 but has taken a variety of forms.

Irregular negotiations with property owners characterize much of the conflict surrounding the mine. No set compensation rate was established by the company or any public agency. Informants report being offered inconsistent prices for land of similar value, ranging from \$200 to \$5,000 per hectare. In some cases the construction of a new house in Tundayme's parish center or other areas was a condition of the sale contract. One's social identity seems to be relevant, as poorer, less-educated campesinos and the indigenous Shuar were offered far less for their land than those who were more adept in advocating for themselves. The financially stable and educated, many of whom have spent time abroad in Europe or the USA, were not easily enticed into selling their land. One colono woman, who had spent 8 years working in Spain stated:

Their first offer of \$7,000 did not excite me. I had to remind them my land was not for sale and that I had worked 8 years outside of the country, away from my children in order to buy it. I had everything I needed: 10 milk cows, pigs and crops. I told them I wanted \$25,000 and a house in Tundayme. They came back again and offered me \$12,000. I'm not stupid, so I kept negotiating and we settled on \$21,500 and they built me a house in Tundayme. When other people found out I had been given about \$5,000/hectare and a house in town they were upset because they had sold at \$200 or \$500/hectare.

Because they were not in as desperate a financial situation and had experience living and working in other countries, many colonos were able to use this social identity to negotiate higher compensation for their land. Even as ECSA nears the end of Mirador's construction phase and prepares to begin extraction, hundreds of hectares remain in dispute.

Those who refused to sell their land have been subject to a process called *servidumbre minera* (see Figure 7) in which the state intervenes to appropriate land needed by the



Figure 7. Servidumbre Minera Sign. "Property under *servidumbre minero* in favor of ECSA" (INREDH 2015).

company to access its concessions. In this case, the state sets a compensation rate and oversees the transfer, utilizing the public police force if necessary. On September 30, 2015, 135 national police officers oversaw the removal of several houses on ECSA's concessions in Tundayme in order to complete the

servidumbre minera process (Policia Nacional del Ecuador 2015). Although the press release from the national police states that all human rights were protected and evictions were realized with no incident, there have been reports of people being handcuffed and forcibly removed in the early morning hours without the ability to gather their belongings (Policia Nacional del Ecuador 2015; Dayuma 2015). Accumulation of land by forceful dispossession of the rural peasant population can be seen as a 'necessary evil' committed by the state in order to provide the monetary benefit resulting from extraction to the entire population in the form of social benefits. This is precisely the intent of *el buen vivir* but as one recently displaced man from Tundayme said through tears on the morning of his family's eviction, "I have nowhere to go with my family, where is *el buen vivir*?" Even after the company is able to access land that has been concessioned for mineral extraction, the question of water remains.

Water is a vital component to copper extraction as it helps separate copper from ore when combined with solvents like sulfuric acid. The Mirador project will require an estimated

166,540 m³ of water per day from the Quimi River for its operations (Leifsen 2015). Securing access to sufficient quantities of water is vital to the operation of the Mirador mine. Ecuador's new water law grants supreme authority over all hydro resources to the state (Registro Oficial Nro. 305). At the same time, Ecuador's constitution enshrines water as a public good to be utilized and freely available to all. ECSA's ability to gain environmental license to appropriate the water necessary for mineral extraction displaces the rural population of access by prioritizing large-scale extraction. The rural population of Tundayme depends not on immense quantities of water, but on quality uncontaminated water to support agriculture and livestock production.

The mining process leaves behind an immense quantity of contaminated water. Tailings piles of rock contaminated with solvents after copper has been removed cause acid mine drainage as contaminants used in the extraction process leech into soil and flow downstream with rain exposure, which is abundant in the tropical rainforest area of Tundayme. The Mirador project plans will directly affect the rivers Tundayme and Wawayme. The Tundayme River is slated to have a containment reservoir built on top of its natural course. Water will be diverted through a processing plant and channeled through a tunnel to join the Machinaza River further downstream from its natural confluence. The Wawayme River will have a tailings pond and a drainage reservoir. The accumulation of water for the mine leaves Tundayme's residents with diminished quantity and quality of water for household use as well as agricultural and livestock production. This process of accumulation first dispossesses users of water through direct appropriation. After water is contaminated through the extraction process it is returned to the river whereby users are effectively dispossessed of access due to contamination.

Dispossession by Contamination

Already during the mine's construction people have changed the way they use land and natural resources in response to perceived environmental degradation. This has effectively resulted in dispossession by contamination even though most people are still living in the area and using natural resources such as water.

The mine's construction has resulted in increased turbidity in the Quimi River which has led to widespread perceptions of contamination among residents. Changes in river quality have caused many residents, particularly the Shuar, to cease subsistence fishing. "We used to fish everyday and it was very easy to catch big fish, now there are no fish" says a Shuar informant. Fishing was traditionally a significant source of nutrition, in addition to food from small gardens and hunting. Aside from fishing, other household uses of the river have been impacted. River water is no longer used for bathing, washing clothes, drinking or even recreation. "Everyone used to gather on the banks of the river with their families to celebrate Carnival but we can't even touch that water now that it's dirty from the mine," states a young Shuar woman. Contamination levels have hindered the ability to benefit from the river, resulting in a dispossession by contamination during the mine's preliminary construction phase.

There is growing concern of future relocation due to contamination from copper and gold extraction at the mine site, which sits above the population center of Tundayme. Local people express their concerns over eventual relocation due to widespread contamination regardless of whether or not they are in favor of the mine. Even those who directly (mine workers and contractors) and indirectly benefit (restaurant and shop owners) economically from the mine realize they may be unable to live in Tundayme after extraction begins. When

confronted with the thought of potential relocation, most informants seemed to not have any idea of where they would go or how they will finance relocation. Some talked of relocating to other areas of the country where they had familial ties while others mentioned migrating to Spain or the USA. Most however, seemed unsure and apathetic, frequently making statements such as: "Who knows what will happen, we'll see." Others seemed to think the company and the government must be planning to relocate them, "How could they just leave us here if everything's going to be contaminated? They have to recognize us and help us move somewhere else," said a colono living in Tundayme with farm land in the surrounding mountains. What is certain is that environmental degradation will continue to worsen as the mine further develops.

Since the Mirador mine is in the construction phase and extraction has not yet begun, the real effects of large-scale open pit copper mining have yet to be experienced by Tundayme's residents. The visible effects they have witnessed thus far are minimal in comparison to what will come. Water turbidity in the Quimi River was the most frequently perceived contamination noted by informants, perhaps due to its blatant visibility and its effect on people's livelihood. Informants continuously stated that the waters of the Quimi River used to be a beautiful, clean black color. Having never seen a clean black river, I journeyed past the mine's encampment, upstream from all construction activities to see the state of the river. I observed a stark difference in water color which aligned with informants' responses (see Figure 8 and 9).



Figure 8. Quimi River downstream from Mirador near Tundayme's center. (Photo by author).



Figure 9 Quimi River upstream from Mirador. (Photo by author).

Although water contamination was the most frequently perceived environmental change attributed to the Mirador project, several people also mentioned changes in soil quality, increased flooding, and increased levels of disease in livestock and poultry. These changes were met with a variety of adaptations and responses.

Diminished soil quality caused people to plant more crops using more agricultural inputs and collect natural fruits from the forests away from the mine, frequently on land that is technically concessioned to ECSA but has not been appropriated as is not currently being used. Increased flooding along the river bank in the Shuar community of Yanua Kim occurred during fieldwork and it was therefore not apparent what adaptations would be made to mitigate damages. However, complaints had been filed with INREDH (Regional Advisory Foundation on Human Rights) alleging human rights violations. Those affected attributed flooding to a small diversion dam near perforation sites which was insufficient to channel water flows during peak rain periods. Further upstream near the small dam, the river ran under a house whose residents said they had never had any problems with flooding in the 27 years they had lived there.

All informants attributed the aforementioned changes in environmental quality to the presence of the Mirador project. They responded to changes in access by altering their livelihood strategies. Changes in access, appropriation of land and natural resources, and dispossession by contamination have also resulted in community responses involving legal cases, public denouncement, and occupation of contested territories.

Local Responses to Changes in Access

The case of CASCOMI

The Amazon Community of Social Accion in the Condor Mountain Range (CASCOMI) is made up of rural mestizo campesinos and Shuar, many of whom are in dispute with ECSA over contested area the company is attempting to



Figure 10. CASCOMI Sign. (Photo by author).

appropriate for the Mirador project. CASCOMI was granted legal status as an indigenous community in 2014 by the public institution CODENPE (Counsel for the Development of the Nationalities and Peoples of Ecuador), although most of its members do not identify as Shuar. Normally polarized divisions among ethnic lines have given way to an alliance based on the human rights-based struggle against the Mirador project. The group has attempted to create community ownership over the area of San Marcos in Tundayme, which is slated to become a tailings dump. At the time of fieldwork, a community garden had been established with cacao seedlings and plans to build several houses were in the works. CASCOMI also declared its legitimacy by placing signs on reclaimed land which read, "Welcome to the

collective territory of CASCOMI" and outline the subjectivity of those who pass to indigenous law (see Figure 10).

CASCOMI has been successful in drawing attention to alleged human rights violations and irregular land acquisition on the part of ECSA. CASCOMI President Luis Rodrigo has publically denounced the company's actions on many occasions and has been on the forefront



Figure 11. Photo of suspended work area, sign reads: "Work suspended. Environmental Remediation" (Translation and photo by author).

of legal action in defense of Tundayme's environment and inhabitants. INREDH has supported CASCOMI by taking legal action based on human rights violations as well as environmental degradation of the Quimi River. Claims of environmental contamination allege that ECSA has not adequately

prevented run-off from the mine's construction from entering the river and also has directly dumped waste into the river. Since these allegations are inconsistent with the company's environmental management plan, the plaintiffs request the Ministry of the Environment (MAE) to revoke ECSA's license to operate. In April 2015 ECSA's license was suspended by MAE pending a mitigation plan to address issues of contamination during the mine's construction (see Figure 11). However, work quickly resumed and informants were unclear as to whether or not the environmental damages had been addressed or what the remediation process was. As previously discussed, there is a lack of knowledge regarding the company's actions, national law and administrative processes for redress which hinders access to land and natural resources, allowing them to easily be controlled by ECSA. Several informants,



Figure 13. Collecting bio-indicators to monitor water quality. (Photo by author).

In order to reduce the knowledge gap created by the tight control of information and its highly technical and inaccessible language, OBSA has partnered with local communities in order to train people to monitor water quality. The technique relies on collecting certain insect species that have been identified as being bio-

indicators of contamination levels in river systems (Norris & Hawkins 2000). It is a simple technique involving little technology which makes it accessible to the majority of residents in Tundayme (see Figure 13). However, it remains to be seen whether people view the technique as useful in their resistance efforts or if it holds sufficient weight to legally challenge ECSA's handling of waste.

Chapter 4: Conclusion

Although ECSA has been granted concession over extensive area in Tundayme many people still benefit from access to the land and natural resources within the concession. This is in part due to the mine being in a pre-extraction phase where all concessioned land has not yet been appropriated and planned expansion has yet to occur. However, it is also due to people's persistent and continued use of land and natural resources to which they now legally have no right. Cattle continue to graze amidst the company's large "Private Property" signs which line the road to Tundayme. Former land owners, as well as those who never agreed to sell, continue returning to their land in order to harvest fruit and collect seeds. They continue to take full advantage of access despite the lack of legal title and intimidation tactics from the company. Former land owners wishing to enter properties near the site of the mine's construction must pass a security guard who may stop people for questioning, take pictures of them and/or their license plates, or radio to a masked motorcycle guard who follows intruders and takes pictures of their activity. While these tactics are intentionally designed to gain, maintain and control access, they are confronted by acts of daily resistance whereby rural campesino and indigenous peoples assert their right to continue traditional agricultural practices which are integral to their identity and survival.

While colonos cleared the forest in order to produce grain and grazing space for their cattle, the Shuar were dependent on the forest for the harvesting of fruits and other materials for subsistence. Historical tensions between colonos and the indigenous Shuar were largely the result of differences in land use. However, a certain alliance has been created between all rural peoples whose livelihoods are threatened by large-scale extraction. Whereas the colono identity is based more on the conquest and utilization of natural resources for economic gain, the Shuar traditionally take a more holistic approach which aims to maintain ecological

balance and satisfy subsistence needs. However, with the threat of large-scale mining, all rural peoples dependent upon access to land and natural resources for survival are at risk. The irony is that the small-scale rural campesino production which colonized the Amazon two generations ago is now giving way to mega-mining which promises even more profit. Instead of being carried out by rural campesinos encouraged by state policy, this new wave of social and physical transformation is perpetrated by transnational mining companies implementing a national development strategy based on mineral extraction. Large-scale mining in Tundayme therefore now threatens the social and cultural identity and well-being of all rural peoples, regardless of ethnicity, due to the fact that they equally depend on access to land and natural resources for their survival.

ECSA's accumulation of land and natural resources is more tangible with direct effects on people's daily lives whereas dispossession of identity is a more subtle consequence of large-scale mining's presence in Tundayme. As the landscape changes with the mine's progression, so do the lifestyles of local residents. Although more subtle and occurring gradually over time, changes in lifestyle have profound impacts on culture. Rural and indigenous ways of utilizing land and natural resources for production are replaced by highly destructive technologies with widespread impact. Whether or not Ecuador can successfully mitigate negative impacts and equally distribute positive gains from large-scale extraction remains to be seen.

If Ecuador plans to transform the Cordillera del Condor into a mega-mining district, adequate direct compensation and relocation of the area's thousands of inhabitants needs to be addressed. However, political dialogue has been suppressed, replaced instead with images of modernity and state-of-the-art mining technology which purportedly produces no

contamination. This leaves people with substantial uncertainty about their future and no remediation if impending disaster becomes reality. At the same time, development discourse based on extractivism propels the indigenous and rural peasant population of Tundayme into a world in which their lifestyle is framed as being at odds with progress. This will have inevitable long term consequences for the rural people of the southern Ecuadorian Amazon as they continue to be part of a profound transformation of their landscape and identity.

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