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‘Looking at risk with both eyes’

Health and Safety in the Cerro Rico of Potosí (Bolivia)



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for the degree of Doctor of Philosophy
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DPHIL DEVELOPMENT STUDIES

'LOOKING AT RISK WITH BOTH EYES'
HEALTH AND SAFETY IN THE CERRO RICO OF POTOSÍ (BOLIVIA)

SUMMARY

This thesis is concerned with core assumptions and practices in dominant approaches to Occupational Health and Safety (hereafter, OHS). I critically evaluate these through an anthropological exploration of the everyday perceptions, experiences and practices related to OHS risks amongst the cooperative miners employed in the Cerro Rico of Potosí (Bolivian Highlands).

Drawing on 17 months of ethnographic fieldwork conducted between 2009 and 2011, the thesis examines the lives and livelihoods of the miners during a time of socio-political and economic transformations and of industry upheaval due to rising mineral prices. I describe how men and women navigate the challenges and opportunities in their lives and livelihoods and how these affect their perceptions and ability to manage the OHS risks associated with cooperative mining.

The thesis hinges on the Andean idea of 'looking at risk with both eyes', which connotes various overlapping and changing ways of understanding, perceiving and managing OHS hazards. This approach makes visible numerous inter-connected issues, which include the miners' individual subjectivities and values, backgrounds and lives, their different motivations for mining and the consequent everyday relations in the mine and beyond. It also allows unveiling the complex net of actors, factors and relationships which, from the individual to the global spheres and vice-versa frame, in a diverse and dynamic manner, both the OHS choices and opportunities of the miners and the particular risks they encounter.

On the basis of this ethnographic evidence about miners' shifting and context-specific perceptions and behaviours in managing risks that are transformed as circumstances change, I question the value of a universalising OHS approach based on assumptions of static and manageable OHS risks that disregard the precarious, complex, uncertain, heterogenic and mutable context in which miners live and work.

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My greatest debt is to the miners of the Cerro Rico, in particular to those working in The Cooperative: the *Malditos* for allowing me being part of their group, Don Pablo (my Bolivian father) for taking care of me and allowing me into his family, Don Adrián and Doña Francisca for patiently teaching me 'how to be a miner and what it means to be a miner'. I also want to thank Marlene, Wilson, Jhonny, Doña Nieves, Felico, Don Juan, Edgar and so many other miners who also made me feel that their cooperative was my own and who amiably took care of me and shared with me their insights and experiences, granting me the benefit of their knowledge. I hope I have not misrepresented them with my writing and I hope I will never forget all you taught me and made me feel. Finally, I thank *Potosinos* more generally for the many lessons they taught me about life and resistance.

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*Pels meus pares, els millors mestres de vida;
la vostra lluita laboral per donar un futur millor als vostres fills va inspirar aquesta recerca.
Pel meu germà, el Nasi, perquè en la distància sempre et tinc al costat.
Pel Pierre, perquè la teva companyia em fa qui sóc i em permet disfrutar el camí.
Pels miners del Cerro, als qui dec la tesi. Espero no oblidar mai tot el que m'heu ensenyat.*

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Acronyms

AFP	Administración de Fondos de Pensiones <i>Bolivian Pension Fund</i>
BAMIN	Banco Minero de Bolivia <i>Bolivia's Mining Bank</i>
CEPROMÍN	Centro de Promoción Minera <i>Centre for the Promotion of Mining</i>
CNS	Caja Nacional de Salud <i>National Health Fund</i>
COB	Central Obrera Boliviana <i>Bolivian Workers' Union</i>
COD	Central Obrera Departamental <i>Departmental Workers' Union</i>
COMCIPO	Comite Cívico Potosinista <i>Potosí's Civic Committee</i>
COMERMIN	Central Integral de Comercialización de Minerales de las Cooperativas <i>Cooperatives' Mineral Trading Company</i>
COMIBOL	Corporación Minera de Bolivia <i>Bolivian Mining Corporation</i>
CONACMIN	Comite Nacional de Amas de Casa Mineras <i>National Committee of Mining Housewives</i>
EMMPSA	Empresa Minero-Metalúrgica de Potosí <i>Potosí Mining Metallurgical Company</i>
FCM	Fondo de Compensación de Minerales <i>Mining Stabilization Fund</i>
FEDECOMÍN	Federación Departamental de Cooperativas Mineras de Potosí <i>Potosí's Federation of Mining Cooperatives</i>
FENCOMÍN	Federación Nacional de Cooperativas Mineras <i>National Federation of Mining Cooperatives</i>
FOFIM	Fondo de Financiamiento para la Minería <i>Trust Fund for Mining</i>
FOMIN	Fondo Minero de Inversión <i>Mining Investment Fund</i>
FSTMB	Federación Sindical Trabajadores Mineros de Bolivia <i>Union Federation of Bolivian Mine Workers</i>
GDP	Gross Domestic Product
ICA	International Cooperative Alliance
ILO	International Labour Organization
IMF	International Monetary Fund
INSO	Insituto Nacional de Seguridad Ocupacional <i>National Institute of Occupational Health</i>
MAS	Movimiento al Socialismo <i>Movement Towards Socialism</i>
MDPEP	Ministerio de Desarrollo Productivo y Economía Plural <i>Ministry of Productive Development and Plural Economy</i>
MEFP	Ministerio de Economía y finanzas Públicas <i>Ministry of Economy and Public Finance</i>

MMM	Ministerio de Minería y Metalurgia <i>Ministry of Mining and Metallurgy</i>
MNR	Movimiento Nacional Revolucionario <i>National Revolutionary Movement</i>
NCPE	Nueva Constitución Política del Estado <i>New Constitution of the State</i>
NGO	Non-governmental organisation
NPE	Nueva Política Económica <i>New Economic Policy</i>
OHS	Occupational Health and Safety
OHSM	Occupational Health and Safety Management
OHSMS	Occupational Health and Safety Management System
OSHA	Agency for Safety and Health at Work
PND	Plan Nacional de Desarrollo <i>National Development Plan</i>
PPE	Personal Protection Equipment
SENARECOM	Servicio Nacional de Registro y Control de la Comercialización de Minerales y Metales <i>National Service for the Registry and Control of Mineral and Metals’ Trading</i>
SMEs	Small-Medium Enterprises
SS	Social Security
SSEs	Small-Scale Enterprises
WHO	World Health Organisation

Glossary

<i>akulliku</i>	Rite of chewing coca leaves
<i>almita/s</i>	Soul/s of deceased miner/s
<i>APOS</i>	Expansive material used with dynamite to cause a major blast
<i>bocamina</i>	Mine-entrance/mouth-shaft
<i>Bs</i>	Bolivianos (10Bs equal to £1, or 7US\$)
<i>caja</i>	Non-mineralised rocks
<i>ch'alla</i>	Offering through libation (usually alcoholic)
<i>ch'ami</i>	Rocks with minerals
<i>chasquiri</i>	Labourer who works with the shovel
<i>chichería</i>	Clandestine bar
<i>cocalero</i>	<i>Coca farmer</i>
<i>compadre/s</i>	Mate/s
<i>compañerismo</i>	Camaraderie
<i>compañero/s</i>	Comrade/s, colleague/s
<i>concession/s</i>	Piece/s of land that cooperative miners rent from the state
<i>cooperativists</i>	Cooperative miners
<i>copagira</i>	Acid water of a yellowish or orange colour that originates inside the mine
<i>criollo</i>	Creole, Descendant of Spanish born in Bolivia
<i>dirigente/s</i>	Leader/s
<i>gringo</i>	Western-looking outsider
<i>guarda</i>	Mineshaft guard
<i>k'ajchas libres</i>	Free workers
<i>laboreo</i>	Day of communal work
<i>labourer</i>	Mine worker informally employed by a cooperative shareholder
<i>Lejía</i>	Substance made from quinoa that is chewed with coca to help release its properties.
<i>mita</i>	Inca system of labour service.
<i>mancharisqa</i>	Fright sickness, scare
<i>member</i>	Cooperative shareholder
<i>mestizo</i>	Term used to refer people of mixed descent (Spanish or European and Bolivian or Amerindian)
<i>Pachamama</i>	Mother earth
<i>Orureño</i>	Oruro-born/ inhabitant of Oruro
<i>palliri</i>	Scavenger
<i>paraje</i>	Individually-owned work-space
<i>pij'cha</i>	Pile of ore that <i>palliris</i> gather in their <i>parajes</i>
<i>pijchu</i>	Ball of chewed coca that miners store in the mouth
<i>Potosino/s</i>	Inhabitant/s of Potosí
<i>q'aracu</i>	Ritual sacrifice of a llama
<i>q'oa</i>	Offering to the Pachamama
<i>rescatiri</i>	Small Mineral buyer (women)
<i>second-hand</i>	Chief labourer
<i>Tatakachu</i>	Patron deity of the miners and essence of god inside the mine
<i>Tío/Diablo</i>	Underground god who owns the mineral
<i>trampa/s</i>	Cheat/s
<i>vacío/s</i>	Pocket/s of gas retained inside the rocks
<i>viuda/s</i>	Widow/s
<i>vocero</i>	Bus driver assistant
<i>wawita</i>	Child

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Figure 1.1. Map of Bolivia

(Modified from: www.transporteturisticobolivia.com)

1. Introduction

‘There have been men who, having entered [the Cerro Rico] only out of curiosity, have come out totally robbed of colour and, grinding tooth against tooth, have not been able to pronounce a word – effects of the horror that they have just experienced. They have not known even how to ponder it nor make reference to the terrors that are in there, because, there are places, no matter how high you lift your head you cannot see the top, and looking below you cannot see the bottom; on one side you see a horror, on the other a fright, and everything you see in there is all random’.

(Arzáns de Orsúa, 1703: 148)

‘I’m not afraid; why should I be?’

(*El Verde*,¹ labourer of The Cooperative)

‘God gave you two eyes for a reason’, *El Verde* told me one day during one of the many rituals in the mine. ‘If you only use one eye you may miss things’. The occasion was the traditional *q’aracu* or ritual sacrifice of a llama during February 2009 as an offering to the *Tío* (uncle), the underground god also known as *Diablo* (devil) who owns the ores. Through this ritual, the miners aim at appeasing and satiating the *Tío* so that he will not ‘eat’ (or harm) them through anger or hunger while they extract what belongs to him. ‘Just using one eye makes no sense’, *El Verde* added, ‘as what you’ll think caused your accident may not be the real cause. One is always to look at things using both eyes’.

This expression, rooted in the Andean cultural heritage, refers to the need to holistically look at the interacting dimensions of life in order to comprehend what happens or what does not happen, why something happens and how (Estermann, 2009; Milla-Villena, 2003; Capra, 2003; Medina, 2000; Grillo, 1990; Cereceda et al, 1987). It reflects the miners’ view that, to understand (and prevent) something (such as a work-related accident), it is not enough to separate and analyse the direct and observable cause-effect (e.g. manual handling of dynamite cartridge - death due to dynamite explosion). It is also important, and perhaps more so, to account for all the imperceptible broader factors and relationships that led to the person being there, the dynamite being used, and the conditions and circumstances that led to the explosion.

¹ All names that appear in this thesis are pseudonyms. Also, miners often use nicknames to illustrate a miner’s position within the workplace as labourer (see Chapter 4). To reflect these distinctions, I have written miners’ nicknames in italics.

Miners use this concept mainly to refer to the inseparability of the cosmological and material aspects of life, but I found the idea of ‘looking at risk with both eyes’ very useful for understanding Occupational Health and Safety (OHS) in the Cerro Rico. *El Verde*’s statement seemed to reflect an understanding of risk that goes beyond the possibilities of a logico-empirical approach, to incorporate the relations established between the empirical and non-empirical spheres of life that determine the particular happenings in the mine and in a miner’s life. I came to see this Andean metaphor as a central means through which to understand OHS. Both during fieldwork and during the writing of this thesis it has allowed me to look at risk both in its material dimension and in its multiple, and changing ‘subjective dimensions’ (McLain, 1995: 1727), whilst compelling me to explore how these apparently inconsistent facets of risk are mutually-defining features of the same reality.

Over the past several decades, risk studies have fallen into either risk-hazard or social constructivist frameworks. Using the concept ‘looking at risk with both eyes’, as this thesis demonstrates, offers the opportunity to develop a ‘creative bridge’ (Swanson et al, 1997: 256) between the scientific approaches used by OHS experts and the broader social literature on peoples’ complex and inconsistent responses to risk (Viscusi, 1990). This notion allows understanding that, just as scientific and social studies of risk do not characterise two exclusive world-systems but rather an integrated one, so do the plural rationalities of risk (Tulloch and Lupton, 2003). It permits articulating the insights that both approaches can bring to the understanding of OHS in order to develop a mutually inclusive theory of OHS that recognises diverse and changing social, political and economic contexts and multiple relationships within these, and that doesn’t determine *a priori* what might work best in all situations. With this purpose, I use the concept of ‘looking at risk with both eyes’ to recognise these seemingly invisible non-empirical factors and relations, unravelling how these are framed and how they differently impinge upon individuals. The thesis offers an approach to understanding the underlying material and relational processes which shape the various ways in which people perceive and behave towards dangerous situations (as shown in the two statements that introduce this chapter).

This thesis began with a personal concern and curiosity developed during my years of work as OHS advisor in the UK, when I realised that workers perceive and respond to health and safety risks (hereby OHS risks) in many diverse ways, despite OHS experts’ efforts to mould peoples’ understandings and practices through training and behavioural programmes as pathways to the accident zero goal. How would OHS work elsewhere? What might be the impacts of OHS

frameworks, made for and by workers in the global North, when applied to very different cultural, socio-economic and historical contexts? In such different contexts, how do workers conceptualise and seek to manage the OHS risks? What frames their choices?

This personal curiosity led me to do preliminary fieldwork in Bolivia during January and February 2009. I had heard about the Bolivian miners years before when I was working in Chile as a livelihood advisor to street children, as it was very common amongst young Chileans to travel to Potosí to visit the mines and see the ‘miners’ dismal working conditions’. After preliminary fieldwork, when I visited several Bolivian mining sites, I decided to conduct research in the Cerro Rico of Potosí. Potosí has long been a site of convergence for different global policies and actors around extractive industry and miners’ working conditions and poverty (see Markland, 2012; Bocángel, 2001). Conditions of work are appalling and, yet, have become both the main tourist attraction in the region, visited by over 75,000 tourists a year,² and a constitutive part of miners’ lives since, as the miners say, ‘we live and die for the mine’ – nourishing it as they are nourished by it.

I ask: How do cooperative miners understand and seek to manage occupational risks? And, to answer this question, I have used three sub-questions: a) What are the different narratives of occupational risks and how are these framed? b) How do different modes of organising labour influence miners’ conceptualisation and management of occupational risks? c) In what ways do different livelihood strategies shape different understandings and management of risks?

The thesis, embedded within the multidisciplinary field of development studies, applies concepts and methods from anthropology and sociology to challenge core assumptions and practices of dominant approaches to OHS through empirical research, ethnographic fieldwork and the notion of ‘looking at risk with both eyes’.

My aim is two-fold. First, to contribute to an understanding of the diverse ways workers perceive and respond to OHS risks and to the complex and dynamic factors and relations that influence these divergences. In so doing I aim, secondly, to demonstrate the need for an anthropological approach to OHS and to theoretically and empirically contribute to OHS’ professionals and institutions’ efforts to achieve a globally healthy workforce (WHO, 2007). I will argue that ironically, the very factors and relationships that determine how different

² Data from Potosí’s Municipal Tourist Office (Interview 15/08/2010).

miners perceive and respond to OHS risks also play an important role in the construction of the particular risks and uncertainties the miners encounter. In so doing, this thesis sheds new light on OHS and, consequently, on the processes used to recognise, analyse and manage OHS risks. My hope is that my research will contribute to the improvement of workers' working conditions in Bolivia and elsewhere (Flyvbjerg, 2006) by understanding their lives both within and beyond the workplace.

At the centre of this thesis is a small mining cooperative³ that I call 'The Cooperative'. The thesis tells the stories of Felico and his brothers, *El Verde*, Don Adrián and *Changuito*, some of the miners that work together in The Cooperative. I explore their individual experiences and investigate how these influence their perceptions and behaviours towards OHS risks at different times in their lives. I also examine how these different workers relate to each other in the workplace, as well as their relations with miners working in other cooperatives, with mineral buyers, local dwellers, and with the state. I do this with a focus on how their personal circumstances and experiences shape solidarities and conflicts in ways that affect their risk perceptions and ability to reduce risk and ensure their OHS in the mines. In so doing, I examine how OHS is practiced in the Cerro Rico and how this 'operationality' is constructed (Greenberg and Colquitt, 2013: 557). I do this using a combination of actor-oriented and organisational ethnography coupled with attention to the historical and current broader issues and relations that shape miners' individual and collective experiences and opportunities, as well as the risks they face.

1.1. 'Welcome to Bolivia, visit Potosí'

Arriving at El Alto's airport of Bolivia's capital La Paz, as one queues to pass immigration while trying to breathe and adapt to the lack of oxygen at almost 14,000 feet altitude, one cannot help but see a large wall painting depicting Potosí's mountain: the Cerro Rico (sometimes referred to as the Cerro). Underneath, a small advertising poster of a Bolivian tourist agency reads:

³ The ILO and the representative body for cooperatives, the International Cooperative Alliance (ICA), define a cooperative as 'an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations, through a jointly owned and democratically controlled enterprise' (ILO, 2014:1; ICA, 2014). This definition however does not entirely reflect the workings of the mining cooperatives at the centre of this research. In this context, I understand cooperatives as economic enterprises and self-help organizations in which cooperation and decision-making is governed by various levels of reciprocities that are conditioned by the differentiated assets, aspirations and particular relationships established amongst participants.

‘Welcome to Bolivia, visit Potosí. Come and see the medieval conditions in which the miners work! Crawling around in mud whilst carrying a bag full of explosives sounds like a great adventure, doesn’t it? That’s exactly what you’ll do in Potosí! You can’t miss it!’

A picture shows cheerful tourists inside one of the mines of the Cerro with their arms around the shoulders of skeletal miners caked in dust. Written along the side of this image, the views of western tourists encourage other fellow adventurers: ‘Scary!! Must do it!’ said one, ‘Chilling, dirty and dangerous, a Bolivia must-do!’ said another. Underneath, a clarification: ‘Safety equipment provided’.

An 11-hour night-ride on a bus with no heating, no seat belts, no head-rests and no shock-absorbers along with at least ten more people than it has capacity to hold, takes me from La Paz to Potosí. ‘No you cannot sit here! This seat is mine! I paid two tickets to travel comfortably!’ shouts a man to one of the indigenous-dressed passengers who, tired of standing or sitting on the floor of the aisle, attempted to sit in an empty seat. As we ascend, the climate is colder and housing visibly poorer; the bus begins puffing and choking, gasping and wheezing. As we descend, the bus speeds up seemingly uncontrollably. Unaware that, a few months into fieldwork, I will have learnt to live with these situations and will no longer perceive them as dangerous (or even notice them) I reassure myself by thinking ‘If something is to happen it’ll happen anyway and this is out of my control’. As temperatures drop, I jealously notice that all Bolivians are wrapped in thick blankets they brought with them, whilst tourists huddle their knees close to their chests, like I do, to keep warm. ‘Are you going to visit the mines?’ asks the Quechuan woman beside me. While eating corn she bought from one of the many sellers that enter the bus at every stop, she covers me with an end of her blanket. ‘Many tourists go there every day; I wonder what is in there to see... only wretchedness...’

Hours after I stopped feeling my legs, and once we have passed through a curved and narrow road on the cliff-edge, passing slow trucks overloaded with ores, after the first light of the day, we pass through Potosí’s symbolic entrance: a narrow passage with abrupt rocky sides known as *La Puerta del Diablo* (‘The Devil’s Door’). According to the legend (Absi, 2009), Saint Bartholomew punished Jesus’ brother *Supay* (the *Tío/Diablo*) for opposing the will of their father, God, confining him to the underground for the rest of his life and locking him in one of the caves; thereby making him the owner and guardian of the underworld wealth.

Once through the Devil's Door, five miles from Potosí city, I can already see the Cerro Rico, the mountain containing the greatest silver deposit ever known (Nash, 1993), overlooking the dry, dusty and sleepy city that sits at 13,420 feet above sea level. I can appreciate the majestic and perfect red conic figure of the mountain which, having been continuously mined for over four and a half centuries and having an incredible history of outlandish glory and wealth (Ferry, 1999), has also won the reputation of eating men alive (Dryburgh, 2011; Vaughan, 2004; Nash, 1993). We are in Potosí. I am at the start of my main fieldwork period.

Figure 1.2. View of Potosí and the Cerro Rico



(Source: www.radiokollasuyo.net)

Ten months later, I find myself part of the crowd in a great demonstration in the heart of the city:

'You came to study Health and Safety in the Cerro?! How long have you been doing this already? 10 months?!! Are you bored at home or something? And you go *up there* [into the Cerro] every day? With *those* [miners]? Did they not *try anything* with you? What have you been doing all this time?! I can give you the answer you are searching right now: Safety zero! What do *those* know about safety! Nothing! Even if they knew, they just don't care, do they? *Those* are only interested in draining the mountain... Here you have it; your research is done, you are now free to enjoy your time...'

This was said ironically by a local government official called Miguel while we were part of a crowd in front of the Cantumarca market, along with thousands of exhausted, hungry, angry and disappointed but resistant *Potosinos*⁴ in the twentieth day of self-siege in the city in August 2010. This demonstration, organised by Potosí's Civic Committee (COMCIPO) as part of the city's protests against the government's lack of response to their development demands, gathered over 80% of the *Potosinos* and miners, who have had enough of seeing the richness

⁴ Inhabitants of Potosí.

of their land being taken away and leaving little more than poverty. From the foot-bridge that crosses Potosí's main road, hung a human-shaped effigy with a noose round its neck. It had the Bolivian president's name, Evo Morales, written on it, symbolising *Potosinos'* anger and deep disappointment towards the unfulfilled promises of change by the people's government that came into power in December 2005. The air was filled with smoke and gases from the cartridges of dynamite that the miners traditionally and repeatedly blast during protests, as well as with revolutionary oaths rooted in the historical exploitation of this marginalised and poor mining region that still remains very much alive: 'Potosí standing, never kneeling!', 'For the dignity of *Potosinos!*', 'Evo neoliberal', 'Dignity or death!', 'To the last!'.

As the demonstrations made clear, Potosí is a poor region, yet rich in minerals, in Bolivia. Bolivia is similarly rich in natural resources, and yet is the poorest country in Latin America (ODI, 2010), with persistent levels of high poverty and inequality (World Bank, 2012). Bolivia has been a significant mineral producer since before its colonisation by the Spanish, and a global hydrocarbon exporter since the 1980s. Yet, recent estimates point to almost 56% of the population living in poverty (UNdata, 2013), 33% of which live in extreme poverty (ODI, 2010) that mainly affects indigenous groups, which roughly represent 60% of the population. Since independence from the Spanish in 1825, political and economic power has been concentrated in hands of the white elites, descendants of Spanish colonists and nineteenth century European immigrants who for many years followed top-down models of economic development influenced by the neoliberal approaches of international development agenda (Ranta-Owusu, 2009). In addition, with a national economy primarily based on exporting raw minerals, the development of the country has always been at the mercy of the international mineral prices and of value chain dynamics and competitions. Both poverty and mining concentrate in the departments of Potosí, Oruro and La Paz, with Potosí having, according to the 2012 census, an incidence of poverty and extreme poverty of, respectively, 67.4% and 49.5%, the highest in the country (Fundación Milenio, 2013).

Little seems to have changed since Lindqvist's trip around Latin America towards the end of the 1960s (1972: 78):

'The road between Potosí and Oruro crosses a mining landscape in ruins. Abandoned smelting surfaces, rusty conveyor belts, the relics of the exploitation of centuries. Everywhere, the traces of former wealth. Left is simply a land of extreme poverty (...). Someone had been there, taken what he wanted, and decamped.'

Potosí continues to display a landscape scarred by centuries of mining and poverty. The anticipated left-wing reforms to which the currently governing Evo Morales' Movement Toward Socialism (MAS) committed itself, have not, so far, happened as expected, nor has the city of Potosí been seen to benefit from supporting Evo Morales with 81% of the vote. Despite the government's emphasis on expanding welfare and challenging the free global trade that most Bolivians blame for the persistent poverty and inequality in the country, the continuity of neoliberal approaches (Webber, 2011), together with most *Potosinos'* feelings that things are not as expected, and the consequent feelings of betrayal, have led to constant bouts of conflict in Potosí, and to the protests described above.

As shown with Miguel's comments above, despite the strong political and historical identity of Bolivian miners as fighters for national development (see Chapter 2), cooperative miners are highly stigmatised by the local and wider Bolivian society. Their stigmatisation is shaped by the general belief that 'their only goal is to rip out as much mineral as possible from the Cerro for their own benefit while leaving nothing for the development of the city and region' (La Época, 1995: 7), as if these miners were stealing what belongs to the city and department of Potosí for their personal wealth in a similar way to that historically done by private mining companies in this region. They are seen as subversives who fear of nothing when it comes to defending their livelihoods and interests, and are negatively portrayed because of their underground relations with the devil, their small and skeletal bodies, red eyes, black faces and hands, mineral smell, and because of their alcohol consumption, rudeness, peasant origin and the 'now for now ethos' (cf. Prentice, 2007) of their lifestyle. All these are characteristics shaped by the dismal working conditions in which these miners work. Despite the fact that the old colonial city of Potosí fully depends on the Cerro's mining activities (Ferrufino-Goitia et al, 2011), its miners, generally disregarded, feared and misunderstood, tend to be considered by the urbanised *Potosinos* only as a useful element for protests (Absi, 2009; Möeller, 2007).

Yet, cooperative miners are the motor of Potosí's economy (Ferrufino-Goitia et al, 2011). They are also the largest labour – and political – force in Potosí and one of the largest in Bolivia, where four types of extractive industry coexist: private, state, cooperative and indigenous-communitarian. Protected and encouraged by the MAS government as the pathway to reverting Bolivia's resource curse by decentralising economic, social and political power through giving the means of production to the people (see Chapter 6), cooperative miners nowadays account for over 96% of the mining workforce. They produce 35% of Bolivia's mining

exports (Gandarrillas, 2013) as Bolivia is the sixth largest mineral producer in the world (MMM, 2011). Mining represents some 10% of the country's GDP (ICMM, 2012).

In Potosí's Cerro Rico, cooperatives are formed by self-organised work-teams where the boundaries between legal and non-legal can be hard to distinguish. These miners rent the mines from the state and then self-organise production and trade. With currently high mineral prices, 18,000 cooperative miners are estimated to produce roughly 3500 tons of mainly zinc, tin, lead, silver and tin-silver composites per day, which they manually blast from the rock, transport to the surface and crush before the ore is refined and exported by mineral buyers (see Chapter 5). Mineral buyers export the ores in raw form to processing facilities located in Asia, Europe and North America via ports on the coasts of Argentina, Brazil, Chile, and Perú (MMM, 2011).

There are no statistics or records of occupational deaths, injuries or diseases for the Cerro, and very little is known about how the 31 cooperatives currently operating in this mountain organise production or manage OHS risks. It is estimated that 14,000 miners were working in the Cerro during 2009. During that same year, combining data from Potosí's cemetery, the *La Plata* primary health centre located at the base of the Cerro, and the city's major hospital (Bracamonte), I calculate that 218 miners died due to work-related accidents and diseases, over 2800 sought primary health care after a minor work-related injury, and 36 required a minimum of 7 days hospitalisation directly from work. Of the 218 deceased miners, 9% died from the long-term mining illness silicosis. A total of 30 miners died in the mineshaft, of which 16 suffered from carbon monoxide poisoning and 14 died due to trauma caused by collapsing roofs and dynamite explosions. Over 1600 miners died between January 2000 and December 2009.⁵

1.2. Meanings of risk and risk control

OHS is the discipline dealing with the prevention of work-related injuries and diseases, as well as the protection and promotion of workers' safety (ILO, 2011). It is generally defined as 'the

⁵ These numbers only reflect miners actually buried in the city cemetery. It is common for miners to take the bodies of their deceased back to their communities or to conduct clandestine burials to avoid paying the costs of the formal burial. Given the geographical and livelihood mobility associated with mining activities, numbers are likely to be much higher. Similarly, the records kept by the health centres do not include miners covered by Social Security and exclude those that follow naturalistic and Andean traditional medicine. Also, due to low mineral prices, the number of miners in the Cerro from 2000 to 2003 is estimated to be less than 5000.

science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and wellbeing of workers' (Alli, 2008: 1). Its theoretical and functional structure is built around the prevention and management of 'occupational risks'. According to the OHS paradigm, the ideal scenario is that once 'occupational risks' have been identified, these can be prevented and controlled, protecting and maximising both the health and wellbeing of workers and enterprise performance as a result (Adishesh, 2003). Conceptualising 'occupational risks' as hazards arising in or from the workplace that could impair the health and wellbeing of workers (ILO, 2011; WHO, 2010; Alli, 2008), OHS experts define 'occupational risks' in terms of calculable probabilities of known outcomes (Leach et al, 2007); as a quantifiable measure of the relationship between the work environment and human pathology (Holmes and Gifford, 1997). Occupational risks are identified by OHS experts by means of prioritising amongst occupational hazards⁶ via a workplace risk assessment that establishes correlations between the likelihood of an undesirable health impact on an individual or group of workers resulting from the specific work technologies and processes, coupled with the severity and magnitude of their impacts (see Table 1.1).

Table 1.1. Qualitative Risk Assessment Matrix

<u>Likelihood</u>	<u>Consequences</u>				
	Insigni- ficant 1	Minor 2	Moderate 3	Major 4	Cata- strophic 5
A. Almost certain	H	H	E	E	E
B. Likely	M	H	H	E	E
C. Moderate	L	M	H	E	E
D. Unlikely	L	L	M	H	E
E. Rare	L	L	M	H	H
<u>Legend</u> E: extreme risk; immediate action required H: high risk; senior management attention needed M: moderate risk; management responsibility must be specified L: low risk; manage by routine procedures					

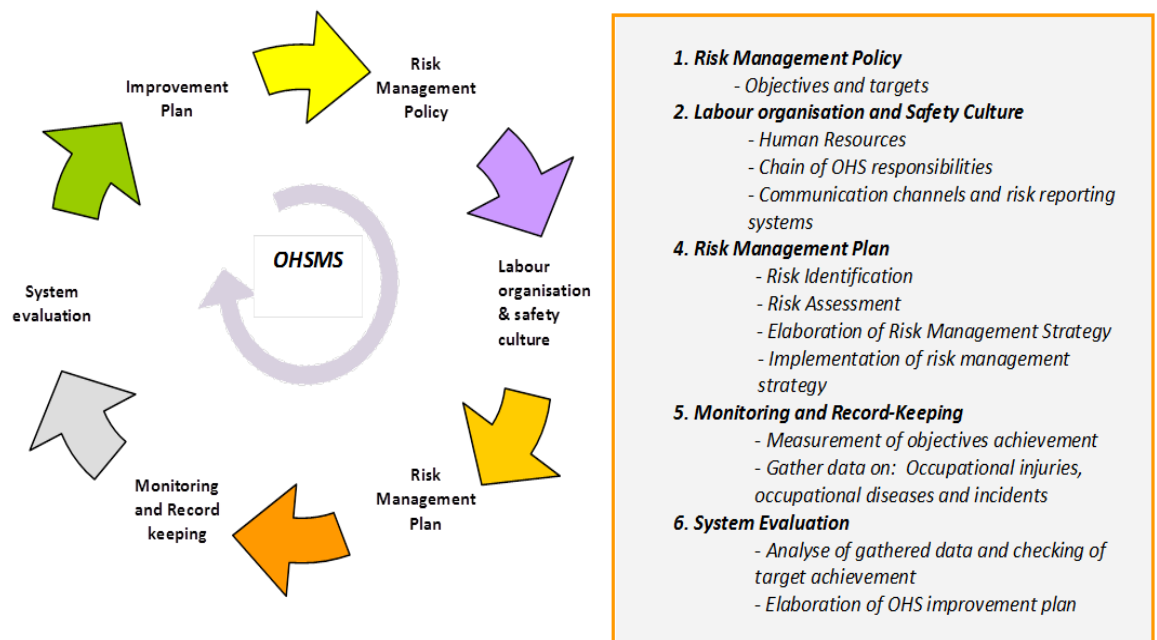
(World Bank, 2007: 12)

Since 'occupational risks' are conceptualised as originating within the physical boundaries and characteristics of the workplace, their associated work processes, and from people's particular behaviours at the workplace, OHS experts have constructed enterprises as the locus of

⁶ OHS experts define 'hazard' as the intrinsic property or potential of a product, process or situation to cause harm on someone. 'Occupational risk' is conceptualised as the probability that a person will be harmed or experience adverse health effects if exposed to a hazard. Accordingly, a risk is identified by multiplying the hazard by the exposure level to it (ILO, 2011: 1). For reasons that will become obvious, I will not make such a distinction.

learning (cf. Juma and Yee-Cheong, 2005) where OHS risk knowledge is first generated and then translated into risk-management action, and have therefore positioned these institutions and the people in them as the responsible ones for managing this. Accordingly, the OHS risk management strategies (onwards, OHSMSs) proposed by OHS involve primarily, technological, organisational and behavioural components within the workplace (Goldenhar, 1996). These primary strategies are followed by ‘standards-setting bodies’ (Burton, 2010: 70) which, advocating a simple, step-by step approach to risk assessment and management within the workplace (OSHA, 2013), are responsible for creating OHS standards for workplaces, and to have them adopted by governments and individual enterprises (Burton, 2010; Alli, 2008; Swartz, 2001). This process is illustrated in Figure 1.3 below.

Figure 1.3. OHS Risk management system (OHSMS)



(Adapted from ILO, 2011: 3)

Social approaches to risk largely emphasise that risks present more than just the challenge of acquiring technical knowledge of their causes and effects and preparing accurate and effective management strategies for prevention and response. According to this literature, risks are contextually embedded (Cutter et al, 2003; Turner et al, 2003); and are economically (Rinefort and Petrick, 2012; Beck, 1992), socio-culturally (Lupton, 2006; Caplan, 2000; Douglas, 1985) and politically (Waldman, 2011) constructed rather than naturally given or determined (Jary and Jary, 1995). However, despite the large bodies of OHS research and social risk literature, there is a dearth of work that relates the insights of social approaches to risk within OHS.

Consequently, both within the OHS discipline and within the growing social science literature on risk, the 'occupational risk' concept remains unquestioned. This deficiency, as will be demonstrated throughout this thesis, limits the possibilities of OHS in achieving its own goal. In addition, in overlooking the broad and complex processes, structures and relations that determine both the construction of these risks and people's ability to respond to these, dominant OHS approaches' tendency to look at risk only with a 'technical eye' contributes to perpetuating the conditions in which miners work, while simultaneously blaming miners, cooperatives and governments for the conditions in which workers' work (cf. Douglas, 2003; Beck, 1992). In bringing together the insights from social approaches to risk to the specific case of OHS, this thesis contributes to an understanding of the dynamics surrounding OHS, its management, and the differing ways in which OHS risks are constructed, perceived and responded to by different individuals.

Following the contributions made by social approaches to risk, there are a number of grounds in which to challenge the workings and assumptions of dominant approaches to OHS. First, OHS' theorisation of risk is based on a rational-actor paradigm (cf. Renn et al, 2000) that assumes universal rational decision-making when it comes to identifying and managing risk. As explained, OHS' fundamental assumption is that since occupational risks can cause undesirable effects, a technical analysis of these effects coupled to a technical investigation of their causes will identify the risks which need to be managed (Swartz, 2001). It is also assumed that the knowledge of these risks, together with an awareness of their consequences on workers, will result in the establishment of appropriate and effective risk management strategies within workplaces.

Looking at risk from a socio-constructivist perspective, several issues require attention, as risk and safety are not objective conditions 'out there' simply waiting to be perceived by people or calculated by professional risk analysts (Covello, 1983). On the contrary, for this body of literature, risk, and its inverse, safety, are embedded in social structures, in the 'social fabric' (Short, 1984: 711) and in culture (Douglas, 1985). Therefore, both safety and risk evolve and exist in and through social relations and structures rather than as solely static and objective conditions that individuals perceive either more or less accurately (Stallings, 1990). Similarly, perceptions of what constitutes an undesirable effect depend on people's particular values and preferences (Jaeger, 2001). In addition, the interaction between risk knowledge and the practical consequences for risk management is less straightforward than OHS would advocate. For example, making clear-cut, strategic choices is dependent on having the power to realise

them (Cornwall, 2007). Finally, in conceptualising 'occupational risks' as originating within the workplace, the broader structures and socio-political and economic contexts in which workplaces are embedded remain overlooked. This is important because these larger structures mould the immediate context in which particular forms of employment, work patterns, processes and specific social relations develop, and these, in turn, further shape the particular conceptualisations of risk and people's scope for risk management. This thesis applies the insights provided by this body of literature and seeks to understand how 'occupational risk' is conceptualised and responded to by different miners and the factors that shape these conceptualisations and behaviours.

As much as research shows discrepancies among risk perceptions (Slovic, 1987), social and cultural approaches to risk also demonstrate that there are important variances in the ways risks and their perceptions are to be understood. From a sociology of risk perspective, Beck (1992) points out that risk is related to class patterns, and asserts that people's adherence to particular risks is highly influenced by a lack of knowledge. Socio-cultural approaches, in turn, tend to argue that since perceptions of danger and sources of anxiety are more socially and culturally constructed (and far more contingent) than risk theorists admit, risk is to be considered from a cross-cultural perspective. For instance, Caplan (2000) points out the need to re-explore risk as a way to challenge the technical frameworks within which notions of risk are commonly considered. Her work however, fails to explore the variety of perceptions of risk that coexist at the local level and how global issues may influence the ways in which particular perceptions of risk are constructed and transformed. Similarly, Douglas and Wildavsky (1982) point out that notions of risk have to do not only with knowledge about the consequences of risk, but also with private subjective perceptions of fear, as people weight risks differently and prioritise among them according to their own life-worlds, values and priorities. Accordingly, for them, a study of risk has to start by asking what it is that people are afraid of. They also state that it is equally important to ask how people decide which risks to take, to manage, or to ignore, since substantial disagreement remains over what is risky or how risky something is, and about what to do with risk. However, in a similar manner to Caplan, Douglas and Wildavsky assume that it is the collective unconsciousness that creates locally embedded values, as if risks were to have the same portfolio in one single setting, and therefore neglecting individuals' agency and broader structures. In addition, in failing to account for the dynamic and ever-evolving local and broader pictures, they overlook how changes in the global circumstances further shift individual's and groups' perceptions of risk and risk itself (see Chapters 2, 5 and 6).

In this sense, research indicates that the experience of risk is not only an experience of physical harm, but the result of processes by which groups and individuals learn to acquire or create interpretations of risk (Pidgeon et al, 2003). Then, risk is to be assessed through the interaction between the physical harms attached to a risk and the social, political, economic and cultural processes that shape interpretations of that event, coupled with secondary and tertiary consequences that emerge (ibid). OHS assumptions can then be challenged, because, in focusing on the immediate causation of OHS risks, and in assuming a universal perception of these risks dependent on awareness, the preconditions that influence both the construction of these risks and people's feelings and behaviours towards them remain overlooked. This becomes clearer when one contrasts risk with the related terms of uncertainty, danger and chance (Stahl et al, 2008). For example, in Chapter 3 I illustrate how Doña Margarita keeps dynamite cartridges under her bed to avoid theft, since the consequences of the theft are far worse and more likely than the chances of this dynamite exploding. She is aware of potential losses of taking OHS risks, but also of potential gains of the decision. In this sense, in addition to trying to understand how people individually understand and respond to occupational risk, danger and uncertainty (see Chapters 3 and 4), this thesis explores how different people participate in creating, filtering, and distributing risks; and examines, in Chapters 2, 4, 5 and 6, the complex mechanisms or processes through which risks and their perceptions are constructed (Stallings, 1990) and change over time (Short, 1984).

Indeed, risk attitudes are highly variable and locally-specific. Actually, perhaps the most important generalisation from socio-cultural approaches to risk is that there is no uniform or consistent risk perception. However, it is also generally accepted that people's risk perceptions frame risk behaviours (Kasperson and Kasperson, 1996). In turn, particular perceptions of what constitutes a risk and evaluations of what risks are worth preventing or bearing are influenced by people's values and priorities (Tulloch and Lupton, 2003). It can thus be concluded that qualities of risk (and what to do with them) are not universal and absolute, but instead have different meanings for different individuals. For instance, Holmes et al (1998) illustrate how employment status influences discrepancies in risk control judgements. Similarly, McDonald and Kucera (2007) demonstrate that risk perceptions among fishermen were the result of a trade-off between safety and earnings. Grätz (2009) in turn observed that workplace arrangements, norms and rules influenced artisanal miners' understandings of OHS risk in North Benin, since systems of risk-sharing based on social contracts and trust among miners influenced the mines' risk perceptions and attitudes. By contrast, Holmes et al (1997) found

that Australian industrial workers perceived work-related accidents and diseases as a normal part of work, and not an illness for which they should seek treatment and prevention.

However, these studies, focused on individual decision-makers' agency, failed to incorporate the broader national and international effects on shaping both risk and these workers' perceptions and behaviours. This thesis takes on board the contributions of this literature in its analysis of the intersection between conceptualisations and management of risk, in recognising: First, that there is no linearity between risk awareness and management of risks at the individual level independent of existing structures that may limit individual's choices. Second, that people's evaluations and behaviours towards risk can change, even though their perceptions, values and priorities remain stable. Third, that risk management is influenced by broader issues that do not necessarily affect particular perceptions of risk.

Indeed, focusing attention solely on workers' risk perceptions does not take sufficient account of the more complex socio-economic relations within which such choices and competences are exercised (Boeck et al, 2006; Rockhill, 2001). This draws attention to the social contours of risk (Kasperson and Kasperson, 2005). The social dimensions of risk have been neglected by the sciences and professions concerned with risk (Short, 1987), which, apart from conceptualising risks as being external to people, conceptualise workers as homogeneous groups with equal entitlements and a common goal in terms of OHS. Thus, what OHS overlooks, is the non-linearity between perceptions and practices, not only as a result of individual values and priorities (see Chapter 3), but also as a result of power relations (see Chapters 4, 5 and 6).

In conceptualising social relations only as potentially beneficial for OHS, this paradigm neglects the social, economic, political and institutional construction of risks; how power relations may affect the particular ways and means by which different people can cope with the risks and uncertainties that they face. Also, in assuming that occupational risks are created within the workplace, OHS management strategies, narrowly targeted to the specific technologies, work processes and behaviours towards risk when at work, fail to address broader structures that also influence both how these workplaces develop and people's choices (see Chapters 2, 4, 5 and 6). Organisations are socially and historically constructed, and thus, as I show in Chapters 2, 5 and 6, they are transformed by both internal and external processes (Clegg and Hardy, 2005).

OHS does account for 'the social', but it does so using a psychosocial approach to workers' behaviours (see Bongers et al, 1993; Slovic, 1987, 2001) that, focused on individual's role in accident causation (Sparks et al, 2001) and on safe person/behaviour (Glendon et al, 2006), fails to acknowledge the political determinants of individual's risk perceptions and behaviours. Within these psychosocial approaches to risk, individual's behaviours have been conceptualised as 'occupational risks' (Espluga-Trenc, 2002). Arguably, this 'riskification' (Wynne, 2001: 446) of individual behaviours diverts attention from the social and political dimensions of risk behaviours, and diminishes awareness of the role of other structural factors, such as the role of the family responsibilities, or global mineral prices, in influencing risk behaviours. Similarly, despite the fact that a psychosocial approach to workers' behaviours helps in explaining why some individuals expose themselves to risks, the approach fails to examine the particular factors, processes, relationships and dynamics that influence these behaviours, and therefore it fails to inform OHS theory and practice.

This draws attention to the social relations at work. As indicated above, OHS advocates universal ideas of OHS management (onwards, OHSM) that follow the rules of bureaucratic rationality. Accordingly, OHSM is seen as deliberate and conscious, planned and the fruit of an intentional strategy. These assumptions can also be challenged: First, these involve a simplified and uni-linear model of institutional learning. Second, the applicability of a rational decision-making model is limited to relatively simple problems, where objectives are clear, unambiguous, and agreed, and where cause-effect relations are clearly known (Stirling and Gee, 2002). Third, knowledge and power are inextricably intertwined (Gaventa and Cornwall, 2006), but the model ignores the significant effects of political behaviour in the risk management process (Heracleos, 1994). Fourth, the socio-economic context of the secondary labour market may act as a structural constraint for management commitment (Simard, 1995).

A large body of literature shows that, in practice, institutional OHSM does not operate in rational and logical terms. A clear example that brings into question this rational ethos is offered by Quinn et al (2007), who found disparities in the burden of occupational health according to the socio-demographic characteristics of workers, mostly related to social position such as gender, ethnicity, immigration status, and income. Similarly, Foley (1998) observed higher rates of injury in temporary workers than in their permanently employed colleagues (in Shannon et al, 2001). This literature shows that the primacy of this science-based model of OHS decision-making has many shortcomings, stemming not only from the difficulties that arise when trying to reduce the complexity of the likelihood and magnitude of

an OHS risk to a comparable and quantifiable measure, but also because, even if the rational objectives of completeness and comprehensiveness were feasible, the scientific approach would not address issues of framing and prioritisation (Stirling and Gee, 2002).

In this sense, economic theory predicts (and recommends, see Chapter 5) that decision-makers spend on OHS up to the point where marginal benefits equal marginal costs, with OHSM thus becoming the result of an institutional cost-benefit analysis (Lahiri et al, 2005; Dorman, 2000). However, research findings that point to intuitive judgements based in decision-makers' values and private goals (Georgakopoulos, 2005) challenge both the economic and the scientific theories, demonstrating that value judgements are behind any risk management decision. For instance, Georgakopoulos concluded that unless OHS risks are considered near and real by decision-makers, the associated costs/benefits of doing or not doing something are not going to figure in the decision heuristics, regardless of the nature of the scientific or economic calculations. Similarly, theorising a real world of multiple decision-makers, complex problems, fast moving markets, unpredictability and uncertainty, Heracleos (1994) argues that 'objective' rationality becomes inapplicable, and that, consequently, decision-making is influenced by what he calls 'conditioned rationality' where the particular commitments, interests and values of decision-makers are primary. In turn, these rationalities change as circumstances and priorities shift, so that entrepreneurs and risk experts are not strictly bound to a single form of rationality and instead, they switch among rationalities (Miller, 2007). OHSM becomes then a much fuzzier process than the strategic, logical and deductive one advocated by OHS. As I demonstrate in this thesis, and in particular in Chapters 4 and 5, labour organisation and cooperatives' assets and internal arrangements change according to the particular concerns, circumstances of its members and external factors. Thus it shows how the everyday politics of the mine (c.f. Burawoy, 1985) and the factors internal and external to the workplace influence perceptions and responses to risks (see Chapters 4, 5 and 6).

This is of special relevance for the under-researched case of OHS in cooperatives. Together with Small and Medium Enterprises (SMEs), cooperatives represent the main employer in economically poorer countries. Cooperatives alone are estimated to employ over 51% of the working population in Latin America (Mogroviejo et al, 2012) and, according to the Bolivian Cooperative census for 2007, one-third of the Bolivian population is a member of a cooperative (ICA, 2014; Mogrovejo and Vanhuynegem, 2012). Together with self-employed workers and other SMEs, cooperatives are estimated to employ 85% of the Bolivian working population (ILO, 2007). The smaller the industry, the higher the rate of workplace injury and

illness (Bluff et al, 2004; Mayhew and Quinlan, 1999). However, and despite research showing that the distinctive characteristics of SME make OHMSs (designed for larger institutions) inoperable (Hopkins, 2006), how knowledge about OHS risks is generated and translated into OHSM in these organisations has not yet been investigated. If there is a common point in the available literature, it is on the importance of acquiring a better understanding of the risks associated with smaller industries and on how best to promote their OHS. In this sense, this thesis contributes to this debate by providing a better understanding how risks are conceptualised, framed and negotiated and with what practical consequences within cooperatives (see Chapters 3, 4, 5, and 6).

1.3. My research journey

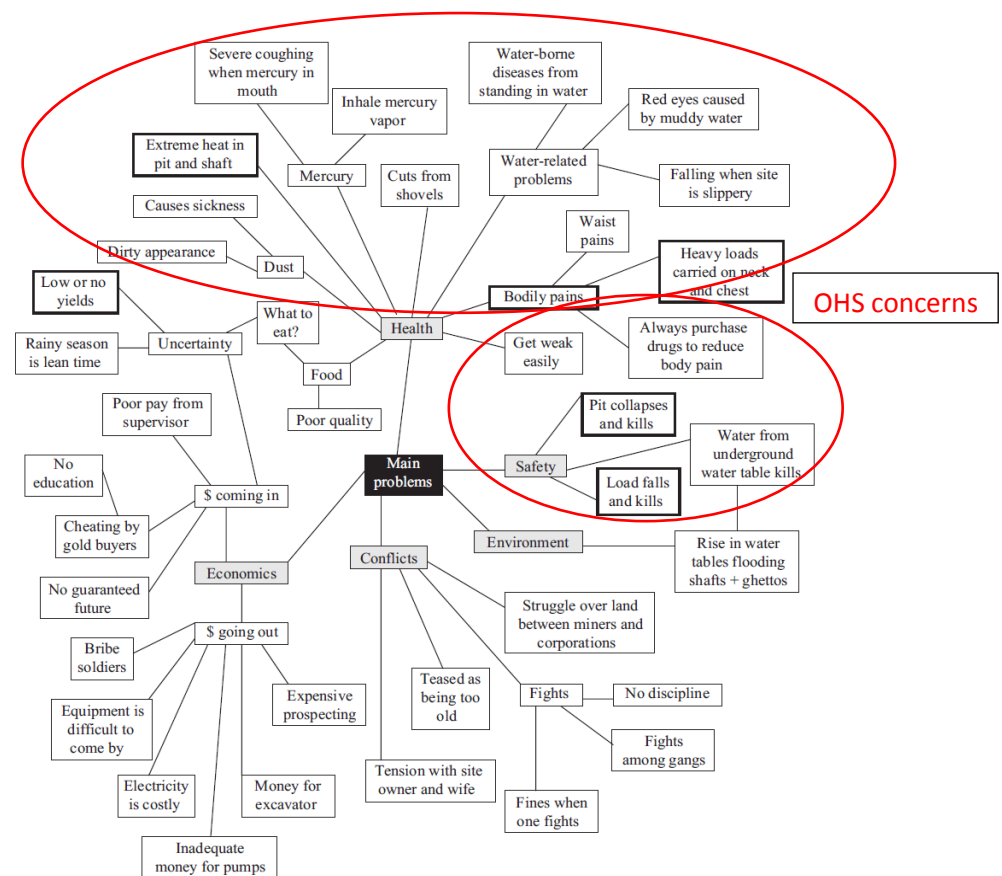
In trying to answer the question ‘How do cooperative miners understand and seek to manage occupational risks?’, this thesis falls into the broader inquiries of risk perception, analysis and management, of lay and experts’ risk knowledges, and of science-society relations, and I am exploring these in relation to the field of OHS and within the multidisciplinary field of development studies.

OHS research has tended to be limited to analysing the physical characteristics of the work environment and its impacts on workers measured in terms of prevalence and incidence of diseases, injuries and deaths (e.g. WHO, 2007; ILO, 2007b; Mock et al, 2005; Loewenson 2001; Leigh, 2000), in economic terms at the organisational, national or global levels (e.g. Yu, 2009; Fontes-lunes, 2002; Guifrida et al, 2001; WHO, 1995), or in terms of workers’ access to OHS services (Rantanen et al, 2013). As explained above, these studies are located within a positivistic ideology that frames scientific approaches to ‘occupational risks’ in terms of calculable probabilities of known outcomes, and in the consequent assumption that the moulding of the labour organisation, training and behavioural programmes, are the primary means through which to promote workers’ safety (see ILOCIS, 2012; Alli, 2008; Stellman, 2004; Swartz, 2001). Instead, the approach used in this research has been explorative in nature and is based on qualitative methodologies. In so doing, my aim is to develop a detailed and deep understanding of the complex dynamics surrounding the construction, conceptualisation and management of OHS risks in Potosí’s Cerro Rico.

I wanted to acquire a deep understanding of what miners consider to be an ‘occupational risk’ and why in order to comprehend how or when such risks are managed within cooperatives, or

why these are not managed. My curiosity and concern was very influenced, not only by my personal and professional background as a nurse and OHS specialist, but also by Domitila Chungara's testimony of *The life of a woman of the Bolivian mines* (Chungara and Viezzer, 1978), by June Nash's (1993) account of Bolivian miners' plight to improve their living and working conditions during the 1960s and 1970s, and by Tschakert's research on the pull and push factors among Ghanaian artisanal miners (see Figure 1.4). Tschakert (2009) demonstrated the wide range of interlinked factors that artisanal miners consider problems associated with their livelihoods. I found it very interesting to observe that only some of the issues pointed to by the Ghanaian miners referred to 'health and safety concerns' as defined by OHS, while the wider range of issues they identified had to do with power relations, living and working in an uncertain environment, trade and economics. Thus, I sought to examine how miners in Potosí's Cerro embody and conceptualise all those issues associated with mining work and with what effects for how they perceive and manage OHS risks.

Figure 1.4. Aggregated mental model of problems associated with artisanal mining.⁷



(Modified from Tschakert, 2009: 27)

⁷ The borders' width reflects the number of responses.

Most miners in the Cerro and some labour and OHS specialists who have developed close relationships with miners seemed to recognise that these wider issues can be seen as 'occupational risks', and simultaneously, consider them to be indirect causes of OHS risks. To start the research, a prime distinction was therefore made, between the specific 'health and safety risks' (those risks dominant OHS' frameworks seem to be interested and focused on and enclosed under the term 'occupational risks') and the broader range of dangers, uncertainties, risks and ambiguities (Stirling, 2007; Stirling and Gee, 2002) associated with miners' livelihoods (referred to in this thesis as 'occupational uncertainties', or 'work-related risks') in order to fully understand how OHS works in the Cerro. The reason for this change in nomenclature is to overcome the confusions and subsequent shortcomings arising from limiting the conceptualisation of 'occupational uncertainties' as simply 'health and safety risks'. Similarly, my research was also, as illustrated by Nash (1993) and by Chungara and Viezzer (1978), to include the particularities of the miners' living conditions and their determinants as an important aspect in understanding OHS.

It seemed to me that the best way to understand this complexity was through ethnographic research, which involved building very close relationships with these miners and their relatives, and required, as miners repeatedly suggested during the time I shared with them, 'looking at risk with both eyes'. As explained, I have used this Andean concept to look beyond the observable facts and behaviours of the different miners, and to open up to the broader complex, dynamic and interlinked processes that contour (Kasperson and Kasperson, 2005) the various observable behaviours, perceptions, and the particular risks miners face.

Hence, this thesis also examines the construction of workplace and OHS risks, with a focus on who, and what historical and current factors and relationships participate in shaping this construction, and how and when? This approach enriches my initial plan of solely looking at how miners understand and seek to manage OHS risks, and it is the result of how the fieldwork findings challenged (and broadened) my own initial thinking and research goal. The significance in so doing is that: to truly grasp OHS, it is not enough to understand how broader issues and uncertainties order miners' understandings and scope for OHSM, it is also necessary to understand the causation of OHS risks and of the miners' living and occupational uncertainties as being rooted in the immediate and wider socio-political and economic contexts in which miners' lives and livelihoods take place and develop (Hilson, 2006; Cutter, 2006).

This thesis is based on 17 months of ethnographic fieldwork (January-February 2009, October 2009-November 2010, January-March 2011, May 2011), plus historical and literature review and data analysis. I originally planned to use a combination of actor-oriented and organisational (or workplace) ethnographies, and my early intention was to select three to four different cooperatives with different modes of labour organisation for the study. However, the characteristics of mining in the Cerro and miners' general mistrust to outsiders made this plan of multi-sited workplace ethnography both unnecessary and unfeasible. Unnecessary because, as I explain in Chapter 4, cooperatives are very decentralised institutions in which each member independently organises labour and production and thus, different modes of organising labour are simultaneously operating within a mining cooperative at any given time. Instead I focused on one cooperative, referred to in this thesis as 'The Cooperative' – although I did have conversations with other miners and undertook visits to other mineshafts to compare the workings of The Cooperative with that of other cooperatives in the Cerro.

My original plan was unfeasible for two reasons: Firstly, there are 31 mining cooperatives currently operating in the Cerro, and each one of them has different mineshafts spread all around the mountain, with no transport or access other than walking at over 15,500 feet above sea level – with the reduced oxygen and consequent breathing difficulties at this altitude. Secondly, the miners' mistrust towards *gringos*⁸ (see Chapter 2) complicated my access to the male workforce. Despite being introduced to some of the cooperative leaders by an ex-miner now employed by the local NGO CEPROMÍN, my initial association with this NGO did not positively influence the miners' perceptions of me. It became obvious that I had to win and deserve their trust. While I did not have this problem with female miners, male miners firstly refused my presence in the Cerro, often making me feel uncomfortable so that I would leave. They feared that I had been sent by the Bolivian government to spy on them and on their practices in order to revert their concessions (see Chapter 6), and had suspicions that I worked for a foreign mining corporation or government that intended to exploit the Cerro.

Gradually, this initial mistrust changed. It was finally completely removed when I started entering the mine,⁹ and I ended up becoming part of The Cooperative and of some of its miners' families through friendship and godmothering ties. Consequently, despite the fact that

⁸ Western-looking outsiders

⁹ For miners, that meant that I was not there to judge them and, more importantly, it showed that I respected their livelihoods and their choices and that I was willing to take risks with them. They acknowledged this and took care of me both inside and outside the mine.

‘my boys’ proudly presented me on various occasions to other miners working in other cooperatives as ‘one of The Cooperative’s comrades’, as I spoke to these other miners, they would often take me by my arm ‘back to my group’. For my own safety, and also to avoid conflict among them that might have persisted after I was gone, I associated mainly with the miners of The Cooperative when different cooperatives gathered together. Focusing on one cooperative which has its office and three mineshafts in the same part of the Cerro, allowed me to simultaneously follow miners’ relations at work and the directives’ and workers’ decision-making processes, something that would not have been possible in other cooperatives, where the elected leaders’ decision-making is conducted in offices removed from the mineshafts. In addition, staying with this cooperative allowed me to achieve a deep understanding that saw well beyond the miners’ tough, rude and reserved appearance. Most of these miners were willing to help me in my quest to understand their lives, livelihoods and risk choices, and to share their experiences and lives with me in exchange for a smile and empathic understanding.

During fieldwork I coupled ethnographic methods at the individual and cooperative levels with the local and national levels, as well as with historical and current socio-political analysis. Regional and national level research took place during mobilisations, protests and ‘revolutionary meetings’ organised by the COD,¹⁰ COMCIPO, COMIBOL,¹¹ FEDECOMÍN¹² and through diverse interviews, meetings and lunches with regional and national authorities and the army, since my position as researcher and as knowledgeable of the miners’ world opened various doors to witness local and national assemblies and meetings. I combined this with life stories and with attention to broader issues (such as the rising mineral prices and the legal reforms promoted by the MAS party) that affected the Potosí localities in order to build a holistic understanding of how historical and current socio-cultural, political, and economic processes – from the individual and household levels to regional, national and more globally and vice-versa – influence, not only these miners’ particular perceptions and behaviours towards OHS risks, but also, the construction of specific risks in the miners’ lives and in the mine.

This ethnographic combination not only allowed me to collect evidence about the place of OHS risk in the lives of the different miners, but also about the miners’ causes of concern and the

¹⁰ Departmental Workers’ Union.

¹¹ Bolivian Mining Corporation.

¹² Regional Federation of Mining Cooperatives for Potosí.

extent to which these compete or converge with each other and influence their perceptions and behaviours towards OHS risks. It permitted me to unravel the ways in which OHS meanings are produced and negotiated individually and collectively within The Cooperative, and how OHS risks have different significance not only for the various actors involved (Arce and Long, 2000; Long and Long, 1992), but also at different times in their lives. Perhaps more importantly, the combination of these methods allowed me to pay attention to how miners' practices and concepts, their diverse and changing strategic stances illuminate broader, historical and current, national and international factors, processes, and relationships which become, sometimes in palpable and sometimes imperceptible ways, the material conditions of the miners' context (cf. Prentice, 2007) that influence their OHS risk perceptions and behaviours at any given time.

Although before going to the field I expected that the main research methods would be structured and unstructured interviews coupled with participant observation, the most productive method turned out to be informal chats and, not only hanging out with miners (Geertz, 1998), but rather, sticking with them at all times, both to participate in and to record their daily routines, problems, and to witness the conflicts and solidarities generated when they were trying to manage these. This gave me the opportunity to observe and discuss their contrasting reactions and opinions towards the same events, and was key for detecting emerging issues (Reeves et al, 2008). I participated in, and recorded in various fieldwork logs, the miners' daily routines and problems, and witnessed the conflicts and solidarities generated when they were trying to manage these. During these months, I shared with miners their routines before, after and during work, as well as their daily, weekly, monthly and yearly rituals to the Andean deities (see Chapters 3 and 4 and Annexes 1 and 2). I accompanied them to their family lunches and dinners, to The Cooperative, mining and city celebrations, to meetings, reunions, trainings, weddings, funerals, protests, marches, visits to hospitals and to Andean naturalists and spiritual healers, to their transactions with mineral buyers and to the mineral processing plants, to the *chicherías*,¹³ markets, etc. As time passed and I had shared pieces of their lives with most of the miners of The Cooperative, despite the fact that I continuously repeated my positionality as a researcher, as my Spanish accent changed adapting to that spoken in Potosí, in my mind, I became one of them, and my own positionality as researcher became blurred. This happened periodically, and it was usually a signal to create

¹³ Clandestine bars for miners with prostitution where miners drink after work.

some distance from the Cerro by going to La Paz to interview government officials, ministers, and labour, OHS and other experts and researchers.

This strategy did not change the fact that, towards the end of the fieldwork, I no longer knew where exactly I stood, partly because of my initial decision to distance myself from my own context and from the global north in order to understand the lives and risk choices of these miners, and partly because of my emotional refusal to belong to the part of the world that miners and most Bolivians blame for creating their historical poverty and exploitation. The intensity of the miners' lives and of their struggles to get through their days, together with my closeness to the miners, affected as well, towards the end of the fieldwork, my own approach towards life in general and towards risks that I faced: accepting risks as miners do and playing with the odds rather than remaining cautious and vigilant both inside and outside the mine. Simply accepting, as most miners do, that if something was to happen, regardless of whether I did anything to prevent it, it would happen anyway. I became, in this way, the research subject of my own research, as I realised that, regardless of my own understandings and knowledge, of my background, differentiated assets and life outside Potosí, my immediate social environment had, in less than a year, contoured my ways of perceiving, evaluating and behaving towards risks to my health.

While I initially often consciously curbed any desire to inform or intervene in OHS-related issues, I somehow ended up embodying the miners' perceptions, responses and behaviours, and was not only able to follow miners' logic, but also accepted this as self-evident (cf. Bourdieu, 1977). Looking back, I now conclude that, perhaps, the multiple challenges posed by my field setting pushed me to take the decision to either get in or get out. Choosing to get in was hard because of the vast differences between my world and theirs, and because of the narratives of the stigmatised 'other' that can easily convince if one does not know enough. But once in, it was even harder, at the end, to get out and distance myself sufficiently to complete this thesis. These miners challenged my own conceptualisations of life, risk and death, of what is important and what is less so. They also taught me to look at things with perspective, with both eyes, and this, among many other things, memories and moments, I owe to them. This said, one of my main concerns with this thesis is, understandably, not to fail them with my writing.

This brings me to the issue of positionality, authorship and research ethics. While building such close relations allowed me to participate in the lives of different miners and obtain thick, complex, and detailed information (Denzin and Lincoln, 1998; Gupta and Ferguson, 1997), it also posed various challenges. Indeed, getting too close to informants can prove to be as detrimental as too little contact (Gledhill, 2000). My closeness with the miners affected me in ways similar to those described by Nigel Barley (1983) in *The Innocent Anthropologist*: feeling like an alien not only when in Europe, but also in La Paz. I was strangely homesick from my temporary home in Potosí and felt I no longer fitted in my original context or surrounded by people that I came, occasionally, to blame, as miners and many Bolivians do, for what I experienced, saw and embodied in Potosí. Back in the UK I was shocked by the amount of vegetable packaging in supermarkets, surprised at the extreme cleanness and strict order of things, and angry for finding myself showering and flushing water, good enough to drink, down the toilet. Although it gradually improved, this recurrent post-fieldwork feeling shaped a complicated writing process. As a result, I often found myself navigating from an etic (normative OHS approach) writing in my attempts to get distance from the field, to a more complex, rich, deep (and also initially more personally challenging) approach to the complexities of OHS during the writing of this thesis.

Indeed, research is not a selfless process (Hunt, 2006; Caplan, 1989; Geertz, 1988, 1986). Both my own identity as nurse, anthropologist and OHS specialist and my experiences during fieldwork are core to the sense-making and writing of this thesis (cf. Davies, 1999). They underpin the thesis and are embodied in this text. However, both in the writing of field-notes and in the later writing of the thesis, I have preserved as much as possible informants' meanings by separating them from my own interpretations and conclusions (cf. Lawless, 1992). To deal with issues of positionality and authorship I have also written myself into the text as I describe the situations, happenings, conversations, events and discussions I witnessed and participated in before analysing them. I do this often writing in an ethnographic present, not to imply an ahistorical and unchanging situation (Hastrup, 1990; Stocking, 1983), but to localise strategies and choices and to clarify my presence during fieldwork (Sanjek, 1991). As substantiated below, the situations described are not atemporal, but rather constantly changing and evolving. My etic analysis (Harris, 1976) builds from miners' emic accounts without being limited to them (Hastrup, 1993). It is as much influenced by my formation as an anthropologist and experiences as an OHS specialist as it is by the data obtained by fieldwork and by my particular fieldwork experience.

1.4. Significant terminology

This section clarifies the meaning of terms used in this thesis, relating to the diverse Andean deities and their overlapping identities, to the different types of miners in Bolivia, and to OHS concepts.

Andean deities

Many miners relate to a world of virgins, saints, deities, and spirits which, they trust, have the power to control what happens in their lives (Harris, 2000; Nash, 1993), namely: Jesus, the Virgin Mary, Saint Bartholomew, the spirit of the Cerro, the *Pachamama* or mother earth, the *Tío* or underground god who owns the mineral, the *Tatakachu* or patron deity of the miners and essence of God inside the mine, and the *almitas* or souls of miners deceased inside the mine.

When possible, I name the specific god or spirit. However, this is not always possible, as Andeans believe that the *Pachamama* is in everything and in all living things. For example, the identity of the *Pachamama* coincides with that of the Virgin Mary and the spirit of the mountain, as well as with the essences of other deities which, like the *Tío*, are both a constitutive part of the *Pachamama* and also have their own independent will. In such situations, I use the broad term ‘deity’. This is especially relevant for Chapters 3 and 4.

Types of miners

Four different types of mining co-exist in Bolivia, namely: private, state, cooperative, and indigenous-communitarian. I have distinguished between these by specifying, when necessary, the type of mining before the term ‘miners’ (e.g. private-miners, state-miners or cooperative miners). These distinctions are essential to understand Chapter 2. In this chapter, I also use the term ‘miners’ to commonly denote ‘all miners regardless of their affiliation to a specific mining productive sector’. Similarly, in several chapters I make a distinction between the miners and Bolivians more generally. This is intentional, in that the miners’ collective identity and sectorial interests have historically forged the miners to conceptualise themselves as a distinct sector formed in opposition to the larger Bolivian society.

When using the terms ‘cooperativists’ or ‘cooperative miners’, I refer to all cooperative miners regardless of their type of affiliation to the cooperative or work role. According to estimates made by CEPROMÍN (2009), about 37% of Potosí’s cooperative miners are cooperative shareholders and 63% are dependent employees of the cooperative shareholders. It is important to distinguish between these different types of cooperativists because, as this thesis demonstrates, the type of affiliation to the cooperative not only influences workplace relations, but also risk management decision-making, the miners’ diverse perceptions of OHS risks, and the actual risks they encounter. These distinctions are also essential to understand how the broader factors and relations that determine the context in which miners live and work impact on the lives of different miners and on their OHS risk choices at any given time. With the explicit purpose of making this distinction clear, I have used two main terms to distinguish amongst cooperative miners. On the one hand, I use the term ‘member’ (from Spanish *miembro*) to refer to cooperative shareholders. On the other, I use the terms ‘labourer’, and ‘sub-contracted miner’ to make reference to those cooperative miners that are dependent employees of the cooperative shareholders. These distinctions are of vital importance to understand Chapters 3, 4, 5 and 6. Also, in these chapters, I commonly refer to all cooperativists as ‘miners’.

Cooperative miners are, as I illustrate in Chapter 3, a heterogeneous group. Beyond this primary distinction between members and labourers, there are many other subcategories of miners. These are established not only according to the miners’ particular work roles within the processes of mineral extraction, but also in relation to the multiple hierarchies of power within the workplace, both amongst members and labourers (see Table 1.2 below). These distinctions are key for understanding the different risks faced by the different miners and their uneven decision-making power. Accordingly, when relevant, I spell out the miners’ particular work roles (i.e. *palliri*, *guarda*, etc., see below) to further clarify their positionality within the workplace.

Table 1.2. Types of cooperative miners

Gender	Affiliation to cooperatives	Type of work	Work area (inside/outside the mine)	Job description
Female	Member	<i>Dirigentas</i> (leader)	Mostly outside	Cooperative's (and FEDECOMÍN) administration and general management: president, vice-president, vigilance committee, treasurer, social or sportive committee, etc.
		<i>Palliris</i>	Outside	Scavenge mineralised rocks in the whereabouts of the mineshafts.
		Worker member	Inside	Exploit themselves their <i>parajes</i> . They are usually lone workers.
		Contractors or Widows	Mostly outside(i)	Take over their late husband's job subcontracting labourers to exploit the <i>paraje</i> .
	Labourer	<i>Guardas</i>	Outside	Guard the mineshaft and miners' working tools and ores against theft.
		Informal <i>Palliris</i>	Outside	Scavenge mineralised rocks in the whereabouts of the mineshafts. Can be subcontracted by formal <i>palliris</i> or be widows of labourers who died of work-related accident.
		<i>Llamphiras</i>	Outside	Remove non-mineralised stones from miner's bins to increase the overall quality and net quantity of the ores.
		<i>Peonas</i>	Inside	Wagon-pushers, <i>chasquiris</i> (with shovel), control of winch, etc.
		Members' wives or relatives	Outside	Help their husbands as <i>llamphiras</i> or go to the mineshafts selling food to miners.
Male	Member	<i>Dirigentes</i> (leaders)	Mostly outside (i)	Cooperative's (and FEDECOMÍN) administration and general management: president, vice-president, vigilance committee, treasurer, delegates, sportive committee
		Old members	Inside and outside	Manage mineral production in their chosen <i>parajes</i>
		New members	Inside	Manage mineral production in their assigned <i>parajes</i>
		<i>Delegado</i> (delegate)	Mostly outside	Supervise and oversee mineshaft work.
	Labourer	Second-hands	Inside	Chief labourer. Manage member's mineral production
		<i>Peones</i>	Inside	Wagon-pushers, <i>chasquiris</i> (with the shovel), drill-operators, control of winch, etc.
		<i>Serenos</i>	Outside	Guard the mineshaft and miners' working tools and ores against theft.

(i) May enter the mine once or twice a year to check the work carried out by their labourers.

Regardless of these distinctions, miners commonly refer to themselves as *compañeros mineros*, or mining colleagues/comrades. This is a usual term used by the miners to describe their sense of group belonging, irrespectively of their affiliation to the cooperatives as members or labourers. However, within cooperatives, it is also common to find some miners who, for their individualised actions, are not considered or referred to as *compañeros* by some other miners. To capture miners' relations in my descriptions, I use the term 'comrade' when used by the miners.

Finally, I occasionally use the term ‘workers’ to generally refer to those members and labourers who actually work in the mine, since, as will become clear in the thesis, this is not the case for all miners in the Cerro.

OHS terminology

OHS experts define ‘occupational risks’ or ‘workplace hazards’ as hazards arising in or from the workplace that could impair the health and wellbeing of workers (ILOCS, 2012; Walters; 2003). Yet, as explained, there are other problems and dangers associated to workplace institutions that are not necessarily hazards to health – at least these are not direct health threats, as I explain throughout the thesis – such as trade opportunities, market competences, or access to mineral and to technological assets. This arguably points to the need to reframe the OHS’ term ‘occupational risk’ as ‘work-related health and safety risk’ or ‘occupational health and safety risk’ (OHS risk). These broader risks and uncertainties that also affect the workplace are referred to in this thesis under the general terms ‘occupational uncertainties’ or ‘work-related risks’. As I demonstrate, making this distinction is vital for understanding how occupational uncertainties influence the miners’ perceptions and behaviours towards work-related health and safety risks.

Potosí city and the department of Potosí

The city of Potosí is the capital of the Department of Potosí. To make clear the distinction between both in the text I have specified ‘department’ when referring to the region. Otherwise I mean the city.

1.5. Thesis outline

The next chapter presents a miners’ perspective on their collective history. To do this I bring together the events and imbalance of powers that have shaped the development of the Bolivian mining industry, and the miners’ accounts of these events and their impacts on their work and lives. This chapter introduces the forces at play that have shaped the immediate and wider context in which miners have lived and worked at different times in history, with an emphasis on unveiling the impacts of these forces and their effects on miners (both as personally experienced and as socially, politically and economically transmitted) for their risk perceptions and behaviours. In showing how as circumstances change, so do the miners’ risk perceptions and scope for risk management, this chapter introduces the importance of looking at risk with both eyes as a strategy to understand OHS.

Chapter 3 introduces the miners at the core of this research. I describe a typical day in the life of five different miners, and explore how their personal circumstances and experiences influence how they individually get through their working days constructing, accepting and preventing risks. The chapter illustrates how the miners' personal characteristics determine not only the mining-related livelihood they each have access to (and therefore the work-related risks that are presented to them), but also their power to make risk-management choices and, subsequently, their OHS risk perceptions and behaviours. This chapter demonstrates that workers' OHS behaviours at work cannot be understood without comprehending their personal circumstances. It also illustrates how OHS risk awareness or knowledge does not frame OHS risk perceptions or behaviours. Instead, OHS risk perceptions and behaviours are shaped both by how miners individually balance overlapping risks and uncertainties that simultaneously affect them and by the degree of control and choice they have over all these.

Chapter 4 focuses directly on the workplace and introduces The Cooperative, the mining cooperative at the centre of this research. I first follow The Cooperative back to its roots in order to explore the particular political, economic and social circumstances that led to its foundation. I then describe the miners' workplace relations, with a focus on the interface between individual and collective assets, commitments and interests and the effects of these relations on the different miners' decision-making power and scope for risk management, as well as for the actual risks they each face. The chapter explores workplace relations with an emphasis on hierarchies and in the 'production of flexibility'. This is, how miners configure and re-configure solidarities and conflicts constantly generating new forms of labour organisation both as response to, and as strategies to prevent, the occupational and living uncertainties that affect them individually and collectively. In so doing, this chapter explores how miners' relations influence OHS practices within the workplace on the one hand, and the various factors and relationships which, from within and beyond the workplace, shape these happenings and relations on the other. This serves to demonstrate that a focus on the workplace and on OHS risks within the workplace is not enough to understand OHSM. Instead, the chapter argues for an understanding of power imbalances and workplace relations 'in production', and of the factors that, external and internal to the workplace, determine these hierarchies and shifts in the workplace.

Chapter 5 explores miners' relationships with mineral buyers, and illustrates some of the tensions, uncertainties and dynamics surrounding the commercialisation of minerals. I illustrate how the miners' productive capacities determine their trade agreements with mineral buyers, and explore how these agreements shape risk and safety in the Cerro through influencing the miners' earnings, production rhythms, labour organisation, workplace relations, and their contributions to Social Security. The chapter then illustrates how, driven by market demands, the miners' relationships with mineral buyers are also conditional to internationally-dictated mineral prices. I examine how fluctuations in mineral prices and associated uncertainties in the miners' lives and livelihoods influence OHS in the Cerro through triggering risk-acceptance behaviours and power abuses, through altering miners' relations with buyers, and through defining the constantly-changing patterns of workplace relations and labour organisation. In so doing, this chapter challenges the reductionist economic approach to OHSM used by OHS by illustrating how it overlooks broader economic considerations involved in people's OHS choices. The chapter invites reflection about the role of trade relations and global economic dynamics and interdependencies in shaping miners' lives and livelihoods and, consequently, their OHSM choices and opportunities.

Chapter 6 explores the miners' relationships with the state and the impacts of these relationships on how the different miners perceive and respond to OHS risks. I describe how the Morales' government's technological and educational support to cooperatives has largely failed to promote OHS in the Cerro because of the government's lack of engagement and 'wilful blindness' to the power imbalances within cooperatives and to the situations experienced by most miners. The chapter then discusses the problem of OHS law compliance. I explore how the state has historically failed to support and promote OHS within cooperatives, and how the 'processes of change' of the Morales' government are simultaneously facilitating and obstructing OHS choices amongst the different miners in spite of non-enforcing OHS legislations. This serves to claim that OHS regulations do not, on their own, regulate OHS, and thus, that an emphasis on OHS laws and in their enforcement are not the key instruments for the protection of workers. Instead, the chapter argues that greater attention needs to be paid to the factors and relations that influence the living and occupational uncertainties faced by miners and their means and capacities to respond to these, as well as the government's options and constraints so as to enforce existing legislations and help miners achieve greater stability in their incomes.

Chapter 7 concludes with the main findings and contribution to knowledge of this thesis and discusses the implications for OHS policy and practice while pinpointing directions for future research.

2. The miners' background: Glow, misery and dynamite

'Silence! Here rest the miners who left their lives for this homeland'¹⁴

Bolivia's entry into world history begins with the mines (Nash, 1993). It also begins with the miners' sense of exploitation of their national richness and of their own physical strength for the enrichment of others, both national and foreign. The Bolivian miners' continued struggles for a better future has forged them a reputation of labour militancy and political radicalism greater than that of any other working class in Latin America (Whitehead, 1980). Their activism has often resulted in armed conflict and massacres, but also in the miners becoming the architects of the events that shaped the history of mining and, with it, Bolivian history and their own. They have become one of the most influential and militant labour movements in Latin America.

This chapter examines the history of the Bolivian miners. I do not aim to 'objectively' reconstruct the history of mining in Bolivia, but rather to present a miner-owned historical reading of collective-self. For this purpose, I bring together on one hand the events and imbalance of powers that have shaped the development of the mining industry and on the other the miners' accounts of these events and their impacts on their work and lives (see summary in Table 2.1 below). Events important to the miners have historically shaped their rationale for action to influence change and are vital to understanding Bolivia today. Later on in the thesis I refer back to these happenings with an emphasis on the impacts that these had and still have (both as personally experienced and as socially, politically and economically transmitted), for the miners' OHS. For this purpose I have divided this chapter into five sections that are ordered according to the different political economies of mining in Bolivia through history. Namely: colonial mining (1545-1825), Independence with the *criollos*¹⁵ (1825-1870), the mining oligarchies (1870-1952), the nationalisation of the mining industry and its aftermath (1952-1982) and finally, the privatisation of the mining industry and the rise of Evo Morales (1982-2005). The very last of these provides the context for this research and is, in effect, expanded upon throughout this thesis. The transformations currently taking place under the Morales' administration, deeply rooted in this historical experience and legacy, are described and analysed from Chapter 5 onwards.

¹⁴ Writing in Potosí's cemetery.

¹⁵ Creoles; locally-born descendants of the Spanish.

Bolivia suffers from the well-known resource curse paradox of being rich in mineral resources while most people live in poverty. Mining has traditionally been the bedrock of Bolivia's economy and the government has historically adopted a development agenda heavily reliant on mining. However, with a national economy primarily based on exporting raw minerals, both the development of the mining industry and of the country have always been at the mercy of the international mineral prices and of value chain dynamics and competitions. This dependency has caused repeated cycles of boom and crisis, cycles that traditionally limit the industrial, economic and social upgrading of resource wealthy countries (Ross, 1999; Auty, 1993). Indeed, these cycles are key events in the transformations of the Bolivian mining industry and, with it, of Bolivian history and of the miners' lives. However, for the miners, the glory and crisis, the glow and misery, are not consecutive cycles; rather, they are concurrent since, regardless of the international prices, mining has enabled some nobles, patriarchs, barons and elites to gather fortunes while simultaneously many proletarian mine workers struggled for survival. It is actually in this antagonism, in this 'devilish' (Torrico, 1993: 45; Garzón, 2007: 1) nature of the mineral and of those who pursue it, that the miners' struggles and their political activism for a better tomorrow can be explained.

2.1. Colonial mining (1545-1825)

According to the legend (Arzáns de Orsúa, 2000: 38), fascinated by the perfect cone and red colours of what the Incas called *sumaj urqu*¹⁶, the emperor Huayna Capac sent his vassals to explore the mountain and to remove ore for him to offer to *Inti*, the Sun God. However, when the vassals found the silver and started digging, a thunderous voice from the bowels of the earth warned them not to touch it 'because it was intended for others that come from far away'. Almost a century later (in 1545) as the indigenous Diego Huallpa was chasing a runaway llama he sought refuge from the cold and lit a fire in one of the cavities of the mountain then called *Potojsi*.¹⁷ The following morning he noticed the silver veins, which had melted with the heat. The sacred mountain's wealth was rediscovered. Two weeks after its rediscovery the first mineshaft, called 'The Discovery', was formally opened by the Spanish in the Cerro Rico,¹⁸ the largest single silver ore deposit in the world. Yet, according to the miners of today, it was a misunderstanding that the mountain's wealth was reserved for the Spanish.

¹⁶ From Quechua, 'beautiful hill'.

¹⁷ From Quechua, 'thunderstorm, loud explosion'.

¹⁸ From Spanish 'rich hill'.

High mineral prices
Low mineral prices

Table 2.1. Global events, mineral prices, and Bolivian and mining events through history.

Mining Period	Global Events	Mineral Prices (CMPI, 2013)	National politico-economic Events	Mining/miners' events
Colonial mining (1545-1825)	Spanish Colonisation of the Americas (1492-1898)		1542: Spanish arrive Bolivia 1545: Silver discovered in the Cerro 1809-1825 Independence War	1545: Exploitation of the Cerro formally begins. Forced mine workers
Foundation of Bolivia (1825-1870)		Silver drops	1825: Bolivia's first president is elected External threats jeopardized territorial integrity National economy collapses, eight <i>coup d'états</i> . Indigenous servitude re-implemented	mining industry in hands of small producers Free mine workers
Mining Oligarchies (1870-1952)	Silver patriarchs (1870-1890)	1880: silver drops	1880: silver drops 1880: Tin rises	1870: Mining industry privatised. Foreign investment reactivates the mining industry. Bolivia is consolidated as mineral exporter. 1890: collapse of silver mining industry. Closure of Huanchaca mines.
	Tin barons (1890-1952)		1885: Patiño acquires <i>La Salvador</i> mine 1890: Starts tin mining industry 1890: Patiño discovers tin mine 1911: Miners establish mutual benefit societies. 1923: Miners demand better wages and working conditions 1923: Uncía massacre 1929: Mutual benefit societies abolished	
	1914-1918: World War I		1899-1903: Acre War against Brazil 1932-1935: Chaco War against Paraguay	
	1929: Wall Street Crash	1930: tin drops	1936: Constitution of the 1 st nationwide labour organisation. 1936, 1937, 1939: <i>coup d'états</i> 1941: MNR Formed, led by Estenssoro	1930: Strike for dismissals and lowered wages. Massacre 1930: First Bolivian mining cooperatives created in the Cerro Rico
	1939-1945: World War II 1947: starts Cold War	1942: tin rises	1943: <i>coup d'état</i> . Miners join the MNR 1951: <i>coup d'état</i> 1949-1952: National Revolution	1942: Miners demand better wages, results in Catavi massacre 1943: Miners join the MNR 1944: 1 st Mining Congress. Formed the FSTMB. Pulacayo Tesis 1947: Potosí's massacre; 1949: Second Catavi massacre

High mineral prices
Low mineral prices

Mining Period	Global Events	Mineral Prices (CMPI, 2013)	National politico-economic Events	Mining/miners' events
Nationalisation of the mining industry (1952-1964)		1955: tin drops (11,500US\$/ton)	1952: Estenssoro President, COB, COMIBOL and BAMIN formed. Established co-government state-workers. 1953: Universal suffrage, education and Social Security; Land reform. 1954: Creation of Mining Fund	1952: Mining industry nationalised, sick benefits and labour rights. 1953: Implemented workers' control on state-owned industries. 1958: Cooperatives legalised with Cooperative Law
	1955: Starts Vietnam War	1960: tin prices rise (13,500US\$/ton)	1955: Inflation hike 1956: Stabilisation Act, removal of co-government. Bolivia receives foreign aid from USA. 1960: Triangular Plan, USA foreign aid. 1963: FSTMB separates from MNR	1956: Mobilisations against Stabilisation Act. 1960: Dismissals, end of workers' control within the mining industry 1962: Strikes against layoffs result in 1962 Catavi massacre 1963: General Strike, massacre. Colquiri Thesis. Creation of CONACMIN.
Dictatorial Period (1964-1982)		Tin prices rise	1964: Barrientos seizes power. <i>Coup d'état</i> . Estenssoro exiled, MNR destroyed.	1963: Laid-off workforce moves into cooperatives. 1964: Protests as Barrientos lowers miners' wages. Massacre
	1971: Bretton Woods break-down. 1973: Oil crisis 1975: end of Vietnam War. Brazil, China and India emerge as mining industries. 1980: Global recession	1965: tin rises 20,500US\$/ton 1975: tin rises 29,000US\$/ton	1965: Inflation hike, USA-aid 1966: Barrientos wins democratic elections 1968: Barrientos dies 1969-1971: 5 <i>coup d'états</i> . 1971: Bánzer seizes power. Coup d'état Outlawed political activity and organisations 1977: nationwide strikes & civil conflict 1978-1980: 6 <i>coup d'états</i>	1966: Barrientos lowers again wages. Mines and unions occupied by army. Strikes and protests result in massacres in the mines. 1967: Miners' congress results in San Juan massacre. 1971: Unions illegalised. Wages cut and subsequent massacre. 1973: Clandestine reorganisation of FSTMB and COB. 1975: Strike demanding increased wages and subsequent massacre

High mineral prices
Low mineral prices

Mining Period	Global Events	Mineral Prices (CMPI, 2013)	National politico-economic Events	Mining/miners' events
Privatisation of the mining industry and rise of Evo (1982-2005)		1982: tin rises 38,000US\$/ton (historical peak)	1982: return to democracy	
		1983: drop in prices Low tin prices (11,000US\$/ton in 1986)	1984: COMIBOL bankrupted, shift to hydrocarbons as mainstay of economy 1985: Estenssoro elected president, inflation hike, NPE and reduction of state interventionism in economic matters	1985: Bankruptcy and closure of COMIBOL mines, privatisation of mining industry, massive reduction of wages, dismissals and dislocation of miners. 1986: 'March for life', trade unionist imprisoned and exiled
	1991: Cold War ends	1992: tin drops (8,000US\$/ton)	1991: BAMIN closes 1995: Privatisation of natural gas reserves 1999: Bánzer elected president. Cochabamba's Water War after attempt at privatising water.	1986: Cooperatives absorb the bulk of laid off mining workforce. State-miners displaced to El Alto, Chapare, Cochabamba, etc.
	2001: Starts Afghanistan War			
	Iraq War (2003-2011) China and India increase mineral demand.	2003: tin drops (5,000US\$/ton) 2004: tin rises (10,000US\$/ton) 2005: tin rises (15,000US\$/ton)	2003: El Alto: Gas War and 'October Agenda' . Protests cause the resignation of Lozada. 2004: protests cause the resignation of Carlos Meza. 2005: Evo Morales elected president with first absolute majority in Bolivian history.	

Bolivian mining dates from before the Spanish colonisation (Abbott and Wolfe, 2003), but this rediscovery of the Cerro Rico and its consequent exploitation by the Spanish represents the start of the history of the miners. It marks the beginning of their sense of identity and of their exploitation, and of what, in *Potosinos'* eyes, is the driving force of their history: the hogging of the wealth of the mountain by a privileged few to the detriment of the local population (Absi, 2009).

'Even the horses were shod with silver during the colonial era in the city of Potosí. (...) Potosí's silver raised temples and palaces, monasteries and gambling halls; it offered reasons for partying and for tragedy, it spilled blood and wine, it unleashed greed, waste and adventure...' (Galeano, 2003: 37). Converted into ingots, the viscera of the rich mountain fed both the development of Europe and luxurious living in the ever-increasing population of Potosí, where the best opera singers arrived to entertain the colonial elite (Wilson, 2009). With a silver production already representing 96-98% of the Alto Perú's¹⁹ in 1600 (Quintana, 1998), the city that sprung up at the foot of this mountain quickly became the centre of the colonial economy and the viceroyalty's jugular vein. It fleetingly became one of the most prosperous cities in the world, with 160,000 inhabitants (similar to the populations of London and Paris), and the single most important source of wealth for the Spanish and European empire. Expressions such as that of Cervantes, *¡Vale un Potosí!* (It's worth a Potosí!), proudly made reference to the mountain's richness. Venerated as the mountain of silver and as an infinite source of wealth by some, nevertheless for many others it was 'the mountain that eats men' and its miners, 'human moles' (Wilson, 2009: 140). The Spanish secured labour in the Cerro by reviving the Inca system of labour service (*mita*), and turning it into a system of brutal exploitation and forced labour (Lora, 2009). Each indigenous village from Cusco to Mendoza was required to choose among its villagers in order to supply one-seventh of their male population as forced labourers for the mines (Francis, 2005: 719). In this way, the Cerro Rico, together with Oruro, Porco and Huanchaca (also in the Bolivian Highlands) produced almost half of the world's output of silver (Bain and Read, 1976). Over 9 million locals and African slaves are thought to have died working in this mountain during the Spanish colonisation, a major factor in the demographic collapse of the Andean indigenous populations (Robins, 2011) for whom the entrances to the tunnels were known as 'mouths to hell' (Wilson, 2009: 141). It is said with pain and regret by Bolivians that during the colonial era enough silver was extracted from the

¹⁹ Name by which Bolivia was known at the time.

Cerro to build a bridge from Potosí to Madrid and that enough people died in this mountain to build two bridges of bones.

The Spanish continued with this method of mining for almost three centuries. The forced labourers and their relatives started systematic resistance during the mid-eighteenth century, when violent episodes between colonial officials and communities rapidly increased, reflecting the stress these populations were experiencing (Stavig, 1999). These localised uprisings strengthened the *Tupaj Amaru* and *Tupaj Katari* indigenous rebellions against the abuses of the Spanish. These rebellions ultimately led to the War of Independence which, in 1825, only partially liberated the miners from the influence of the Spanish (Loayza-Bueno and Datta, 2011).

2.2. Founding the Republic with the *criollos* (1825-1870)

The main feature underlying the Bolivian mining history from its independence in 1825 to the 1860s is the complete collapse of the mining industry (Lora, 2009) and with it, of the national economy. The living and working conditions under the *mita*, the consequent bouts of rebellion and the 16 years of the Independence War together left a depopulated and destroyed Bolivia now facing external threats which jeopardised territorial integrity. In addition, the price of silver fell in the world market, and the development of the mining industry was further affected by the fact that the Spanish destroyed all they could (mineshfts, smelters, roads, etc.) before leaving Bolivia in 1825 (Arce-Álvarez, 2003). In the Cerro, only 50 of the 5000 mineshfts opened by the Spanish were still working in 1829 (Lora, 2009). Subsistence agriculture returned as the main productive activity, and the mining industry was left to small producers and associations of independent miners who, manually exploiting the mineral (Serrano, 2004), had a very low productive capacity. Circumstances were not ideal, but miners interviewed by June Nash (1993) in the 1960s believed their predecessors experienced an improvement of the quality of their lives, a view shared by the miners I interviewed. For example, Don Román explained how the miners' conditions had changed with independence:

'We lived like animals when the Spanish were here... Potosí was divided between the miners' stables and the houses where the Spanish and *criollos* had their luxurious lives. We would live 50, 100... the more of us they could fit in the same stable the better... sleeping on the floor and with no place to do our necessities. When a miner died he was buried right where he was, in the mine if this was the case... buried of course by the other miners... After independence we were at least free... and the earnings from our work were for us'.

Note that Don Román speaks about this process as if he had in fact lived it, somehow incorporating the socially transmitted memories as his own recollection of lived experiences. Like other miners in the Cerro, he embodies the experiences lived and transmitted by his predecessors and consolidates these as his own identity.

The *criollos* that led the Independence War in protest at their inferior treatment by the Spanish (Lora, 2009) – and who had grown rich during it – promptly came to control the economy. They used their economic power to mould the fledgling republic according to their economic interests, and in this way Bolivia started Independence with the liberal philosophy that prevailed them (Platt, 1984). According to Lora (2009: 5), the *criollos*' liberal programme entailed the 'freedom to trade with any country and freedom to exploit peasants and workers'. In fact, under the *criollos*' influence, the Bolivian government decreed the indigenous populations would only be allowed to work their ancestral lands if those individuals who cultivated the land paid a proportionate land tax (Arce-Álvarez, 2003) – something most were unable to do. Through this system, which effectively meant the reestablishment of the previously abolished colonial tribute, the *criollos* increasingly came to govern the indigenous and *mestizo*²⁰ masses, and the poll tax imposed on the indigenous communities, often paid with personal services, work in the mines or agricultural products, became the single most important source of revenue. The *criollos* thus continued the mining industry prolonging the Spanish 'high return system' by forcing indigenous people to provide cheap labour. A clear example of this is seen in the 'Huanchaca' mines (in Quechan, 'bridge of sadness') of Pulacayo (north Potosí), where the silver production – which represented 50% of the national production in the 1860s (Espinoza-Morales, 2010) – was extracted by more than 10,000 miners that were 'owned' by the mine proprietors (Rojas and Rodríguez, 1974), and where the expression *la plata nace matando* (or 'silver is born killing') was crafted (ibid).

With the argument that to consolidate the sovereignty Bolivia had won in the battlefields it should open its doors to the technological advances of industrialised countries (Arce-Álvarez, 2003), the *criollos* sought the technical and economic assistance of foreign investors to develop the mining industry. The popular responses were immediate, mainly channelled through *El Eco de Potosí*, a local paper which, representing the voice of the *mestizo* masses of workers, warned that 'Bolivia must wake up to the dangers of foreign trade policies that will sacrifice our interests to the interests of others' (Lora, 2009: 11). Through this paper, the city

²⁰ Spanish term referring to people of mixed descent (Spanish or European and Bolivian or Amerindian) as a racial category.

of Potosí became the voice of those who opposed mineral trade arrangements that, concentrated in the hands of a few, would, they believed, fail to promote nationally-owned production. However, with the creole elites having economic and political power these voices were ignored, and as foreign powers started investing in Bolivia's mining industry, relatively independent mine owners were replaced by a large capitalist industry. Bolivia was reintegrated into the world markets as a mineral exporter along with the creation of a creole mining elite that popular memory today puts along with the Spanish on the list of those who usurped Bolivia's mineral wealth.

2.3. The mining oligarchies (1870-1952): From 'silver patriarchs' to 'tin barons'

With foreign investment from Chile, the UK and Germany, and recruiting European skilled experts, the new mine-owners started a process of modernisation. These investments were key to revitalising the industry after years of crisis (Espinoza-Morales, 2010), but also concentrated it in the private hands of the *criollo* leaders of independence and their descendants Aramayo, Pacheco and Arce – the 'silver patriarchs' – who retained the wealth from mining for their own benefit and to the detriment of the country. First, the dependency on foreign capital meant that investors wanted high returns, which resulted in indiscriminate extraction and little planning for the future (Nash, 1993). In addition, while with these investments the Bolivian mining industry quickly recovered its position as the third largest producer of silver in the world (Mitre, 1981), the development of the mining industry did not translate into even development throughout the country. In fact, the patriarchs located their smelters abroad, which consolidated Bolivia's role as an exporter of raw materials. With this, not only did Bolivia lose the added value of its mineral production, but it also had to re-import the final product at international costs. Furthermore, the patriarchs reinforced their economic power through influencing national politics to their own advantage. For example, Pacheco became President in 1884 and, in 1888 the patriarchs competed for the presidency. Arce was President from 1888 to 1892 (see Annex 3). In this manner they managed to liberalise mineral trade, further reducing state control and claims on export revenues for their own benefit. In terms of the effects on the miners, a clear example of the 'malfunctions' of the mining process (Albarracín, 2008: 137) during the silver oligarchy were the Huanchaca mines. Owned by Arce and operated with Chilean and UK investment, the Huanchaca mining company was the second biggest world mine in production (Alurralde-Anaya, 1973). There is no record of organised resistance at the time, but a nineteenth century song from Pulacayo (where the

Huanchaca mines were located) illustrates the sense of unfairness felt by the miners: 'I am the little miner, sir, and I earn my bread with my labour. I have blisters on my hands and chest. The patron is harsh, and the silver that we take from the mine is never for us' (in Smale, 2010: 8).

The idea that 'the mines are not ours' (Almaraz-Paz, 1966) together with the antagonisms between the mine-owners and miners, led to a shift in miners' understanding of their exploitation as based not only on racial stigma but also on class relations of production which, in their eyes, were fostered by foreign investment. Comparing wage figures or pointing to the difference between the profits of the mine-owners and the returns to the workers (Nash, 1993), miners argued that they were victims of exploitation similar to that experienced by their predecessors in colonial times. An ex-union leader explained to me how the uneven share of the benefits framed the miners' feelings of exploitation:

'Bolivia was poor and our wages barely allowed us a living while the patriarchs and investors gathered fortunes... With only a day of our production the owner would cover all the monthly production costs. Our work during the rest of the month was directly filling their pockets...'

The oligarchy of the silver patriarchs did not last long. The introduction of paper currency during the 1870s caused a drop in demand for silver with a consequent drop in prices, causing the collapse of the Bolivian silver mining industry and the closure of the Huanchaca mines in 1890. However, while between 1880 and 1900 the price of silver dropped by 43%, that of tin went up by 53% (Espinoza-Morales, 2010) due to increased global demand resulting from the Industrial Revolution. Bolivia redirected its focus from silver to tin, which was found together with silver but which had previously been left in the mines. This led to a new era and a new mining oligarchy formed by Patiño, Aramayo and Hochschild – the 'tin barons'.

Alongside these events there was another fact that, in the eyes of the miners, is more essential in explaining the developments of what is, for some, known as the 'tin era' (Arce-Álvarez, 2003) and, for others, as the 'tin curse' (Taboada-Terán, 2006; Córdova-Claire, 1986). It hinges around the discovery of the tin veins by Simón Patiño, a humble Bolivian miner (Mitre, 1993) who would later become the fourth richest man on earth (Harris and Albó, 1974), winning the title of 'tin king' (Geddes, 1984) to the detriment of miners and Bolivians (see below). The fact that a Bolivian miner who had experienced the conditions of exploitation of miners later came to abuse miners to his own benefit, nurtured the miners' notion that 'the metal belongs to the devil' (Céspedes, 1965) and that the metal's nature demonises those individuals who pursue its

ownership regardless of their origin, life experience, personal or economic qualities, assets, and their earlier kindness, generosity or goodwill. This conviction continues to affect the cooperative miners' relationships with *Potosinos* (see Chapter 1). It also ultimately led to the miners' and Bolivians mobilisations against privatised mining that continues today.

Patiño was a Bolivian miner who initially worked in the Huanchaca mines and afterwards moved to Oruro to work with a German exporting company. In 1895 he acquired La Salvadora ('The Saviour') mine in Llallagua (north Potosí) – believed to have mineral of marginal quality only – as payment of a debt, and in 1890 he found in this mine the largest tin vein in the world (Nash, 1993). With initial Chilean investment, Patiño's La Salvadora quickly became one of the richest deposits ever exploited. In 10 years, tin exports increased five-fold and Bolivia's share of world production more than doubled (Ayub and Hashimoto, 1985), further increasing by 175% in volume and by 350% in production value from 1900 to 1913 (Alurralde-Anaya, 1973). This enabled Bolivia, in 1910, to rank second in the world production of tin. As explained above, the foreign investment during the silver oligarchy left a bitter taste in the mouths of Bolivians, and consequently it was widely appreciated when the former Huanchaca mine-worker Patiño broke his relations with the Chilean investors as his earnings increased. However, if it was expected that a mining industry owned by a Bolivian ex-miner would benefit Bolivians, this never happened. The riches generated in the mines remained in the hands of the new elite and Patiño, like the other two barons, invested his profits abroad. In fact, the barons registered their companies abroad benefitting foreign governments through their tax payments to the detriment of Bolivia. Furthermore, rather than themselves governing as the patriarchs had done, the barons, led by Patiño, controlled national politics through financing their own political representatives – known as *La Rosca* ('The Screw') – and through funding the army. In this way, the barons also influenced legislation to their benefit. Consequently, while tin mining itself absorbed far more capital and produced more wealth than silver, it did not stimulate the growth of the national economy and did not trickle down to the rest of Bolivians (Quiroga, 2002). On the contrary, in the eyes of today's miners, Bolivia remained a rich country filled with poor people. For them, the tin glory was built through preserving the previous antagonisms, since the wealth generated in the mines remained in the hands of a small elite, leaving the country with impoverished people and decreased mineral wealth (Fields, 2012).

The effects of the tin era were not better for the miners, amongst whom premature ageing and death continued (Oporto-Ordoñez, 2007) and who still today refer to the working and

living conditions at the time as similar to those lived during colonial times. Despite investing highly in extractive technology, the barons did not invest in the health or safety of their workers and were insensitive to the miners' working and living conditions (Bocángel, 2001). Mining was capital and labour intensive and the miners had few options or rights. With the state and the army under the control of the barons, national policies did not influence miners' conditions (Quiroga, 2002), and workers' attempts to have their rights enforced were fiercely repressed by the army. Various writers (Geddes, 1984; Almaraz-Paz, 1969; Céspedes, 1965) describe the miners' feelings of exploitation at the time, feelings that, according to the miners I interviewed during fieldwork, were (and still are) not solely based on the conditions themselves, since, as miners say, 'we aren't afraid to work'. But rather, on the observable contrasts between the wealth of the barons and the misery surrounding Bolivians in general and the mine workers in particular that, they felt, their work produced:

'The barons accumulate profits and exhibit a lifestyle typical of the Indian maharajas (...). In exchange, they only leave Bolivians pierced mountains, diseased bodies and frustrations in the soul (...). You have to see a Bolivian mining camp to discover how much a man can resist (...) The wealth melts into misery (...) the camps are aligned with the symmetry of prisons, with squat huts, stone and mud walls covered only with old newspapers, zinc roofing and floors made of soil; the wind of the pampas slips through the cracks and the whole family squeezes into improvised beds (...). Hidden behind these walls are the hungry people with diseased lungs.'

(Almaraz-Paz, 1969: 79)

These circumstances reinforced the miners' view that Bolivia's wealth, either exploited by outsiders or insiders, would ultimately always benefit outsiders, and that for Bolivians to benefit from the country's natural wealth, Bolivian mining had to be owned and managed by the state under the control of the workers. The contradictions created by a mining industry concentrated in private hands transformed miners' anger, pain and frustration into organised political activity. In the words of the mining activist Filemón Escobar (1986: 9):

'The miner's political consciousness starts from the forms of his daily work. His life is daily at stake; he regularly faces death. The 'accident', name given to death, is the norm. This will tone the miner for his social and political struggles. He will combat, he learns to hate the exploiters because inside the mine the system is savage and one constantly works under the inquisitorial gaze of the foreman'.

The miners' resistance started in 1911 with the establishment of mutual benefit societies aimed at providing their members with help in case of illness and to aid family survivors in the event of death (Oporto-Ordóñez, 2007). However, seen as insurgencies, these were abolished

by the government in 1929 (Alexander, 2005). The first mining cooperatives appeared in 1930 in the Cerro Rico, and were initially known as 'syndicates of free workers' (*K'ajchas Libres*) comprised of unemployed, injured and retired miners who organised themselves to manually exploit marginal and depleted parts of the mine and shared the earnings. The barons and the state saw this initiative as an opportunity to convert an unemployed workforce into productive assets in return for zero investment (CEPROMÍN, 2009). For the miners, however, these syndicates were both an opportunity to collectively 'safeguard our labour and subsistence rights' (Cooperativa Unificada, 2009: 2), as well as their liberation from the patronage relations that restricted their options and rights. Thus, although these miners' working and living conditions remained dismal, the syndicates represented a gain that for the miners positively influenced their wellbeing, since these allowed them to make choices regarding their working time, productive relations and organisation of the production (Absi, 2009), and to own their earnings. However, this event also marked the separation between these miners' collective aims and struggles and those of the rest of miners operating in the country.

For the workers directly employed by the barons, the first attempt to establish a trade union was in Patiño's mines in 1923 when, following a rise in tin prices as result of the increased international demand during World War I, the miners called for better wages, improved conditions, and a shorter working day. This was however violently repressed by the army and the state (Alexander, 2005) and responded to with dynamite by the miners, which caused a massacre amongst the miners and the prompt destruction of the union. Considered by Patiño and the state to be a miners' defeat, miners themselves perceived this Uncía massacre as a symbol of their courage in resisting their oppression, and it was after this event that the miners' multiple struggles coalesced into a single union struggle (Harris and Albó, 1974). The clandestinely organised miners called again for a general strike and mobilisations in 1930 when, following the 1929 Wall Street Crash and the subsequent drop in tin prices, the barons managed the increased production costs and commodity rivalries by lowering the workers' wages (Lora, 2009). The miners' demands were again crushed with the army firing at the insurgent workers to reinstate order (Nash, 1993).

While these repressions aggravated the restiveness of the miners and increased strikes and dynamite-in-hand mobilisations that one after the other were brutally suppressed, a similar situation was experienced away from the mines, where the lack of redistribution of the benefits from mining, the impoverished population and the political instability caused by the

barons' influence on state procedures triggered the formation of several left-wing parties that were also quickly put down by the state and the army (Alexander, 2005).

World War II increased tin prices, and the Patiño miners' consequent demands for higher wages and their subsequent repression led to the Catavi massacre in 1942. After this, the Patiño miners, led by Juan Lechín, joined the Revolutionary Nationalist Movement (MNR), a populist movement constituted in 1941 and led, amongst others, by Víctor Paz Estenssoro – Patiño's former lawyer. This alliance reinforced both the popular and the miners' movements, which resulted, in 1943, in the first of a series of successful revolts against the tin oligarchs. A year later the miners organised the first Mining Congress from which they constituted the Union Federation of Bolivian Mine Workers (FSTMB). With Trotskyist influence and proposing a programme of proletarian revolution known as the Pulacayo Thesis, the FSTMB declared Bolivia had to be freed from the 'imperialist yoke', called the state 'a docile instrument in the hands of the exploiting class' and claimed that 'workers are to initiate an armed class struggle to establish a workers' state' (FSTMB, 1992: 17). In this manner the FSTMB and its armed miners began to rally, consistently calling for violent armed rebellion for the working class' benefit and employing a counter-hegemonic discourse that deeply challenged the existing social order (Sanabria, 2000).

Figure 2.1. Wall painting in Potosí's cemetery



This culminated in the 1952 National Revolution. This was bloody and ugly (Smale, 2010), but what the miners remember is a successful rebellion against a capitalist form of trade that nurtured patronage relations of production and allowed a few to benefit from the work of many others. Their organised uprisings restored to the miners their trampled-upon right to dignity. Through these insurrections, they went from being passive subjects of the will of others to the agents of change for a better tomorrow. With their organised anger, they shaped the conditions for the tin magnates to lose their lucrative mines and their power. The army, which had largely functioned as an instrument of suppression and protector of the established social order, was abolished. Instead, a new era was opened; an era this time, co-administered by the miners.

2.4. The nationalisation of the mining industry and its aftermath (1952-1982)

The Revolution brought a series of profound transformations that raised the hopes for a better future among Bolivians. Estenssoro, the leader of the MNR movement, became the acclaimed President of the Republic and Lechín, the leader of the miners' Federation, the Minister of Mines and Petroleum. Lechín promoted the creation of the COB,²¹ an umbrella federation of labour unions which came to co-govern with the state – securing the participation of workers in government decisions. Parallel to this, a continued supply of weapons to the miners' federations was secured in order to guarantee the revolutionary government's stability against possible oligarchic or military counterattacks. Thus, the new government was able to implement the three central pro-sovereignty goals that had served as the revolutionary banner: universal suffrage, nationalisation of the mining industry (that was the miners' own historical goal) and land reform (discussed below). This also allowed for the establishment of workers' control in government proceedings.

These changes soon impacted on Bolivians, who rapidly saw their citizenship and labour rights expanded. The revolutionary government redistributed the land back to the peasants, abolishing the practice of debt servitude created by the *criollos*. Parallel to this, with the establishment of universal suffrage, the population of eligible voters increased five-fold (Morales, 2010). The export and sale of all minerals became a state monopoly to be administered by BAMIN, the state-owned Mining Bank. Then began the process of nationalising the mines. COMIBOL, the Mining Corporation of Bolivia, was established and it

²¹ *Central Obrera Boliviana* (Bolivian Workers' Union).

took over the barons' companies and started managing the country's mineral production. According to Malloy and Thorn (1971), nationalisation transferred over 85% of the country's tin production, 95% of its foreign exchange revenues, and about half of central government's fiscal receipts from private hands to the state. These changes positively influenced national incomes and, after the miners lobbied the government for redistributive policies (Rodríguez-Ostria, 2001), for the first time in history Bolivians benefitted from mining with the universal free education, health care and a new law, through which Social Security became mandatory and extended to all Bolivians (Farthing and Kohl, 2009).

Notable transformations were also made within the now state-owned mining industry, starting with an increase in wages, establishing rates of pay regardless of production (Nash, 1993), getting labour laws enforced, providing death benefits (Alexander, 2005) and finally implementing worker control²² over the state-owned industries. These considerably improved the state-miners' working and living conditions (CEPROMÍN, 2009). Parallel to this, the government legalised the previous 'syndicates of free workers', transforming them into 'cooperatives' with the 1958 Cooperative Law. Treating cooperatives as subsidiaries of COMIBOL (CEPROMÍN, 1987) rather than as autarkic institutions that were to manage themselves, the state facilitated these independently organised miners with direct access to the natural resources through the rental of mineral concessions. Instead of selling their production to entrepreneurs, cooperative miners were now to sell the mineral to the state, which through BAMIN offered good prices (Michard, 2008), loaned extractive technologies and materials (Araníbar, 2005), and provided access to loans and credits in exchange of advance payments (Argandoña-Calderón, 1978). According to Whitehead (1980) and Godoy (1985) actual working conditions did not improve much. However, the cooperative miners I encountered during fieldwork unanimously emphasise the positive impacts that these changes had for their individual and collective wellbeing as they remember this period with yearning. For example, Doña Francisca perceived the effects of these changes in terms of stability, self-help and solidarity: 'things were better... more settled... our work would be our gains, Bolivia's gains... who was earning would contribute for all and this way we would all help each other...'.

²² In his report to the First Congress of the COB in October 1954, Lechín sketched the role that he attributed to workers' control: 'In Bolivia, worker control has acquired a really revolutionary and democratic meaning (...) The introduction of the right of veto puts the responsibility into the hands of the workers for the administrative policy of the mines (...) This right has existed for over a year now and that experience has convinced even its most staunch opponents that workers' control is the best defence of the workers' interests' (in Alexander, 2005: 91).

However, these events also marked cooperative miners' separation from the miners directly employed by the state.

The miners not only used their power with the government to facilitate short-term improvements to their living and working conditions, but also sought the long-term preservation of these conditions. With this objective, and conscious of the devastating effects that falls in mineral prices had historically had for themselves and for their relatives, they influenced the government to create a Mining Fund to purchase minerals at a fixed rate independently of the internationally dictated prices (World Bank, 1976). The fund served two basic objectives: the protection of the mining industry and of the national economy during moments of tin pricing crisis and it increased state incomes during periods of high prices. The idea was that the profits accumulated during periods of high mineral demand would strengthen the economic capacity of the state to protect Bolivians and miners during periods of crisis but also, and perhaps more importantly, that these profits would allow the state to bring added value to the mining industry – a struggle which, as I will discuss in Chapters 5 and 6, continues. Bolivians, miners and the state saw this industrialisation as the pathway to lift Bolivia's mineral curse, since the elimination of the *criollo*-induced role of Bolivia as a raw-material exporter would increase national incomes both through the retention of the added value and through reducing the re-importation of processed minerals at high prices – thus reducing Bolivia's dependency on global markets. Perhaps at a more ideological level, this meant that, for the first time, the Bolivian mining industry would respond to the country's internal needs rather than to external demands, indeed a social gain celebrated with euphoria.

This was however not to last. According to the World Bank (1976) the post-revolutionary years of workers' control were lost years from the point of view of economic growth. Massive social spending caused Bolivia to end up with a galloping inflation which, accompanied by a rapidly dropping GDP per capita, exponentially increased costs of living (Prado-Robles and Klein, 2006). The increased fiscal deficits were quickly explained by various domestic and foreign groups as the result of both the miners' lack of capacity to administer the mining industry (Bocángel, 2001) and of the losses created by the new policies' marked slant towards redistribution (World Bank, 1976). The Revolution's major accomplishment was seen to be only about social empowerment and therefore 'partial' (Patch, 1961: 123). It became generally accepted that the poor economic performance was 'due to the state-miners' increased wages and workforce and their drop in productivity' (ibid), the low return of state loans by cooperativists, as well as stemming from state protectionism (Mitre, 1993) and subsequent

expansion of social benefits under the workers' control. Many commentators perceived the situation arising from the workers misusing and over-estimating the benefits and under-estimating the costs of the reforms (Prado-Robles and Klein, 2006). As I explain in Chapters 4 and 5, these perceptions by some Bolivians continue to affect the cooperative miners' access to loans and thus their OHS.

The economic decline resulted in the 1956 Stabilisation Act. Sponsored by the USA as an austerity program (Kofas, 1995), this act removed the miners' share in government decision-making and authorised the state to compensate the tin barons for the nationalised mines. The Act also redirected state surpluses from social welfare and industrialisation to the re-payment of foreign debts. The miners and other left-wing sectors of the population quickly interpreted this Act as a 'direct attack on the popular economy' established since the Revolution (Dunkerley, 1984: 87). For them, not only was the inflation necessary to help create the conditions to benefit the oppressed classes and boost domestic production (Lora, 1960), but COMIBOL's profits and losses had, they argued, been 'deliberately understated and overstated' (Burke, 1987: 11). They saw the 'lack of profitability' and the 'draining of the national treasury' arguments as a discourse intended to undermine the FSTMB's power (Sanabria, 2000). Claiming that under the workers' control, production costs had been reduced despite the increased labour force and workers' benefits (Arce-Álvarez, 2003) and that a year before the Stabilisation Act they had achieved a recovery in the GDP (Zondag, 1968), the miners argued that the blame had been conveniently placed upon them (FSTMB, 1992: iv). In their view, the bad economic situation was because of the fiscal and foreign debts inherited from the previous era, and because of the low mineral prices and the accumulative detrimental effects that an export-led economy (which the Act itself was actually reinforcing by re-directing state incomes to repay debts) had had on the Bolivian economy. Furthermore, for them, if anyone was to be compensated it was Bolivia and its miners and not those who had 'milked the country away leaving behind a backward and forgotten Bolivia' (Chungara and Viezzer, 1978: 5). They also saw this Act as a manoeuvre to protect USA's and Bolivian's middle class' economic benefits (Artaraz, 2012). For the miners, it was an ideological and economic strategy that envisioned the rise of a new elite, secured the Bolivian tin supply for the USA in the Cold War, and controlled the flourishing socialist-communist labour movement (Alexander, 2005: x).

The miners could not stop the Act, and from my interviews with cooperative miners I found that some have internalised the blame, as if their present conditions (see Chapter 3) were what they deserved. This becomes clear with *Chasqui's* description of the collapse of the

Revolution: 'we administered badly... the state would supply all we needed but we simply took and gave nothing in return, we didn't appreciate what was given to us and... here we are!'

The Stabilisation Act did not stabilise the economy. On the contrary, more than 22 million US\$ paid in compensation to the barons bankrupted the treasury and aggravated the fiscal crisis (Morales, 2010). Moreover, the Act's clauses and its bonded loans – tied to the demand that Bolivia bought an equivalent amount of goods from the USA (Nash, 1993) – increased the country's dependency on foreign aid and on the international commodity dynamics while simultaneously reducing Bolivia's say in the price of its minerals. Furthermore, with every major economic decision made by the MNR government being monitored by USA advisers, the USA loans extended to Bolivia also led to the loss of other sources of support, like the projected Soviet Union's investment in a national tin smelter (*ibid*). The result was Bolivia's confirmation as an exporter of raw minerals, a stagnation of the GDP per capita and a rapidly decreased quality of life (Prado-Robles and Klein, 2006). After four years of stagnating economy aggravated by a minor fall in tin prices, Estenssoro endorsed the Triangular Plan: a programme for re-structuring the mining industry which was a condition for Bolivia to receive further USA-aid (Alurralde-Anaya, 1973). The plan aimed for the rationalisation of the mining industry and of COMIBOL's operations as a strategy to secure state profits (Nash, 1993). However, for the miners, this 'rationalisation' implied the end of the workers' control within COMIBOL, the dismissal of workers, and a reduction in their wages and benefits (Hudson and Hanratty, 1989).

The immediate consequence was the state-miners going on strike, its suppression, the 1962 Catavi massacre and the FSTMB's violent separation from the MNR. This motivated the FSTMB's 1963 Colquiri Thesis, through which the miners denounced the government as 'anti-national, anti-worker, servant to imperialism and traitor to the ideals and interests of the people' and claimed their right to use violence to satisfy the just demands of the proletariat (FSTMB, 1992: 72-73). These events also consolidated a differentiated class consciousness amongst the miners (Nash, 1993), that from then on was defined not only by the antagonisms created by relations of production and class hierarchies, but also by the 'independence of the mining working class' from the other labour, popular and political movements which, for the miners, simply came to enlarge the list of those who benefited at their expense (FSTMB, 1992: v). This consciousness continues today and shapes the miners' attitude in national politics. For example, in a union meeting that I attended, a COB leader (making reference to the governing MAS party) asked those present not to trust any political party but instead to always protect

their collective interests as a mining class. They were not to be convinced by 'shiny but fake alliances' with any political, labour or civic movement, and the audience were reminded of the experiences learnt from the past, when such alliances ultimately used miners and worked against miners' collective interests.

To counterbalance the miners, Estenssoro began strengthening the army to shift the balance of military power away from the FSTMB. For this purpose he appointed General Barrientos as his Vice-President, only to see Barrientos ousting him from power through a military *coup d'état* backed by the USA in 1964 – three months after his re-election (Kofas, 1995). With this the MNR was destroyed, Estenssoro exiled to Perú, and an era of military dictatorships inaugurated that continued until 1982.

Dictatorial period (1964 – 1982)

This coup confirmed the miners' suspicions that the USA had been behind the collapse of the Revolution all along, but the tensions between the government and miners seemed to wane shortly after the coup when Barrientos (a former MNR activist himself) sought their collaboration in up-lifting the country. This truce would however soon end, as Barrientos continued with Estenssoro's welfare cuts and export-led approach to the economy. In this way, and with mineral prices now being twice what they were during the workers' control, for the first time ever COMIBOL showed profits in 1966 (Alexander, 2005) and the national economy grew at an average rate of 6.5% per year (Hudson and Hanratty, 1989). Perhaps this allowed Barrientos to legitimise his rule in 1966 when he stood for presidential election and won. However, these profits came at a high cost since Barrientos had sold the mineral resources under favourable terms to the USA to the detriment of Bolivia's economy, and the fiscal incomes were accompanied by an increase in the foreign debt due to the new loans (Malloy and Thorn, 1971). The bulk of Bolivians did not enjoy any of the benefits that came from the state assuming full control of the industry (Chungara and Viezzer, 1978). On the contrary, and in the particular case of the state-miners, they instead experienced massively reduced wages (Lagos, 2006) and severe cuts in their benefits and labour rights while their living conditions in the mining camps worsened to resemble those in 'concentration camps' (Malloy and Thorn, 1971: 200). Union members previously managing COMIBOL were replaced by army-trained foremen (Lagos, 2006) and the army (whose presence remains today in all mining cities) was sent to the mines to control insurgencies. Labour unions became increasingly controlled by the state and the army and several key union leaders were fired and exiled.

Union demands for an improvement of their conditions were, again and again, brutally repressed by the new state-owner and responded to with the usual dynamite by the miners, which caused several massacres in 1964, 1965, 1966, and finally, the San Juan Massacre in 1967, when the miners were expecting Barrientos to discuss a rise in wages and instead the army arrived and indiscriminately fired into the crowd regardless of their age or gender (Lagos, 2006). Six months later, the first Bolivian Federation of Mining Cooperatives (FENCOMÍN) was created in Potosí, through which cooperative miners separated themselves from the FSTMB and the COB.

Following Barrientos' death, General Hugo Bánzer seized the presidency in 1971. For the miners, Bánzer's ideological allegiance was instrumental in maintaining a USA foreign policy driven by Cold War and anti-communist concerns (Artaraz, 2012: 146). His presidency was characterised by unprecedented high mineral prices because of the Vietnam War and subsequent economic growth, but was also the most brutal and violent of Bolivian dictatorships, and severely suppressed both civilian and labour rights (COB, 2008). In fact, Bánzer's economic growth was characterised by foreign investment, by a low retention of the profits in Bolivia – which attracted foreign investment by decreasing export taxes (Arce-Álvarez, 2003) – and by an uneven redistribution of these benefits towards *Oriente*, the richest region of Bolivia where he was born and where the conservative elites are still concentrated today (see Chapter 6). Labour and popular movements suffered severely. Bánzer immediately banned the COB and outlawed all political activity in the country. Under 'Plan Condor', the bouts of resistance by either unions or popular movements were controlled by an army directly instructed 'to exterminate the insurgent groups' (CEPROMÍN, 2009: 4). Labour leaders were exiled, imprisoned, tortured, killed or forcibly disappeared even when in exile (MERCOSUR, 2009).

The FSTMB clandestinely organised inside the mines. In the words of Feliciano, a miner activist who was tortured, imprisoned and latter exiled: 'we resolved to restore, as a matter of urgency, the life of the unions to fight for the recovery of the democracy, and in June 1975 the COB organised a clandestine meeting' (in Farthing and Kohl, 2009: 126). Given that – despite mineral prices being eight times higher than what they were during the workers' control (Arce-Álvarez, 2003) – the state-miners' wages did not guarantee minimum family survival (Peláez and Vargas, 1980), the FSTMB called a general strike demanding an increase in the basic wage. This was quickly put down by the army. Mining camps were besieged and hundreds of workers were dismissed, detained, and transported to concentration camps while miners' homes were

raided and their families intimidated (Lagos, 2006). After this, the unions were dismantled. Miners' wives continued the fight. Organised since 1963 to support their husbands' struggles for better living and working conditions, the National Committee of Mining Housewives (CONACMIN), chaired by Domitila Chungara,²³ initiated a general hunger strike that lasted over 23 days in 1977. Their determination encouraged other sectors of the population which massively joined the miners (MERCOSUR, 2009) not because they had finally accepted the miners' view that their struggles were for Bolivia's benefit, but because of their common desire to end the repression from which they were also suffering. Altogether with the cancellation of a UK £19 million grant to COMIBOL after British mineworkers visited the mines (Nash, 1993) and pressure from the US president Jimmy Carter for Bánzer to hold elections, the social unrest initiated by these women was crucial to bringing down Bánzer in 1978 and for the restoration of the democracy in 1982 after four years of internal conflicts.

2.5. The privatisation of the mining industry and the rise of *el compañero Evo* (1982-2005).

‘In the streets and the squares they will find our breasts,
we have come from far away to demand our rights.
In our eyes and in our hands we bring suffering and hope,
but here we remain scattering the embers.
By now I go but in my chest a cry is born.
All together comrades, we miners will return,
All together comrades, we miners will return...’

(Fragment of the song *Los mineros volveremos*, interpreted by Savia Nueva)

The return to democracy in 1982 coincided with a collapse in world tin prices following the end of the Vietnam War and aggravated by the emergence of Brazil and China as mineral producers (CEPROMÍN, 2009). It also coincided with a hyper-inflation initiated with the end, in 1971, of the Bretton Woods' global system of monetary management. Thus, democracy did not fulfil the hopes for a better tomorrow. After three years of political instability and social unrest caused by a worsening economy, Estenssoro, returned from exile, won the 1985 elections against former dictator Bánzer on the promise to deliver wellbeing to Bolivians. However, after election, Estenssoro reversed many of the decrees made in 1952 with the declaration of the New Economic Policy (NPE) and, closing state-owned mines as dictated by the International Monetary Fund (Nash, 1993). Previous advances made in education, health

²³ Daughter of a miner and MNR activist, a miner herself and the wife of one of the miners imprisoned after demanding higher wages. She died in 2012 of lung cancer.

and social welfare were reversed as government funding was withdrawn, the mining industry privatised, and the achievements of the period dominated by the workers' control categorically consigned to history (Artaraz, 2012).

Stating 'our Bolivia is dying', Estenssoro justified the government's need to take these economic measures for 'safeguarding the country' (Chúlver-Vargas 1990: 17). The structural adjustment formulated by the Washington Consensus Plan Baker for economic recovery was implemented with the promulgation of Decree 21060, which implemented the orthodox neoliberal prescription for economic reorganisation. This involved severe cuts in wages and in social welfare, rises in local commodity prices, privatisation, deregulation, liberalisation of the markets and the reduction of state interventionism in economic matters. With this process, known in Bolivia as *privatización* (privatisation), COMIBOL's operations were shut or transferred to private companies, which resulted in a massive layoff of the mining workforce.

After over 15 years of uninterrupted rises in mineral prices which peaked with a historical record of 8 US\$ per unit of tin in 1982 (compared to 1 US\$ per unit during 1952), those state-miners whose salaries had barely allowed family survival and whose demands for better living and working conditions had repeatedly been severely suppressed, were now made redundant with no compensation due to the bankruptcy of COMIBOL. For the miners, as had always happened and despite their warnings that Bolivia would not survive unless the patterns of production, accumulation and redistribution were socialised, the mining working class was, once again, to suffer the consequences of others' greed. In Domitila's words, 'new rich have been created and the people that have not seen any benefits from a state-owned mining industry will pay for it' (cited in Lagos, 2006: 37). Lechín, still leading the FSTMB, quickly organised the miners:

'Comrades, in these hard times for us and for our families we need to make ourselves felt and express our problems face-to-face with the government. We grassroots' miners, comrades, we know that the closure of the mines will cause unemployment and the disappearance of Oruro and Potosí. We need to get to La Paz comrades, no matter if walking, in a great march that symbolizes our struggle, a march, companions, for the life of the miners'.

(in Antezana, 2011: 1).

The Spanish newspaper *El País* (Azcuí, 1986) described the end of the march:

'The Bolivian miners that accompanied by their families marched to La Paz to protest at the closure of the state mines decided yesterday to voluntarily return to their homes after being besieged for over 24 hours by the army with tanks impeding any aid reaching the miners. The COB launched a call for general strike against the use of the siege and to request the release of the detainees. The government meanwhile is preparing to exile more than 100 political prisoners, mostly trade unionists'.

The frustrated 'march for life' represented, according to García-Linera, the 'death of the working class' (2000: 211). It also broke down 'the source of collective certainty that fed Bolivians' confidence in the future' (ibid). While the violent retaliations to the miners' demands had previously strengthened their resistance and reinvigorated their organised struggle for a better future, this time Estenssoro's response left the miners both powerless and with no further strength nor hope. It is in this context that the song quoted at the beginning of this section, 'We miners will return', acquires its full sense. This song became the slogan that accompanied the miners' 'march for life' from La Paz back to the diverse mining camps. It expresses the miners' feelings of loss and despair (Hines, 2009). It also reflects pride and rage, resistance, and a continued fight for greater justice.

For the Estenssoro administration and that of his successor, Sánchez de Lozada, the power of the labour movement seemed finally to have been broken and the sporadic resistance posed by miners, urban workers and peasants was unable to roll back the neoliberal project (Sanabria, 1999). Neoliberal theorists contend that economic liberalisation, privatisation and decentralisation lead to increased productivity, greater democracy, more efficient public sector investment and faster local development (in Kohl, 2002: 449). However, the economic restructuring formulated by the IMF's economic adviser for Bolivia, Jeffrey Sachs, led to a decline in government revenues and to an enduring financial crisis (Finnegan, 2003). Even though the NPE increased Bolivia's GDP, brought down the inflation and eventually stabilised local prices, the promised prosperity never materialised. Instead, its impacts for Bolivians were devastating. First, the NPE increased Bolivia's foreign debt (Mesa et al, 2008), and the investment brought by foreign companies also represented, for the miners and other left-wing sectors of the population, a surrender of sovereignty (Arce-Álvarez, 2003). In addition, as Potosí's Karachipampa smelter was shut just after its construction and VINTO, the only state foundry created in 1970 privatised, the country returned to being only an exporter of raw materials. Furthermore, to attract foreign investment the weight of taxation was switched from income and corporations to consumption, which shifted the burden of paying for a diminished state to the less well-off (Kohl, 2002). Consequently, these economic policies paradoxically plunged Bolivia into severe depression, since the increased GDP came to be

accompanied by increased poverty and by a widened wealth gap between most Bolivians and the tiny elite (Dangl, 2007). It led to the entrenchment of local elites, to regional imbalances in wealth, and to mounting regional protests in the face of reduced government spending on social programmes and increased prices for basic services (Kohl, 2002).

The NPE was especially harsh for the peasants and workers at the bottom of the socio-economic hierarchy. Indigenous communities were impoverished and, with most workers facing increased unemployment, they started eking out a living in the informal economy, driving their standards of living below minimal survival (Mesa et al, 2008). For the rest of the workers, since the neoliberal approach to stabilising the economy consisted of transferring control to the self-regulating market, the market decided the value of their wages (Artaraz, 2012). The NPE also involved removing all structural barriers to the free functioning of markets, including regulation and legislation, workers' rights, subsidised prices of staple goods, etc. Neoliberal reform thus abolished the minimum wage and, cutting state spending to the bone, the new legislative framework allowed employers to hire and fire at will, reduce labour costs, opt out of welfare contributions for their employees and refuse to recognise trade unions (Finnegan, 2003). In the miners' case, living and working conditions declined 'from bad to abysmal' (Nash, 1993: xiii). For the now privately-employed miners, salaries were frozen and benefits slashed. With increased local prices, these miners saw a 45% decrease in their buying power while annual working days and daily working hours increased (CEPROMÍN, 1986). Decreed the free negotiation of working arrangements between labourer and patron (ibid), these miners came to accept any wages and working conditions just to keep the jobs. Cooperatives absorbed much of the laid-off labour force, rising from 26% of the mining workforce in 1974 (Argandoña-Calderón, 1978) to 70% in 1987 (CEPROMÍN, 1987).

For many, the mining cooperatives came to symbolise the last memory of the frustrated Revolution (FENCOMÍN, 1988). However, their conditions quickly deteriorated as government support was removed following the end of the Cold War and the closure of BAMIN in 1991, and worsened again with the establishment of the *igualdad jurídica* (legal equality) of the different productive sectors operating in the country in 1997 (see Chapter 6). Adopting the labour organisation of COMIBOL's workgroups and gradually taking over most of COMIBOL's operations not exploited by private enterprises, the cooperative miners continued mineral production, this time using their own 'wit and creativity' (Möeller, 2007: 87), experience, and the obsolete technology that a bankrupted COMIBOL was unable to sell. The social gain that represented cooperative miners' liberation from the tin barons in 1930 ultimately damaged

them. With the NPE, cooperativists now had to enter, unprotected, into direct competition in the mineral market at both the national and global levels (see Chapters 5 and 6).

For the miners, privatisation betrayed the Revolution and with it Bolivia and its miners, but the debilitated unions had lost their capacity to lead a popular movement from a position of industrial strength (Gill, 1997). Most important for their weakening was the social dislocation resulting from many having to move home – known in Bolivia as *relocalización*. The loss of jobs meant that most state-miners migrated with their families to the cities or to the coca-farming area of the Chapare looking for work. According to Rodríguez-Ostria, the dispersion of miners reached 80% (2001: 287), something many saw as an intended and not residual consequence of the privatisation process aimed at diminishing the miners' power with the logic of 'divide and conquer' (FSTMB, 1992: xi). The miners came to understand the NPE as a political and economic manoeuvre of the USA which perpetuated the exploitation of others' wealth through the expansion of free markets. For them, the NPE not only re-positioned most Bolivians at the bottom-end of the socio-economic hierarchy and decision-making power in Bolivia, but also placed the country at the lower end of the international division of labour. This marked a new phase in these miners' struggle for Bolivia to benefit from its natural wealth, this time, aimed at dismantling the neoliberal model that had prevailed in the country since the Revolution and at challenging the global economic system (Shultz and Crane-Draper, 2009). In the words of the FSTMB: 'we propose the active resistance to the oligarchic neoliberal model in our struggle to never again empower someone else's hands' (1992: xii). With this, and despite the unions having been severely debilitated, the miners' voices and explosions, as they had warned after the frustrated 'march for life', would soon be heard again, ultimately becoming key to the rise of Evo Morales and for Bolivia's current move towards a 'post-neoliberalism' and 'post-capitalism' era.

The rise of Evo (2005-present)

Many issues contributed to the rise of the *compañero* Evo and to Bolivia's current politico-economic transformations. Of vital importance were the social organisations' increasing discontent at a neoliberal reform that had failed to deliver general wellbeing. Evo, the *Orureño* or Oruro-born llama herder of humble origin, while receiving significant support and training from European NGOs, the anti-globalisation movement and the World Social Forum (Loayza-Bueno and Datta, 2011), had fiercely defended the right to grow coca (not cocaine) against the US War on Drugs, and many Bolivians saw him as 'one of their own' (Sivak, 2009). His fight

came to represent the struggle against foreign dominance that many Bolivians feel kept them, as they say, ‘as beggars sitting in a golden chair’, and one by one these organised social groups came to enlarge the coalition of social movements that make up the MAS party (meaning ‘more’ in Spanish, MAS stands for Movement Towards Socialism). Of vital importance were the dislocated miners. Finding work as small-scale farmers or street-sellers in the urban slums (particularly El Alto, on the edge of La Paz and the coca-growing region of the Chapare in Cochabamba), the miners carried with them their concept of class warfare and their traditions of trade union organisation. Perhaps the most significant example of this was Filemón Escobar, the miner who replaced Lechín as leader of the FSTMB after the ‘march for life’ and who went to the Chapare region in search of a livelihood as a coca farmer or *cocalero*. There he met Evo, who at the time was the leader of the *cocaleros*’ federation. Their encounter was essential for Bolivia’s current ‘process of change’, since Escobar became Evo’s mentor and one of the co-founders of the MAS’ ideology, adding to Evo’s democratic change and pro-indigenous tendency the Trotskyist ideals of anti-capitalism and social force as pathways to change.

Bolivia’s anti-neoliberal contest first materialised in Cochabamba during 1999 when the democratically elected yet former dictator Bánzer agreed the sale of the city’s water company to foreign ownership. This provoked a series of spontaneous non-violent popular responses, which Bánzer responded to with force and which came to be known as the Water War. Led overwhelmingly by the miners, social unrest continued to escalate culminating in the form of the Gas War when Sánchez de Lozada returned as president in 2002 after a narrow electoral victory over Evo Morales. Responsible for the privatisation of Bolivia’s natural gas reserves in the 1990s (the mainstay of the economy since 1985) and of causing a rise in local prices, his re-election quickly triggered a reaction from those Bolivians who were seeing hydrocarbons exported unrefined with little benefit for the general population. Multiple struggles coalesced into a single rebellion against neoliberalism. Bolivians’ refusal to allow the gas to be used in a way that would continue the situations previously experienced in mining triggered tumultuous protests and road blockages that, centred in *El Alto*, paralysed the country and ultimately caused Lozada’s resignation in 2003.

A year and a half later, more protests forced the resignation of Lozada’s successor Carlos Mesa (who also followed neoliberal policies), and opened the way for a new era of national politics and development policy with the election of the leftist Evo Morales in December 2005. Complemented by the political sociologist and former indigenist *guerrilla* leader Álvaro García-Linera and by Filemón Escobar, Evo immediately pursued what he called a ‘revolutionary

agenda', wrongly perceived by many as the continuation of the National Revolution. With the historically-charged slogan '*Tupaj Amaru* the rebellion, Evo the Revolution', Evo and the MAS party, inspired both by traditional Marxist ideas and indigenous visions of a more egalitarian society, announced goals to 'end external and internal colonialism' by asserting control over natural resources, redistributing welfare and by forging a new system of political engagement. Evo's rise to power, which fits within a wider turn to the left in Latin America, was quickly responded to by some of the USA media, with some journalists labelling Evo as 'communist, cocaine producer and dictator' (Fox News, 11 February 2006, CNN, 3 May 2009). In response to the following remarks by George Bush: 'Morales' legitimate victory at the polls is evidence that Bolivia might be moving away from democracy', Evo reflected: 'I think Mr. Bush wants us to be a colonized democracy: dependent, submissive, and subordinate to foreign interests' (in Padgett, 2006: 36-37).

Indeed, winning with the first absolute majority in Bolivian history, the MAS is a one-party government. However, as I discuss in Chapter 6, it is a one-party government formed by a coalition of organisations and parties and regulated under a participative democracy. This often results in conflicts and heterodoxies (Postero, 2010). However, according to the current vice-president García-Linera, these tensions are essential to build a flourishing country in which the heterogeneities complement rather than impede the common wellbeing.²⁴ Such an approach reflects an Andean notion known as the complementarity of the opposites.

2.6. Conclusions

The miners' history has been a constant struggle to ensure that the country's mineral wealth benefits Bolivians. In their eyes, as in those of many other Bolivians, the so-called resource curse is not so much a matter of unpredictable fluctuations in mineral prices; rather, it is an issue of the greediness of those who benefit at others' expense. For them, reversing these conditions means socialising the country's mineral wealth and giving people the ownership and control of the means of production. As I discuss in later chapters, Bolivia's current 'process of change' is significantly influenced by these historical experiences and tendencies of miners, who ultimately rebelled against a system that, in their eyes, maintained them as 'beggars sitting in a golden chair' by becoming part of the coalition of organisations in the MAS party and helping its rise to power. The rise of the NGO-trained humble llama herder seen by the

²⁴ Public Seminar by García-Linera titled 'The situation is catastrophic but not serious', 17/03/2011.

bulk of those who felt economically used and politically marginalised as ‘one of their own’ marked a new dawn filled with hopes for, as Evo says, historical justice.

History, and how it is interpreted (Harris, 1976), is key to understanding today’s Bolivia, not only because of the socio-political, economic and legal heritage that continues to frame many of the happenings in the country but also because it has taught Bolivians and the currently governing MAS some lessons that are vital to understanding the direction of the country’s process of change. Amongst these, mistrust in foreign investment as a source of national growth, refusal to privatise the country’s natural wealth, recognition of a heterogeneous Bolivia that is a single one in its diversity, and the assertion of the people’s full participation in state procedures to ensure that Bolivia’s wealth evenly benefits the different Bolivians. In Potosí, history has also shaped a tendency amongst well-off *Potosinos* to fear and marginalise the cooperative miners for their ‘relation with the metal’ and for their class militancy, and to consider them only as a social force for local demands and protests (Möeller, 2007). Amongst the cooperative miners, history has separated their sectorial concerns and struggles from those of the other miners operating in the country. It has forged among them a solidarity that is complicated by a strong tendency to solve their problems through conflict and dynamite, a high vulnerability to unregulated buyers and internationally-dictated mineral prices, and a collective memory that shapes their defence of their class interests, as they say, to the bitter end.

The next chapter explores the early impacts of *el compañero* Evo among the cooperative miners, which, as explained in Chapter 1, nowadays account for at least 96% of the mining workforce and for 35% of Bolivia’s mineral production as the country is the 6th largest global producer of minerals (MMM, 2011). I do so by introducing some of the miners at the core of this research. I will describe a typical day in the lives of five cooperative miners, with an emphasis on analysing how they individually get through their working days constructing, accepting and preventing the risks associated with their jobs.

3. Lives, livelihoods and risks: The emics of OHS

‘Calvario, Pailaviri! Calvaaariooooo, Pailaviiiiiiiiiii!!’ Yell the *voceros*²⁵ with their bodies hanging halfway out of the doors of moving buses as they announce their route. Everyday at around 7am, Potosí bursts into activity as miners start their ascent of the Cerro or return home after the night’s work. On a typical day, Don Adrián leaves home shortly after dawn, having had breakfast with his wife Doña Teófila. They live right at the edge of Potosí, in the ‘Plan 40’ peripheral area beside the road to Sucre. They live in a little house Don Adrián built himself with the help of his family, having moved here from Cotagaita to look for work as a cooperative miner after losing his job with COMIBOL in 1985. Cardboard and plastic screens pinned down with rocks and old tyres serve as the roof. The house has three rooms that surround a central courtyard. Don Adrián, his wife and their four children live in the main room, furnished with a bed, a wooden table and two chairs. They rent the second room to his sister-in-law. She lives with her partner and the two children she had with her previous husband, who died years ago in a mine accident. The third and smallest room serves as common kitchen and storage. The house has neither water nor electricity, but Don Adrián has managed to connect a cable to one of the road lights, and in this manner they can, sometimes, enjoy a night-light in the courtyard and a little TV. Like most of their neighbours, they have no sanitation, and use the street at the back of the house.

After breakfast, Don Adrián walks through the dusty, uneven and narrow streets laden with garbage and without sewers until he arrives at the main avenue. There he usually catches one of the city buses for the fifty-minute journey to Pailaviri, the base of the Cerro where the road ends. Buses pick up miners from all around the city, taking them first to *el Calvario* (‘the Calvary’) – or the miners’ market – and then to Pailaviri. To save money, Don Adrián normally goes straight to the mine without stopping at *Calvario*, but today we will meet at the market so he can collect the lamp he left yesterday after work for repair.

The *Calvario* is perhaps the busiest part of town at this time of the day. As we head to the little workshop repairing Don Adrián’s lamp, we pass a variety of stalls and street vendors that supply everything a miner needs. From milkshakes, food and drinks, to coca leaves, *lejía* (‘bleach’) and bicarbonate that miners chew with the coca to help release its properties to avoid feeling thirsty, tired or hungry during work. From alcohol, cigarettes, dry llama foetuses

²⁵ Bus driver assistants.

and aromatic herbs needed for work rituals to hammers, picks and shovels, boots, dust masks, helmets, lighters, dynamite and fuses for extracting the ore. From pharmacies selling every medication without prescription, placards reporting current beer and mineral prices, mineral buyers offering good deals and improvised laboratories for analysing ore quality, to specialists reading the miners' luck or which, through rituals, respectfully intercede with the deities to favour the miners' health, safety, production and prosperity. Miners meet and chat outside small workshops as they wait for their carbide lamps to be refilled, battery lamps to be electrically re-charged and tools to be repaired. Amidst the crowd, a few groups of tourists already equipped with flawless overalls and helmets take snapshots of people and buy coca leaves and dynamite.

Each miner in the Cerro individually organises his Personal Protection Equipment (PPE) and journey to the workplace. Some travel in Hummer trucks they were able to buy when mineral prices were high or after finding a good mineral vein. Many queue at the *Calvario* in the hopes of jumping on the back of a buyer's or cooperative member's truck for a free ride. A few miners share a taxi to reach the upper parts of the Cerro, which costs a worker's day's wages. Others will try to save some money by walking for between 1-3 hours to reach one of the 489 *bocaminas* (mine-entrances, mouth-shafts) that are currently being exploited, and which are distributed all around the mountain. Still others will simply live in the mines or caves of the Cerro. Like most miners, Don Adrián and I will take the bus to Pailaviri.

Cooperative miners are a very heterogeneous group. I have met miners aged between 11 and 74, and although most are young, many are aged; they can be strong, vigorous or feeble. Although a predominantly male environment, many women also work inside and outside the mine (see Table 1.2). While some miners live alone, many live with their dependants. They are single, married, widowed and remarried, literate and illiterate, school students and university graduates. While some are cooperative shareholders or 'members', many are subcontracted labourers whose jobs depend on the members' productive plans. In addition to those men and women working full-time in mining, the Cerro offers part-time and temporary employment opportunities to retired miners (due to age or ill-health), to peasants that seasonally combine mining with agricultural work and to others living in Potosí city, such as university and school students and graduates that combine study, work in construction, as guides or in the processing plants with mining. In turn, some of those working full-time in mining are also engaged in livelihood diversification alternatives, such as mineral trade. For many, mining is an opportunity to earn cash to pay for studies, weddings, music systems, cars or fashionable

clothes. While some dream of becoming rich through mining, for others mining is a livelihood diversification strategy that brings in a more or less regular additional income. For most, mining indeed represents their only feasible livelihood. The meaning of their work and the significance of OHS risks is not the same for all within this diverse group of workers. Their socio-economic situation is highly variable and, although they may be working alongside each other, each person's world-views, expectations, priorities and desires, their everyday projects (Prentice, 2007), assets and agencies (Tulloch and Lupton, 2003) can differ considerably from those of other miners. Furthermore, these diverse characteristics are not fixed, but rather dynamic and constantly re-shaped by the structures and opportunities that present themselves in the workplace and beyond (Prentice, 2007). As these change, so will the character of livelihood and form of mining that a miner will seek and be able to secure, the risks involved and the decision-making processes by which OHS risks will be perceived, accepted, and prevented.

This chapter demonstrates how the variety of personal circumstances influence livelihood possibilities, and how the combination of biography and livelihood shapes not only the OHS risks that miners face, but also the decision-making processes by which these risks are perceived, managed and accepted at any given time. For this purpose this chapter explores the experiences of five different miners: Don Adrián is a cooperative shareholder who works alone. Felico is the ambitious and caring leader of a work group; *Changuito*, in contrast, is new to mining. I then recount Doña Margarita's experiences as a mine-guard and finally, Doña Francisca's days as a *palliri* (scavenger).

3.1. 'Otherwise I'd be indebted'. Don Adrián: the lone manual worker.

Don Adrián is a 56-year-old member of The Cooperative. He comes from a family of miners and started working in the mine with his father when he was 12, extracting the ore with the help of donkeys. He works mostly on his own. He works almost every day, at his own rhythm depending on his mood, personal or household needs, mineral prices, and the quantity and quality of mineral he finds in his *paraje* or individually-owned work-spot. Sometimes his eldest son Miguel (13) accompanies him to work, but today this is not the case because Miguel has to study for school examinations. Don Adrián knows that 'he will exhaust his life in the mine', and is happy to do so if his efforts mean that his children will not have to live in the manner he has; as he says, 'to give them the chance away from the mine'.

Don Adrián usually arrives at the mine at around 8am and goes straight to his hut where he keeps his work-tools (sledgehammer, drill-bit²⁶, bag) and clothes. He also keeps his PPE here. The 'material' PPE consists of a carbide lamp, lighter, plastic helmet, rubber boots that prevent the contaminated water from burning his feet, and an old t-shirt that he uses to protect his neck from dripping acids inside the mine and to protect his lungs from dust. The 'spiritual' PPE consists of alcohol, oranges, cigarettes and coca leaves.

On arrival at the mine, he first greets people and starts the *akulliku*: the ritual of chewing coca leaves (see Annexes 1 and 2). This will give Don Adrián 'strength and courage' to get through the day, keeping him alert and suppressing his hunger. Coca is also a path to communication with the *Pachamama* and thus, with the tutelary deities that many Andeans believe have the power to control what happens in their lives (Harris, 2000; Nash, 1993). Opening this path through faith and through *akulliku* is vital if the deities are to 'warn him' of possible dangers or to 'encourage him' towards the mineral vein, as one has 'to be open to receive the *signs* sent by the gods' and live harmoniously with them through rituals. Don Adrián's experience as miner has taught him that if he does not show the deities due respect through ritual, his life is imperilled; the mineral he extracts belongs to them, and he must ask for their permission to work so that 'things will go well'. In performing *akukillu*, he is asking permission to begin work and for the *Pachamama* to ensure his safety. If the coca tastes bitter, he will interpret it as a bad augury and return home (Absi, 2009).

The *akukillu* starts some 45-60 minutes before entering the mine, time in which its substance starts to act. Don Adrián sits alone inside his hut or alternatively, outside chatting with Felico, Don Juan and other cooperative members about football, the quality of the ores they found, current mineral prices and how other members are doing in their work-spaces or *parajes*. He puts the leaves one by one in his mouth making a *pijchu* or ball of coca in his mouth, all the while observing other miners as they enter and exit the mineshaft: in with empty wagons and out with filled wagons. When he finally enters, at around 9.30am, Don Adrián knows that there have been no collapses during the night and that there is no gas in the main passages or in other members' *parajes*, because the other miners are working as normal and nothing has been reported. He takes his tools, puts the electric lamp on and we head to his *paraje*. Just at the entry of the mineshaft he crosses himself.

²⁶ A mechanical drill-bit used as a chisel because he does not have the drill.

As we go deeper into the mine, the darkness takes over and the air smells of oxides and gases. There is acid water on the floor thanks to rain infiltrating the mountain. Most miners perceive rain as an OHS risk, as it not only makes the ground and walls unstable but also impedes the miners' control of the dynamite explosions and forms the so-called *copagira*: an acid liquid that drips from the top of the mine to collect on the floor. 'If it touches your skin it will instantly burn', Don Adrián warns me. 'An old t-shirt covering the neck and avoiding looking up is the best way to prevent it' he tells me, and jokes that if *copagira* gets in my eyes I will have a 'free cataract operation'. As we walk along the main passage, it becomes narrower and the air becomes thicker, with less oxygen. Temperatures slowly rise. We leave the main passage and enter his *paraje*: the part of the mine where years ago he decided to start excavating to 'try his luck' and which is now his private work-spot. While The Cooperative 'ensures' OHS in the common areas (see Chapter 4), from this point in the mine, Don Adrián's safety and that of his workers (if any) are his own responsibility. His *paraje* is divided into two main areas that he opened following two mineral veins (see Figure 3.2 in page 73): one going down and a newer one going up, like a 'chimney'. We take the way up because he had dynamited the lower *paraje* the day before and since he cannot afford ventilation, 'there will still be dust and smoke from yesterday's explosion'. Besides, he tells me that he prefers to advance the job in the upper area as the mineral found there is of better quality and currently worth more than the mineral in the lower vein.

We go up one level using two sets of handmade wooden ladders fixed to small rock ledges on the wall with knotted wires. As I put one foot on the first stair both ladders move, but he tells me not to worry because they are 'well fixed'. He advises me to put my feet on every other step as some steps are loose or broken. He is carefully introducing me to the risks in his *paraje*, risks that he knows and that help him reduce another risk: that of other miners entering and stealing from his *paraje*. Having personally built the place, he knows it like the back of his hand. He does not perceive 'these small inconveniences' as risks to his health but he does know that these indeed constitute risks to me. He takes care to indicate the traps and problems on the way so that I do not have an accident. 'Don't look down!' he shouts. Once up, we stop a few minutes while he digs out the tools he has buried there. 'Do you feel the wind? Use it well to breathe as there is no ventilation in the next level'. We go up a second level, but this time there are no ladders; neither are there ropes to help us on the way up. He climbs the five-meter vertical-tunnel like a spider, and knows exactly where to 'Put the right foot and the left hand... and then gain momentum to jump and put your right hand on that rock-ledge and

the left foot in there...' He patiently and carefully guides me as we climb, without any protection or aids, the chimney that he made following a thin tin mineral vein.

As we get higher and closer to his new work-area, I start smelling the oranges he keeps around. He tells me that in the event of gas, breathing through an open orange will give us time to leave the site as 'the citric repels the gases'. Some five meters higher we stop. This is the end of the chimney; this is where we will be working today. At the very end of the chimney he has placed two wooden tables as horizontally as possible, wedged into rock ledges. We climb over these and sit on them; they move. It is pitch black around us and we can only see what is in the light of our helmet lamps. Don Adrián tries unsuccessfully to light the lighter:

'If there is gas the light will go off and this means we must leave. Sometimes there isn't enough oxygen for the lighter to work. That's why I bring the carbide lamp. If the carbide light goes off we are to quickly leave'.

On the wooden tables there is a small Tupperware box with rotten meat inside. He explains that if there is gas he will open the plastic box and 'the meat will absorb the gases...This will give us time to escape; once outside we'll throw the meat away and it'll explode'. As I recover my breath and get used to the darkness and lack of oxygen, he stands on the wooden boards I am sitting on and, with a sledgehammer in his right hand and a drill-bit in his left, he starts drilling a hole in the rooftop. *K'ajcha! k'ajcha! k'ajcha!* This is the noise of the drill-bit breaking the rock, and the name by which cooperative miners are popularly known since the first cooperative, *K'ajchas Libres*, was created in the Cerro in 1930. It is hot and his work is hard. The air feels bitter on my tongue, nose and eyes but he advises not to scratch, as my hands are covered in arsenic. He sweats, but tells me that he cannot drink water while working because 'the body is hot and the water is cold'. 'If I drink I may get sick'. He has to cool his body before drinking to avoid diseases.

By taking into account the particular strength of the rock and the intended tunnel width, Don Adrián has calculated that he will need to bore four blast-holes, each one-meter-long and 1cm wide, vertically into the roof of the chimney. This is the maximum number of holes he can drill without causing a collapse. This will take an experienced miner like Don Adrián about six hours. As he manually drills the holes, he explains that the main risks involved in this task are the *vacíos* ('empties'), pockets of gas retained inside the rocks. He clarifies that there are two types of gases: one which 'attacks your nerves and makes you feel drowsy but still may let you escape' (carbon dioxide) and another that 'directly attacks the brain and we would instantly

die' (carbon monoxide). At this point I ask him if it is not better to work in pairs, as most miners tell me, so that escape and survival is more likely. 'No', he tells me, 'hiring people I'd become indebted'.

Figure 3.1. Don Adrián at work



After 3-4 hours of work we take a break, as the effects of the *pijchu* of coca stored in his mouth since the morning wear off (Absi, 2009). We descend towards the main entrance of Don Adrián's *paraje*, reaching a small hall where he has a little altar with a figure of *Tatakachu*. There we can sit on the floor and see each other's faces. It feels cold; the air is fresher here and there is more oxygen too. 'This is because there is natural ventilation that I made by drilling holes to the main passage to prevent the accumulation of gases here', he says. We are in his safe area. As I enjoy the draught, he recommends I put on a jacket, 'as the *Tío* [the capricious-natured underground god who owns the mineral] may operate through the wind carrying diseases'. The jacket, the coca and the *Tatakachu* can protect us from this while we are inside the mine. We sit and chat for an hour while making a new *akulliko*, chewing fresh coca leaves and offering the best leaves to the *Tatakachu*. We smoke a cigarette²⁷ and make a small *ch'alla* (offering through libation) with alcohol, sharing with the *Tatakachu* so that things

²⁷ The smoke symbolises the visible bridge between the material world and that of the tutelary deities (Espinoza-Chamalú, 1991). Opening this path during *ch'alla* and *akulliku* is vital for the miners to be open to the signs sent by the deities to warn of possible accidents or to encourage them towards the mineral.

‘will go well’: so that he will protect us if anyone or any tutelary deity wishes to harm us, so that he will interfere ensuring our safety while we extract the ore. Seeing our light, other miners join us and we all ‘share’: we share the time, the space and the offering, sharing with *Tatakachu* as if he was one of us, including him in our conversations and drinking with him by pouring alcohol at his feet while calling him by his name. ‘For you *Tatakachito*, *Tatakachito* take care of us’. After an hour, we go back to work. It is 2pm.

Don Adrián continued drilling for three more hours. Having finished the blast-holes, he sat with me on the wooden tables and we rolled four paper tubes. We filled these with APOS, expansive material used to cause a major blast that dynamite alone will not do. We fixed the rolls in the holes, trying to hold them in. We then took the dynamite cartridges. Don Adrián inserted the end of a 60cm fuse into each cartridge and, with his teeth, he secured a blasting cap between each fuse and cartridge. ‘If it doesn’t make good contact there is no explosion’, he smiled at me in response to my gaze. Once ready, we proceeded to carefully place the dynamite cartridges in the blast-holes, pushing the APOS back in. ‘This length of fuse will only allow us 45 seconds to leave’, he told me, so he waited until I was at the bottom of the chimney before lighting them. The way down was very difficult, as the drilling had coated the chimney’s surfaces with gravel, making everything very slippery. ‘Relax your legs, don’t stay rigid otherwise you’ll fall because your body is not reactive!’ he shouted from up above; ‘Let your body go, this is the only way’. I made my way down safely following his instructions.

As he lit the first fuse, the air became thick and filled with a smelly smoke, making it impossible to open the eyes and extremely hard to breathe. ‘That’s why I have to memorise where each fuse is!’ he shouted, ‘otherwise I’ll lose time trying to find the next wick!’ Once the four fuses were lit, Don Adrián scrambled down to me. We hide behind a corner. BOOM! BOOM! BOOM! BOOM! He smiled at me as the floor, roof and walls trembled, and as the air filled with the noise of rocks falling, white dust and grey smoke made breathing, listening or seeing almost impossible:

‘They all exploded. This is the good thing of a dry *paraje*... there is more arsenic but there is no water so the dynamite does explode when you want it to... unless the *Tío* or the *Pachamama* are unhappy... they can do and undo as they please...’

We left the *paraje*, took the main corridor and exited the mine at 4pm, readjusting our eyes to the light as we happily and thankfully approached the exit. Things went well today. We celebrated and thanked the *Pachamama* for her assistance by making a *ch’alla* outside of Don

Adrián's hut, sharing with the *Pachamama* by making libations of alcohol before each sip of beer. As miners from other groups finished their day's work, we all joined together and shared with the *Pachamama* to celebrate and thank, because 'things went well'.

Due to retire soon, Don Adrián works to maintain his family and to give his children a chance at a livelihood which does not involve working in the mines. Having calculated the amount of mineral he needs to produce to achieve this aim, he chooses to work alone at his own pace rather than within a group where he would have to negotiate with the interests and commitments of others. Working alone, however, involves the risk that there may be no-one to help if he suffers an accident or if his lamp simply goes off.

Don Adrián could rent a drill that would allow quicker mineral extraction and increased earnings. However, as discussed below, this would also incur additional costs and risks that he is not willing to take. In fact, although he consciously takes risks to avoid higher production costs and shared decision-making and despite the fact that he deliberately builds risks into his *paraje* to prevent theft, Don Adrián places his own safety before additional earnings. This is evidenced by the fact that he worships the protector *Tatakachu* instead of the capricious mineral-owner *Tío*, believed to be more adept at encouraging miners towards the mineral. Alongside theft, he considers the main risks of his job to be the variable mineral prices, the presence of gas and dynamite explosions. The severity and frequency of these risks combined with Don Adrián's poverty (cf. Moseley, 2003; Wildavsky and Dake, 1990) and commitment to his dependants, means that he does not perceive fatigue, falls or the presence of arsenic as risks. In fact, he welcomes the presence of arsenic despite being aware of its health effects, as it indicates good-quality mineral and a dry *paraje*; thus, greater earnings and less problematic dynamite explosions.

Don Adrián manages the risks to his health by complementing naturalistic, spiritual and material risk prevention strategies and technologies into a single OHSMS (see Annex 4), using Andean spiritual risk management strategies for the risks he is unable to control. As the next section shows, this is also characteristic of Felico, a 32 year-old member who leads a family group, and who conceptualises mining as an opportunity for social mobility rather than a means to get by.

3.2. 'We're family; we share fortunes and misfortunes'. Meet Felico: the group leader.

Unlike Don Adrián, most cooperativists work in groups. Working in group increases production, as members pool their individual physical strength, assets and *parajes*, thus improving also their chances of finding a good mineral vein. Given that few miners have sick leave benefits (see next chapters), group work is also a mutual insurance mechanism. Not only does group-work mean miners can expect a quick rescue after an accident, it also means that if one member is sick or injured, the group can continue mining and thus support those unable to work, as they continue dividing the group's earnings. While some groups only use manual tools, Felico's group uses electric tools borrowed from a buyer. This enhances the miners' productive capacity, but also involves greater economic costs and has more OHS risks (see below).

Felico and his brothers not only work together, but they also live in the same house, together with their families. Having been mine workers since childhood, they dream of finding a good mineral vein, buying a piece of agricultural land in lowland Bolivia where the climate is warmer and migrating there. This dream has kept them working in the Cerro for more than 15 years, during which Felico has become a mining entrepreneur.

Felico started working in the Cerro when he was 10, helping his father, who left the countryside to work as a labourer in one of the cooperatives. At 16, Felico became a labourer for Don Pablo and worked his way up to becoming a member of The Cooperative five years ago. With help from his brothers and father and working manually like Don Adrián, last year Felico found a good mineral vein in his *paraje*. A mineral buyer called Roberto immediately invested in his production lending him an electric drill. Shortly thereafter, Felico made his two brothers members of The Cooperative. Finding the vein and having access to extractive technology, Felico decided to invest in hiring labourers and opening a new mineshaft a few meters below The Cooperative's main mineshaft. This new shaft has been open for a few months and already Felico has found a good mineral vein. Other miners in The Cooperative think that Felico's luck is because he made a 'pact with the *Tío*' promising him a human foetus in exchange for a good mineral vein.

Felico's group calls itself *Los Malditos* ('the cursed') and is now one of the largest in The Cooperative. The group consists of Felico's father (59), two brothers, Claudio (30) and Lucho

(24), two *compadres*²⁸ (mates) *Huayta* (40) and *Chacal* (37), and Roberto (28), the buyer who lends tools to the *Malditos* in exchange for a share of the production and the group's commitment to sell their mineral exclusively to him, but who never enters the mine (see Chapter 5). *Los Malditos* also employ 10 labourers, some of whom work more regularly for the group than others.

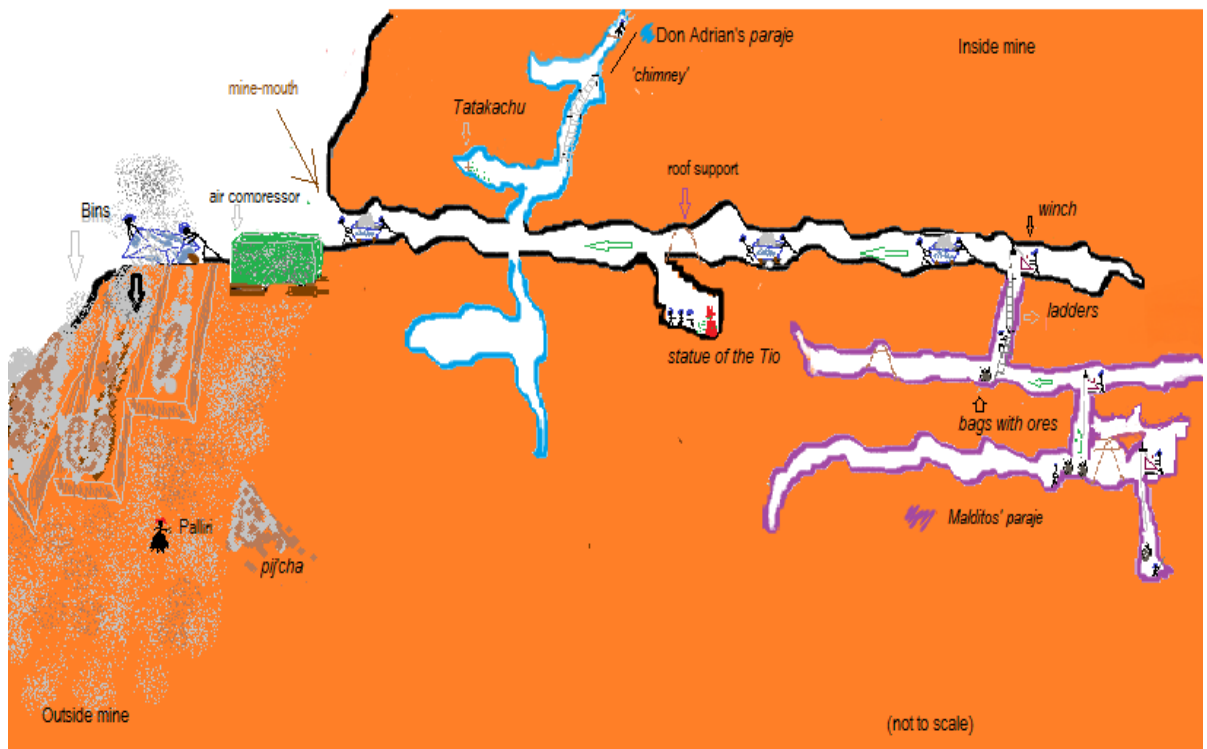
Although their labourers work six days a week, the *Malditos* work only five, arriving at the mine around 8am from Tuesday to Saturday (see Annex 2). Once at the mineshaft, Felico goes straight to the office to chat with Don Juan (the president) and with other leaders and members, while his brothers go to the *Malditos'* hut with their labourers. At the hut, with Felico popping in and out, they all chew coca, discussing the job to be done that day and who will work where and with whom depending on who has arrived to work. Eventually, when ready, they start entering the mine. Felico is proud to be a good leader and before anyone from his group enters the mine, if earnings are good, he offers them a glass of milk (ideally donkeys'). It is believed that milk helps prevent silicosis by protecting the lungs from dust. Usually, the labourers will be the first to enter the mine, while the brothers and their comrades take a bit more time to chat to other members outside. Lucho and Claudio tend to enter together, crossing themselves like Don Adrián.

The *Malditos'* *paraje* is the furthest into the mine, reached after a half-kilometre horizontal walk to the end of the main passage and then a descent down three levels. This is typical for new members' *parajes*. Allocated to them by the most powerful members of the cooperatives, these *parajes* are hard to reach and contain uncertain mineral content. To get to the first level there are wooden ladders fixed to the walls, which move a bit but all steps are secured. To go down the second level, we hang onto the air pipe to aid our descent until we reach two flights of ladders. This space is used both for us to reach the next level down and for the labourers to lift the ore to the upper level with the help of a semi-mechanical winch. Using the winch is an

²⁸ *Compadrazgo* (or co-fatherhood, literally the relation between parents and godparents) is a very important relationship in Bolivia and in the wider Andean society. Dominated by rules of symmetrical or asymmetrical reciprocity, this relationship serves mainly to reinforce friendships and alliances (Lazar, 2008) through the establishment of spiritual kinship between people of the same, or different, class and status (Bolton and Mayer, 1977; Long and Roberts, 1984). It is a mechanism that promotes social solidarity for life security (Mintz and Wolf, 1950), and those who are united by this relationship use the self-reciprocal term *compadre* (Smith, 1984: 118) in the case of men and *comadre* in the case of women. In the mine, sharing equipment (such as drills), offering political support or providing personal labour can, temporarily or permanently, put two (or more) miners in the position of being *compadres*.

easy and 'non-risky job', so Felico tends to allocate it to older, younger, inexperienced, injured, or drunk workers. These labourers are to wait in place until the miners on the lower level arrive at the bottom of the winch carrying 50kg-ore sacks. They deposit the sacks in bags made of rubber-tyre. These are then hoisted up and deposited in a wagon. This is repeated between levels until the ore arrives at the main passage, where the workers push the full wagons out of the mine, depositing the ore in bins from which the buyers will collect it (see Figure 3.2 below). The *Malditos' paraje* is a wet area and the wooden rails have been eaten by the *copagira*, making them loose and irregular. To 'avoid accidents', wagon-pushers balance the weight of the full wagon against their own weight to constantly re-establish its gravity centre so it does not derail.

Figure3.2. The mining process



During the morning, Felico's job, like that of his brothers and mates, consists mostly of coordinating; ensuring and helping labourers remove the ore freed by yesterday's explosion. Explosions are calculated to fill one buyer's truck; one truck holds 12 wagons worth of ore, with each full wagon weighing between 1-2 tons. The labourers' working day is done when 12 wagons have been deposited in Felico's bin. At the end of the week, Felico will normally pay each worker 50-70Bs/day (7-10US\$) for this job. Then it is 'up to' the labourers to decide

whether they 'want' to do a double shift to earn extra money or to 'help' Felico extract more mineral when he needs it (see below and Chapter 4).

There is a high risk of gas in the third and lowest level of the *paraje*, as natural ventilation holes have not yet been drilled and Felico has not yet planned the extension of the air pipe. 'It isn't worth it', he tells me, explaining that he needs to be certain that there is a good mineral vein before investing in safety. To avoid the problem of accident compensation, the brothers are usually the only ones to enter the third level, winched down in one of the rubber-tyre bags. The level consists of a two-meter square hall where they think the mineral vein is, and is accessed through a vertical tunnel which is half-meter in diameter and about three meters long. Lucho is usually the first one to go down, since Felico is the group leader and Claudio drills: 'If there's gas it'll affect him instantly; to help him recover we'll make him drink urine or urinate on him', explains Felico.

After Lucho goes down and checks the area for collapses or gas, others descend. They all work manually, lifting the rocks to the winch in bags and making a human chain that transports the ore to the outside bins. They do this until the space is empty enough to drill for a new explosion, having a break in the middle. Today is Wednesday. This means that during the break the *Malditos* will make a *ch'alla* with the *almitas* (souls of deceased miners who are believed to remain in the mine wandering the tunnels), 'so that they don't become forgotten and cause an accident as revenge' (see Annexes 1, 2 and 4). Since a mineral vein was found between the second and third level, a new additional level has been opened, supported by thin wooden slabs. Small stones fall on us as labourers walk on the floor above. Felico tries to reassure me by telling me that last year two miners died in the spot where we are sitting. 'They're our friends', clarifies Felico as I look even more worried, 'they take care of us... drink, drink with them', he says, passing me alcohol in a dusty plastic bottle cut in half. Lucho smiles at me, telling me that 'those things [accidents] are not to be thought of, as thinking of what may happen brings bad luck'. I explain to them that, for me, one is to 'think of what may happen to be able to prevent accidents'. They all laugh and Lucho says:

'Have faith and follow your fear... thinking the worst brings the worst... Thinking too much means that you don't have faith, that you don't trust the *Pachamama*, the *Tío* or the *almitas* will take care of you... and this will only anger them... Then is when things happen!'

While we share with the *almitas* and renew the *pijchus* of coca, making a new *akukillu*, some labourers join us while others rest in their workplaces. Most labourers continue working while we have a break. A guide arrives with a group of tourists, bringing more drinks, coca and cigarettes which we all share for about fifteen minutes. Over the years, miners have become used to tourists entering the mine. Tourists do not usually represent an added risk for members, although they often make work harder for the wagon-pushers, as they crowd the narrow corridors of the mine. However, guides recommend that tourists bring coca, cigarettes, alcohol, dynamite and sodas to distribute as they go through the mine, ensuring the miners accept their presence. As tourists take snapshots of the dust-covered *Malditos*, some of us use the break to prepare the APOS rolled in paper.

Around 4pm, once the labourers have gone, the *Malditos* initiate the drilling. Having taken into consideration the strength of the rock and the amount of mineral they wish to remove, Claudio has decided that he will drill eight blast-holes 1.5 meters in length and 1.5 cm in width. In two hours, he has made the holes with the help of an electric drill and air compressor supplied by Roberto. Felico pays 80Bs/hour (11 US\$) to the compressor owner, plus his share of the electricity bill. Dry drilling fills the air with dust, so once the eight holes have been drilled, breathing or seeing becomes almost impossible. The resulting lack of oxygen produces headaches and faintness. However, the pressure of the air in the pipe is too high to use for breathing. It works well for the drill, but it takes our breath away when we instinctively reach for the pipe for oxygen. Felico tells me that the *pijchu* of coca in our mouths helps prevent silicosis, because 'in constantly spitting the liquid accumulated in the mouth we also spit the dust, so it doesn't enter our lungs'. We also use masks purchased at the *Calvario*, which cost around 200Bs (30US\$), while the filters, which need replacing after every drilling session, cost about 100Bs each (15US\$). To reduce costs, Claudio uses old socks as filters, shaking and cleaning them after drilling. Lucho left his mask at the hut today, so he covers his nose with his t-shirt, because 'walking all the way to the hut would take too long'. Miners are well aware that it is recommended that they wet the rock while drilling to reduce dust (see Chapter 4), but when I ask Claudio why they don't use water, he replies that this would be an extra cost. Besides, says Felico, wet-drilling takes longer as the water softens the earth, and brings the additional risk of delayed or unsynchronised (too late or too early) dynamite explosions (see Annex 4). Felico recommends I drink a glass of linseed oil as soon as I get home. They all concur, nodding their heads: 'the oil makes the surfaces of the lungs slippery so the dust cannot lodge there causing silicosis'.

Once the dynamite has been placed in each horizontal hole, the *Malditos* and I ascend via the winch system to the upper level, one after another, to 'safeguard ourselves against the explosion'. Claudio stays, lighting one fuse after the other. It is so dark and dusty down there that it is impossible for Claudio to see or breathe. *Chacal* tells me that Claudio always starts lighting fuses from right to left, with his eyes shut to prevent sparks getting in his eyes. He makes the fuses on the right slightly longer than the ones he places last on the left, to give himself more time in case he can't find the next fuse quickly. 'Each drill-operator has his own technique to get out alive', he tells me smiling. 'Why don't you buy longer fuses and light them all from here?' I ask. 'Money' is the reply. At this moment Claudio shouts 'EXPLOSION!' and runs towards us, climbing to the second level using the rope because the winch would slow him down. BOOM! We count seven blasts that make the whole tunnel tremble. Dust, smoke and rocks fall on us from the roof and Felico, looking up, says... 'Don't fuck with us *Pachamamita*...' We wait another minute for the eighth explosion, but it doesn't come. We wait a bit longer and then decide to leave the area without checking why it didn't explode, as 'it may explode while we check it'. 'Let's go', says *Huayta*, 'we'll see tomorrow'. As we approach the exit the air becomes clearer: we are happy but things did not go too well: 'We'll have to do it again tomorrow'.

Once outside, we go straight to their hut. We celebrate the end of work with a *ch'alla*, making libations to the *Pachamama* 'so that things will go well... better, tomorrow'. The *Malditos* chat, asking themselves what the problem was, why the dynamite didn't explode. 'Maybe it got wet', says Felico. 'It may explode later'. 'It cannot be the *Tío*...' says Lucho, and silence fills the hut. *Chacal* tells me that the *Pachamama* or the *almitas* made rocks fall on us to warn us against going to check the last cartridge: 'They were telling us get out, we'll see tomorrow'.

For Felico, using his influence within The Cooperative to help his brothers become members is a way to protect and care for his loved ones and to share fortune and misfortune with them. As he told me: 'if I get rich my family does too, if one has problems... or an accident... or dies, the others are here for you and your family'. It is also a strategy to increase the family's chances of finding a mineral vein and Felico's voice within The Cooperative (see Chapter 4), and thus, of rising in social status. While he admits that he likes taking care of people, his generosity also means that his is the last word in decision-making. In addition, his role as a 'giver' means that the others remain indebted to him for the favours received.

Felico considers the main risks of his job to be gas, dust, dynamite explosions, compensating workers after an accident and not finding good ores. Despite the higher economic costs, increased OHS risks and the risk of having to pay compensation, Felico employs labourers and accepted Roberto's technological investment because he wants to increase production and his chances of finding mineral. However, dry-drilling frequently exposes the *Malditos* to high concentrations of dust, which increases their risk of suffering from silicosis. They usually manage this risk by wearing masks, but they often use old socks instead of filters to reduce costs.

Initially, Felico would not allow *Huayta* and *Chacal* (the mates) or the other labourers to undertake the riskier tasks. As they are not cooperative members, their families would have no compensation in case of death or injury and Felico would have to find a way to provide this. He secures the ladders and roofs in his *paraje* (making it 'safer' than Don Adrián's) to prevent the risk of compensation. Although working in a group involves some degree of risk sharing (Grätz, 2009) and spreading, Claudio and Lucho face the greatest OHS risks. While Felico enters the mine twice a week, and labourers do the heaviest tasks, Claudio and Lucho undertake the riskiest. There are several reasons for this:

Working in group involves a division of tasks; Felico organises production and commercialisation while Claudio concentrates on the drilling and explosions. Lucho, the youngest brother (who also only has one son) is the one entering the cavities where there is high risk of gas. Like Claudio, Lucho enters the mine prepared to die in order to advance the job for the group, 'for his brothers', knowing that they will take care of his dependants if anything happens to him. Yet, sometimes, for the labourers, voluntarily taking a high risk or working double shifts is also a means of asserting their commitment to the group's interests and returning Felico's 'gift'. Thus, despite the fact that Felico appears overtly unhappy when non-family members take risks, this behaviour is also a sign of commitment to the group and to Felico, definite proof of being, as Lucho says, a good miner: 'fearless and committed'.

The next section presents a more common type of work-group, a group in which the cooperative shareholder does not enter the mine and instead subcontracts labourers to do the job.

3.3. 'I don't care what they believe, I enter, do my job and leave'. *Changuito's induction to mining*

Most groups in the Cerro operate as small enterprises where one or more members informally employ a trusted and experienced labourer (called *segunda mano*, or 'second-hand') to extract the ores for them – usually alongside other labourers, subcontracted by the 'second-hand' – while the members never or rarely actually enter the mine. This is very typical with retired, sick or injured members whose economic circumstances are better than Don Adrián's and who are able to employ labourers and modern technology while they pursue dreams of becoming wealthier. Widows who refuse to work as scavengers (see below) also contract labourers to exploit their *parajes* for them. Some cooperative members who are sufficiently wealthy, engaged with other livelihoods, absent from Potosí during periods of low mineral prices or who have grown fearful of entering the mine hire labourers to do all the work. Finally, employing labourers is very common when mineral prices rise and the members wish to rapidly increase production (see Chapter 5). In fact, with mineral prices at a current high, it is estimated that there are some 18000 miners in the Cerro, of whom less than 5000 are actual cooperative members, with the rest informally contracted labour.

Labourers decide to work in the Cerro for many reasons. Many peasants go to the mines to work for a few days each week and return home on weekends. Others initially go for few months (combining this with seasonal agricultural work) or when land or livestock do not provide enough and, like Felico's father, finally stay in the city. Many only seek work when mineral prices are high or when they need extra cash for their agricultural or livestock investments (Harris and Albó, 1974), for building a house before marriage, paying for children's education, etc. The average wage of a labourer is normally twice that of other local jobs, so city dwellers also make extra cash in cooperative mining, for instance, before Christmas. Attracted by the 'high wages' or 'pushed' (cf. Tschakert, 2009) by the lack of jobs, city dwellers seek work in the Cerro when mineral prices are both high and low (see Chapter 5), and occasionally also to fund their university studies or those of their relatives. For many, working in the Cerro offers them the possibility of earning some additional money in a flexible job where it is not required to attend every day. Initially on probation, their successful integration (and promotion) within the cooperative will depend not only on their personal motivation, but also on their physical strength and ability to work well within a team avoiding conflictive situations (see Chapter 4).

Changuito (in Quechua, 'the young one') is an 18-year-old novice labourer newly subcontracted by *El Verde* ('the Green'), the second-hand of Don Juan (the president of The Cooperative who is formally retired). *Changuito* started working with *Los Verdes* ('the Greens') a week ago. He studies at the university in Potosí and, needing to pay for his studies, he accepted the job offer when *El Verde* went to the university recruiting temporary workers. *Changuito* had been working in one of the mineral processing plants, but decided to change to mining because 'in the processing plant they pay on a monthly basis and night temperatures are bitterly cold'.

Changuito does not chew coca. Neither does he believe in the *Tío* nor the 'spirits of the deceased' that can warn or cause accidents. As he says, he simply 'comes, does his job and leaves'. Like all beginners, he works as a *chasquiri* (loading mineralised rocks onto to the wagon) and wagon-pusher. For experienced miners, this is the simplest job, requiring only physical strength and willingness to work hard. This is conceptualised as a 'non-risky' job, as *Changuito* will not be drilling or dynamiting, jobs usually reserved for experienced miners. However, for *Changuito*, just 'about everything in this job is a risk'.

When *Changuito* first arrived at the mine, an old *paraje* that had not been exploited for over a decade collapsed, opening a hole under the main passage's wagon rails. Although this did not impede other groups from working, Don Juan (the president of The Cooperative and the leader of *Los Verdes* group) decided not to allow his labourers to enter the mine until the situation was addressed. *Changuito* was told to return at 8pm.

Before entering the mine, *Los Verdes* prepare themselves for work with the *akulliku*. As usual, *Changuito* abstains. He stays with me, telling me that he does not believe in these practices. Don Juan and *El Verde* warn *Changuito* to chew coca 'for his own good', asking him to listen and trust their experience. He refuses, and tells me that he does not need it nor does he like the bitter taste of the coca.

Los Verdes entered the mine around 9pm and shortly afterwards *El Verde* emerged from the mine carrying a semi-conscious *Changuito*. 'A rock fell on his head breaking his helmet and leaving him unconscious', *El Verde* told me. As the labourer responsible for the subcontracted, *El Verde* helped *Changuito* out and left him outside the mine while the others continued working. 'Changuito had plenty of blood on his head, face and hands but they left him alone at

the entry of the mineshaft', the mine-guard told me (see next section). Nobody accompanied him to the hospital, as doing so would mean not finishing the job and thus not being paid for the rest of the day.

Still with a headache, the following morning *Changuito* went straight back to the mine to claim the medical expenses from *El Verde*. 'What happened?' I asked him. 'We were loading [mineral to the wagon] and I felt lightning in my head'. He didn't remember anything more except lying alone outside the mine. Once he recovered consciousness, he started walking down the Cerro, towards the city. He was lucky to find a taxi that had just dropped off some miners at another mineshaft, as there is no transport to the Cerro at night. The taxi took him to the hospital at *Calvario*. Here he was advised to stop working at the mine, given painkillers, ten stitches in his head and a bill for treatment because he is not covered by Social Security.

El Verde was getting ready to start the morning shift when he saw *Changuito*, and laughingly told him 'You angered the *Tío* and he warned you', just before telling him payments are sorted out with Don Juan. *Changuito* waited with me in the sun for three hours until Don Juan finally talked to him. 'What happened to you!' smiled Don Juan, 'gravel made your helmet fall and you got scared?' 'No', replied *Changuito*, 'it was a huge rock'. *Changuito* gave Don Juan the taxi and hospital bills. 'It's not like I didn't warn you! Because of what you have done to the *Tío* you got what was coming to you' said Don Juan paternalistically. 'You angered him and he warned you... we warned you!' Looking at the bills, he told *Changuito* that he would deduct the cost from the group's income for the day and that *Changuito* will only be paid for the hours he actually worked: 'It was 50Bs [7US\$] per the job done, you did half of it... I'll give you 20 [3US\$] and we'll cover your bills'. Then, Don Juan asked *Changuito* if he wanted to work, to which *Changuito* replied he would not as he still had a strong headache. Don Juan started to suggest that a headache is not a problem when working as a *chasquiri*, but *El Verde* intervened saying it was better if *Changuito* took the day off, as *Changuito* was still 'afraid' and this would bring an accident. For *El Verde*, *Changuito's* fear would put the entire group at risk. Don Juan accepted and *Changuito* left.

After *Changuito* left, *El Verde* told me that he would not allow *Changuito* to enter the mine until he chewed coca 'to get courage' and recovered from his 'scare'. 'He thinks he knows everything because he goes to the university but we know what works in here and how things work and have to be done for things to go well', he said. The next morning, at 8am *Changuito* was at the mineshaft ready to work and joined the other members of the group chewing coca

before entering the mine. To reassure him, *El Verde* explained to him that they had reinforced the roof. In addition, he told him:

‘today before working we’ll do a *ch’alla* with the *Tío*, you’ll give him his coca so that you can make your peace with him... if I were you I’d ask him forgiveness for your ignorance and tell him that you’ll respect him and never again take his mineral without his permission’.

So they did, but after this day, *Changuito* never returned to the mine. Weeks later, *El Verde* told me that it was best like this:

‘one is to walk along one’s fears... The *Tío* doesn’t like it when people are weak and not working with willingness, without respecting the fact that they obtain minerals because he [the *Tío*] allows them to... He [*Changuito*] didn’t ask permission to work nor thank him afterwards... without gratitude and with fear he was easy prey... We were all at risk!’

For *El Verde*, *Changuito*’s co-workers may suffer the same fate, either for allowing a non-respectful person in the mine or by simply being caught in the accident.

While it is not usually the case for rural labourers, many city workers experience cultural shock during their first days in the mine. As they are introduced to the miners’ understanding of risk causation and to the deities that, according to miners, have the final word in mineral production and safety, suspicion and mistrust develop on both sides. For experienced miners, the new miner needs to understand that there is a greater reality and a non-empirical logic behind OHS. He has to accept this in order to develop the faith and courage that will ensure the wealth and health of both himself and his workgroup and act accordingly, joining the group in ritual celebrations and work preparations. Only by accepting what he is told and learning from the experiences of others, will the new labourer survive and cope as a miner. *Changuito*, as a university student, only believes in the physical or ‘material’ causes of risk and, as he says, ‘the rest is superstition’. For him, everything in the mine is risky, and he does not share how miners conceptualise risk causation and management. Seeing risks everywhere in the mine, *Changuito* is afraid this work constantly imperils his life and health. He tried to control his fear by telling himself ‘this is a temporary job to save money’. But accepting a non-empirical causation of risk means embracing his inability to fully control what will happen to him and to be mentally ready for an accident to occur at any time (cf. Burawoy, 1972). Most miners have internalised such acceptance over the years but for *Changuito*, this is difficult. An accident like

Changuito's with no major consequences and the subsequent 'scare' (*mancharisqa* or *susto*) bridges the gap between these two worldviews. There are two possible outcomes: the newcomer will accept the teachings of the more experienced miners and be initiated into their worldview and OHS management practices, or he will leave and seek another livelihood. Accidents thus become an induction into the miners' world, an initiation to the mine (Absi, 2009).

Although the miners I have introduced thus far are men, this is not the case for all labourers. In this next section, we meet Doña Margarita, a female labourer who works as mine-guard in another cooperative of the Cerro.

3.4. 'What else could I do?' Meet Doña Margarita: The mine-guard

'The mine means living between life and death. It's the worst thing. They enter [alive] and exit dead... there isn't difference if you are young or old... and young women are left alone with four, five children... And we suffer! Because... we're left with nothing, no compensation of any kind... because all the work our husbands did is only for the members... and we suffer a lot... as we remain without our husbands... I too am a widow; I haven't received anything since my husband died and I've been left to my own luck with my children... I've stayed as a guard... Living here I don't pay rent... What else could I do?'

(Doña Margarita, 34)

Like all *guardas*, Doña Margarita lives in the Cerro just outside of the mineshaft, in a little tumbledown house granted to her by her cooperative with her five children and without water or electricity. As mineral prices are currently high, there are some 350 guards living and working in the Cerro, of whom all but three are women of all ages and with an average of six children each. Most are widows of labourers that have been offered this job as compensation for their husbands' work-related death. Doña Margarita, like most guards, comes from the surrounding countryside, from which many leave in search of better livelihoods or to follow their relatives heading to the mine. A minority of guards come from the city, often to hide and protect themselves and their children from domestic violence. Like most guards, Doña Margarita's main language is Quechua, and she cannot read or write. 98% of the guards have access to neither Social Security nor retirement pensions. For many, this job is their only viable livelihood strategy, because it allows them to care for their children while working. The fact that the job comes with a free place to live is also attractive, and an incentive to stay in the job.

Employed by a cooperative that has a mineshaft at the back of the Cerro, Doña Margarita's job is to guard the mineshaft and prevent thieves from taking members' tools or ores. For her, theft is the greatest risk of her job:

'If members' tools are stolen they won't be able to work... they'll have to work manually and they'll get angry at me...they'll say that I've let their property be stolen and that I've damaged them... that I should have been guarding at all times... and I'll have to pay for the stolen material...'

A few months ago, while she was at the market buying food, leaving her twelve-year-old son Ángel in charge of guarding the mine, three drills were stolen. She says her monthly wage of 450Bs (65US\$) has subsequently been 'significantly reduced' to repay an estimated cost of 4,000Bs (600US\$) per stolen drill. As with *Changuito*, 'not being paid' is an important work-related risk for Doña Margarita, but other issues completely beyond her control impact on the regularity of her pay. For example, when mineral production or prices decrease or during Carnival celebrations, as when members' earnings are reduced or spent on rituals, they frequently fail to pay labourers (see next chapters). To help towards the cost of the stolen drills, her fourteen-year-old daughter Abigaíl now works nightshifts as a wagon-pusher for 50Bs/night (7US\$), attending school on the days she is not too tired. In addition, although not related to mining, Doña Margarita also receives money in the form of cash transfers. Three of her children are beneficiaries of the *Juancito Pinto* yearly cash grant of 200Bs (30US\$), introduced by the Morales government in 2006 for children attending school. Her two eldest also receive NGO study-scholarships. She uses this money for repaying the debt and for the family to live on.

To prevent theft, Doña Margarita stays close by 'her mineshaft' and surrounding area all day. She does night patrols every three hours and each time she hears her dogs barking or 'strange noises'. To find her way at night she could use a lamp, but she prefers not to: 'If I use the light to see them, surely they can also see me!' She feels safer walking in darkness, avoiding being seen, 'as thieves can often be violent'. To prevent theft or violence towards her and her children, she sometimes makes whispering noises, hoping that 'whoever it is wandering around will think that night mine workers are around and leave the area'. She also always carries a cartridge of dynamite next to her breast in case she needs to scare thieves away. 'Of course I wouldn't blast it towards where they are!' she explains to me. She does not mean to harm them, but rather to scare and to show them that she will protect herself and the miners'

property with all her means. However she knows that many thieves are in fact labourers that have not been paid by members, or even members themselves, stealing from other members as revenge or through envy.

‘How can I stop them if they want to get their owed wages through theft or are seeking revenge? But... if I let them take ores or tools... then I lose my job or... I’ve to repay, and if I face them... sometimes they’re bad.... they can do things...some hit... rape us.’

Physical violence as a result of confronting thieves is for her the second most important risk associated with her livelihood after theft, and guards working in this area of the Cerro have developed a self-help system with the support of a local NGO:

‘Now we’ve cell phones... and also our whistles because phones don’t always work or we don’t have money [to top them up] or we couldn’t charge them because we haven’t electricity... then we always have our whistles... They are loud the whistles. It was a gift from *Voces Libres* (meaning ‘Free Voices’). We go to the top of the debris, blow the whistle and, if one isn’t sleeping, one hears it and replies using the whistle. That means... okay... things are okay here... If we blow it three times it’s because we’re in danger and we need help; twice is simply a warning that something is wrong, something is happening or moving around. One whistle means that we aren’t sleeping, that we’re alert...’

Doña Margarita tells me that once she whistled three times for help as she was scared of strange noises in a group’s hut, which turned out to be a bat. While we both laugh at her story, it is representative of the tension she experiences every single night.

After the night watch, her workday starts around 5am, as night workers begin to leave the mine. She gets out of bed and washes her hands and face (and those of her little ones) with her own urine. As miners prepare for work or leave the mine, they knock on her door, asking her for the keys to the huts or for the dynamite she keeps under the bed where she sleeps with her children. They go to their respective huts, chew coca, chat and get ready for work or do the *ch’alla* after work. Before entering or leaving the mine, they return the key to her. In the same room where she sleeps, she has a little gas cooker that she uses when miners or CEPROMÍN bring her bottles of gas that she pays for. She knows the risk of explosion and also tells me how the APOS and the nitrate in the dynamite give her headaches. When I look concerned, she looks at me and says: ‘What can I do? It’s safer to keep it here...’

Sometimes Doña Margarita cannot eat or drink because she does not have time or money to go down to town for food. She tells me that she often drinks the orange-coloured water that comes out of the mine, knowing that it is mineralised and contains acids:

‘It’s *copagira*, but what else can I do? We’ve nothing else... Sometimes it makes us ill, it hurts the stomach and sometimes it burns as we drink... What can I do? This is what we are to live... Sometimes miners or CEPROMÍN bring water... or I can fetch some myself when I go to the city... but sometimes this is all we have... leaving the mine to shop sometimes makes things worse... How can I leave if I don’t find someone to cover for me while I’m gone? No...It’s too risky... sometimes when we’re gone... if we aren’t around, miners themselves steal’.

The sun is very strong and she protects herself by wearing a hat she knitted, as well as covering her body and putting coca leaves underneath her eyes to keep them moisturised. This part of the Cerro is very windy and she considers the winds to be a health risk. ‘Wind brings diseases’, she tells me, ‘it brings coughs, colds, scarlet fever, measles, scabies.... but the worst is the ‘bad wind’, the one that can twist your jaw’.²⁹ To prevent this, she chews coca as it will not only stop her from feeling hungry or tired, but it will also give her body strength to fight the ‘bad winds’. She also protects her nose and mouth by breathing through a woollen cloth and wears a ring made especially for her by a traditional healer to protect her against the effects of bad winds. ‘Wind also brings punishments from people or from the *Pachamama*... and can develop into fatal diseases’. To prevent this, she believes she must be thankful for what she receives from life, reciprocating the ‘gift’ through living harmoniously with the miners who employ her and with the deities with the power to control what happens in her life.

For Doña Margarita, the main risks associated with her livelihood are: theft, not being paid, physical violence, lack of access to water, lack of free time, and the effects of the adverse environmental conditions on her health. She is fully aware of these and does her best to manage them using all the means at her disposal. Managing these risks, however, makes her accept and ‘tolerate’ (Lehman et al, 2009; Moseley, 2003,) other risks to her health she is also aware of, such as prolonged exposure to heat, drinking contaminated water, or the presence of explosives within her living space. She manages the risk that igniting the gas cooker in the room where she stores the dynamite may cause by frequently cooking outside, burning old wooden rails and rubbish. But weighed against the possibility of losing her job, she perceives

²⁹ I believe this to be a facial paralysis caused by a brain embolism. Embolisms are common at this altitude due to the body’s need to produce more red blood cells, which increases risk of blood clots.

the risk of explosion as less likely, and thus, more tolerable than the risk of theft. Her OHS risk perception and her acceptance is not therefore framed by her lack of ‘understanding’ (Rantanen, 2005: 35), ‘awareness’ (ILO, 1999: 5), ‘knowledge’ (WHO, 2010: 16) or ‘education’ (Burton, 2010: 30). Rather, it is the result of a cautious analysis in which the overlapping risks that affect her (and her children) at work and in her personal life have been carefully weighed and prioritised. Responding to these depends on having the power and resources to do so.

Not all female miners in the Cerro have such a limited degree of control, such little choice about risks and such a vast array of severe risks simultaneously affecting them. The next section describes how another female miner, with a greater degree of control over risks than Doña Margarita, gets through her day.

3.5. ‘I’ll work here ‘til my last day’. Meet Doña Francisca, the *palliri*

While Doña Margarita is the widow of a labourer sub-contracted by a cooperative member, in contrast, Doña Francisca is, like all formal *palliris* (scavengers) in the Cerro (see Table 1.2), the widow of a cooperative member who was offered this job as compensation for her husband’s work-related death. Her status as ‘widow of a cooperative member’ gives her rights and entitlements within the cooperative and beyond. She is a formal member of the cooperative. Like most *palliris*, Doña Francisca lives in a house by *Calvario*. She is 65 years-old and lives with her daughter and granddaughters in a house with water and electricity. At the time of my fieldwork, there were 70 formal *palliris* in the Cerro, most more than 55 years-old.

Doña Francisca’s husband had an accident when working. ‘A rock crashed his cranium’, she tells me. While he survived, he was disabled for the rest of his shortened life. Not entitled to receive widowhood benefits, Doña Francisca worked for 10 years following this accident to maintain their children and to pay for her husband’s medication: ‘It would have been better if he had died’. She was 35 by the time he passed away. ‘My cooperative helped me by allowing me to work as *palliri*’. As *palliri* she can scavenge minerals lying around her cooperative’s mine-entrance. In return, she pays 15% of what she collects to her cooperative.

Like most *palliris*, Doña Francisca is bilingual Quechua-Spanish, but she cannot read or write. She receives a small and insufficient widow’s pension, her own retirement pension and a monthly cash transfer of 200Bs (30US\$) for the elderly introduced by the Morales government in 2006 (*Bono Dignidad*). However, her husband’s early death and their intermittent

contributions means that her retirement and widowhood allowances are not enough for her to live on. This, as well as the deep and personal relationship she has developed with the mine over the years, drives Doña Francisca to work in the Cerro, as she says, 'until the last of her days'.

Doña Francisca gets up every day at 6.30am; gets dressed, has breakfast alone and slowly goes to Pailaviri. If her personal finances, mineral prices and work opportunities permit, she delays going out too early to avoid the morning's bitter cold. Today, we leave her house around 8am and, after buying coca, take a bus from *Calvario* to Pailaviri. Sitting on the bus, she explains to me how newly-widowed women are refusing to work as *palliris* and are increasingly choosing to work inside the mines instead, continuing their husband's work:

'There are more risks inside... the mine is ugly you see? But there is also more gain... perhaps, if the luck is with you... But then, if the widow has an accident... what happens to the children? Sometimes women have to think beyond earnings... When my husband had the accident things weren't this way. Women and priests... we weren't allowed inside the mine. The *Pachamama* gets jealous, you see? She wants the miner to herself. If she gets angry she can cause an accident... or hide the mineral so you don't find it. Then the men would blame the woman for angering the *Pachamama*... better to work outside as *palliri* to avoid problems! If I'd had the chance of working inside at that time... perhaps I'd now enjoy a decent pension... but with the money I receive... I'll have to work here until my last day! Mind you! Perhaps I'd be long dead!'

Arriving at Pailaviri, we go straight to the *paraje* assigned to her by her cooperative. Doña Francisca is very happy with her *paraje*'s location. It is in Pailaviri, right next to the bus stop, below the bins where wagon-pushers deposit the mineral before it is collected by buyers, and it is shaded by the rusty remains of an old COMIBOL glory. 'I can reach my *paraje* by bus, I have shelter from the sun and rain and I can easily go and pick the mineral that falls from the buyers' trucks before anyone else... It's perfect!' she tells me proudly. As we arrive at her *paraje*, we start the *akulliku* to prepare ourselves for work, keeping the best coca leaves, as Don Adrián does, for the *Pachamama*. After 30 minutes chewing coca and once it starts releasing its properties, Doña Francisca carefully moves a large rock, revealing her work tools and PPE (two handmade sledgehammers, two brushes and one pair of perforated woollen gloves) wrapped in a dusty cloth. She grabs the tools and replaces them with the chosen coca leaves. 'Let's start', she tells me, 'I must leave early today as I need to catch the bus to Sucre for my cataract operation tomorrow morning'.

Doña Francisca will take advantage of 'my help' to do the heaviest job: transporting the largest rocks with minerals (*ch'ami*) she found yesterday to her *pij'cha* (pile of ore that *palliris* gather in their *parajes*). First though, she wants to see the *wawita* (or 'little-one'), a twelve-year-old boy who lately wanders the Cerro asking for some impromptu jobs. She does not know his name, his exact age, or whether he is living alone in one of the caves of the Cerro. 'I don't know', she tells me when I ask: 'many come from the countryside looking for work... Many come with their little brothers and sisters. I think he's the oldest and feeds his little brothers'. She is not sure and does not seem to want to know. She goes to the boy, gives him 10Bs (1,5US\$) and asks him to clean one of the bins after the buyer has collected the ores stored therein. She has an agreement with another member of the cooperative that she will 'clean' (sweep) his bin between the filling and emptying of it. She explains that this allows her to retrieve higher quality ores than those she finds lying in the mining debris or on the surface of the Cerro. 'For miners it's good that different ores of different qualities don't mix', she tells me. 'The mineral loses its value if many ores mix together'. Usually she does this job herself with a brush inside the bin. Today she will pay the *wawita* to do it for her. 'I help the boy helping myself', she tells me:

'The *wawita* usually moves the heavier rocks for me. He gets his wage for the day and I won't have back pain at night. Today we are two; we'll carry the rocks so he can have a lighter day'.

Doña Francisca taught herself everything she knows about mining. 'By working, making mistakes, and paying for those mistakes'. After one hour carrying the rocks to her *paraje*, we sit on the ground and start picking up rocks of different sizes one by one and breaking them into pieces with the sledgehammer to see if there are any traces of mineral inside. The name *palliri* originates from this process, from the Quechua *pallar* ('pick, choose'): 'This one... yes... this is *ch'ami*, toss it to the *pij'cha*. This other... no... this is only *caja* [rock with no mineral], throw it away...' To distinguish ores and assess their quality, Doña Francisca examines the colour, smell and sometimes the taste. 'Good silver appears reddish, good zinc looks like chocolate, good silver smells bitter... because of the arsenic', she tells me. 'What about this?' I ask. 'This is pyrite, the fool's gold! You won't eat much with this!' She laughs at me.

'I made this mistake once, trust me; you only make this mistake once. You're alone here, you know? When I started other *palliris* taught me some of what they knew... but...If I learn what they know... less mineral for them, isn't it so?'

It is hot, about 35 degrees Celsius, and the sun is very aggressive at this altitude. However, as usual Doña Francisca hasn't brought liquids to avoid urinating in the open. She is aware of the dangers of the sun and we both protect our skin with clothes that cover our whole body. For me, this is a very physically demanding job, made harder by the lack of oxygen at this altitude. In less than thirty minutes my legs cannot bear the posture, my arms cannot hold any more rocks and my hands are covered in blood from blisters. She laughs at my hands and sweaty face: 'with years the skin hardens and no more blisters will appear... with time, you won't even feel the pain!' She takes a short break with me. 'Don't feel bad', she tells me, 'having a break when tired is one of the privileges of being a pensioner!'

Figure 3.3. Doña Francisca collecting rocks



After three hours of work, around 1pm, we take the lunch break. Before eating, she replaces the dried coca leaves on a wound in her leg with the *pijchu* she has had in her mouth since the morning; then re-bandages the leg with an old strip of clothing. 'It's nothing', she tells me, 'a rock fell on me two months ago... the coca will help with the inflammation and prevent infection'. We eat cold corn-on-the-cob, potatoes and dried llama meat in the sun, with our hands and faces covered in dust and mineral. After a 30 minute break, we chew coca again and we go to see how the *wawita* is doing.

'Either he didn't do the job or he didn't do it well... One can never delegate tasks! If things are to be done properly, I'm to do them myself... Losing money, I'm losing money; the *wawita* has made me lose money...' Doña Francisca rushes back to her *paraje*, picks up the two brushes

and climbs up to the bin where miners are already depositing new ores from the wagons. 'We need to sweep all we can from underneath the new load', she tells me. Upon seeing us, a mineral buyer tells us to stop and leave it, but she explains that what is underneath the new load belongs to her. 'If you haven't taken it already it's ours', he replies. We continue. As we rush to sweep the area in order to collect as much mineralised gravel as possible, the wagon-pushers continue emptying the wagons on the top of us. Rocks constantly fall over us and the air is filled with mineralised dust. Sometimes they warn us, shouting 'It goes!' while simultaneously loading the bin. We have to constantly be on the lookout to avoid a rock hitting our heads or feet while we sweep. The dust thickens the air and this is exacerbated by our sweeping. 'Sweep with the wind', she recommends me. The dust is burning in my nose, mouth and eyes, but like Don Adrián, she tells me not to touch my face. 'Just hold it; don't make it worse by scratching'. The bin next to us is being emptied by young men filling the buyer's truck. Like us, they don't wear masks and instead some use their t-shirts to cover their noses and mouths. 'Don't worry', she tells me, 'dust is bad inside the mine but not here in the open space'.

The bin cleared, we transported our newly-collected ores to her *pij'cha* with the help of the *wawita*. At 5pm we were about to leave when Doña Francisca noticed that the bin had just been emptied and was ready to be 'cleaned' again. She decided to stay and clean it 'before someone else does it or fills it again'. We quickly cleaned it in two hours. It was dark and bitterly cold when we finished. Doña Francisca missed the last bus to Sucre, meaning she would also miss her appointment for the eye operation. 'What can I do if there is work to do?' she told me, 'work does not come for free; one is to take advantage when it comes'.

Retired due to her age but with insufficient income, Doña Francisca works to top-up her income and because, as she says, 'staying at home I'll sicken'. For her, the main risks of her job are not finding good-quality ores, mineral prices, tiredness, backache and the extreme cold and heat in the Cerro. She says that taking a break when tired is one of the benefits of being a pensioner, and she manages the risk of tiredness and back pain by taking regular breaks and employing the *wawita*. Yet, she worked till dusk, missing her appointment for a cataract operation because 'one is to take advantage of a work possibility when it comes'. In fact, while she manages the risk of finding only low-quality mineral through her agreement with the cooperative member to clean his bin, this arrangement also means she must always be ready

to 'jump into the bin and clean it'. Her need to obtain higher-quality ore that is lighter to carry than the rocks she usually finds in debris, her desire to prevent the member from making an agreement with other *palliri* to do this job, and the current good mineral prices result in Doña Francisca accepting the risk of being hit by rocks whilst cleaning the bin, since labourers will not stop for her.

Like many miners, when weighted against the chance of finding sellable ores and against her personal needs and commitments, Doña Francisca does not perceive dust, sub-acute injury like blisters and bodily-pains, other than those which would immediately severely impede her capacity to work (i.e. backache), as OHS risks. These are so common that she considers them a normal part of the job and life (cf. Holmes et al, 1997; Burawoy, 1972), things one simply learns to live with over the years. She is fully aware of the causes of these problems and how to prevent them. But although she receives a widowhood and retirement pension and has a little more choice and agency to manage these than Doña Margarita, she accepts and tolerates these as it means she can maintain the partnership with the member and the chance of finding relatively good ores. Production and income needs and 'the way things are organised' frame her risk acceptance.

3.6. Conclusions

It is generally agreed that beliefs about the causes of risk influence the way people prepare for and respond to risk (Kasperson and Kasperson, 1996). However, as this chapter shows, although accepting that tutelary deities have a role in OHS risk causation is often a must for new miners, cultural perceptions do not limit the miners' understanding and management of OHS risks. They do not pose a 'barrier' to OHS (Hentschel et al, 2002: 6). As shown, miners simultaneously articulate different ideologies about risk (Nash, 1993) complementing material, naturalistic and Andean beliefs into an integrated OHSMS (see Annex 4). People participate in this symbolic universe to different degrees (Lazar, 2008), and spiritual management of OHS risks does not dominate production or safety choices. Rather, it allows miners to cope individually and collectively with the hardships of their work and with the unintended effects of their choices. In addition, miners' OHS risk responses are not only shaped by their understanding of their causality. As shown, their behaviours are also heavily influenced by their ability to respond.

This chapter explores divergent interpretations of OHS risk, its causes and management given by diverse miners. It shows that accidents represent screening methods and a means of induction for new miners. They are also the pathway for most women to become miners.

All the miners described above, regardless of gender and regardless of status or position in the mine, face severe, multiple and overlapping risks, and do not have the means to fully control these despite their risk awareness. The combination of the hazardscape (cf. Cutter, 2006) in which miners live and work and their reduced capacity to respond ultimately shapes their risk tolerance. Ultimately all the miners have to take some risks with their health in order to secure regular, needed household income.

Understanding the life-worlds of miners is thus essential for comprehending how they individually perceive and respond to OHS risks. Miners' life-worlds shape the type of mining work that is available to them and, subsequently, the OHS risks they face. It also shapes the degree of control they have over risks and thus, their OHS risk perceptions and behaviours. As discussed in Chapter 1, labour and OHS literature tends to focus the attention on 'workers in the workplace' thus alienating workers from their personal spheres. Consequently, this literature conceptualises workers as homogeneous groups with equal entitlements and a common goal in terms of OHS (see for instance ILO, 2011; WHO, 2005; Stellman, 2004). It is also assumed that knowledge of a risk and of its effects will result in particular behaviours in response (WHO, 2010; Beck, 1992). As demonstrated in this chapter, neither is the case in the Cerro. The mine is a socio-economic and ethnically heterogeneous setting (cf. Grätz, 2009), and miners often take, accept and tolerate risks despite their awareness of them. Indeed, making clear-cut, strategic choices is dependent on having the power to realise them (Cornwall, 2007). As demonstrated, this power is determined by economic constraints, emic understandings of life, beliefs, and by the hierarchies of power that different workers experience when working with others who have different motivations, life-experiences and assets. These elements in a person's life determine the variable degree of control and choice they have in responding to OHS risks, regardless of their risk knowledge and of the fact that they share the workplace. In turn, as the next chapters show, although I have here presented the miners' situations in an 'ethnographic present', their situations are neither fixed nor static (Hastrup, 1990; Sanjek, 1991). For example, the longer miners stay in the Cerro, the better their positionality within the workplace and the better placed they are to build relationships and make risk management choices. As their situations change, so do miners' feelings (cf. Slovic, 2010) and approaches to the OHS risk they face. Therefore, although this chapter

presents a different type of miner in each section, I do not mean to pigeonhole risk perceptions (or the risks they face) according to mine-related work. As the next chapter discusses, the particular type of work that a miner carries out at any given time (and how) depends on many factors which can quickly change, meaning the particular jobs do not *per se* frame particular conceptualisations of OHS risk.

The following chapter explores further the relationships between miners, focusing on the interface between individual and collective assets, commitments and interests. I examine how miners' workplace relations affect different miners' OHS perceptions and scope for risk management, as well as the particular OHS risks they each face. In order to do so, the chapter focuses on The Cooperative and explores how miners' workplace relations make their days possible.

4. 'Together We Manage': Relations in production and the production of flexibility 'for things to go well'

Despite the fact that miners commonly refer to themselves as *compañeros mineros*, on arriving at The Cooperative one is first confronted with the hierarchy between cooperative members and their labourers. This hierarchy governs mineral production. On a typical day, by 9.30am, most members are sitting and chatting in their huts, surrounding the mineshaft or in Marlene's (the secretary) office, while wagon-pushers are already emptying the second or third wagon from the members' *parajes* to their respective bins. Not surprisingly, most labourers complain of their relationships with members saying that 'they are only the members' mules'. They extract the members' ores while most members chat about football, criticise the leaders of Potosí's civic committee for publicly referring to them as 'capitalist entrepreneurs hidden behind cooperatives', check the amount and quality of the ores that their labourers are accumulating in their bins, and organise production and commercialisation while observing how other members' teams are doing.

The distinction between members and labourers is not only reflected in the miners' particular relations and roles of production, but also in the way members and labourers refer to each other. While members are generally referred to adding a respectful 'Don' in front of their names (i.e. Don Adrián, Doña Francisca), labourers are usually called by their mining nicknames: names that are only known and used by miners in relation to their work. Labourers' nicknames generally refer to their distinct personal features, virtues and attitudes, or to their particular jobs and abilities. *El Flaco* ('the thin one'), *Chasqui* (works as *chasquiri*, with the shovel), *Llama* (has long eyelashes and large teeth), *Mono* ('monkey', has long arms), *Chacal* ('jackal', good ore searcher), and *El Verde* ('the green', always wears a green overall) are examples of the names used both to reinforce the hierarchical roles and status within The Cooperative and to make jokes and play calling games.

Workplace hierarchies are not only present between members and labourers, but also amongst members and amongst labourers. In fact, the deferential use of 'Don' reinforces the age and recognition of the member in the same way that being acknowledged as a miner is earned, not just with the membership status, but rather, through the member's experience (regardless of how economically successful), skills (in finding mineral veins, drilling, handling explosives, and in managing human relations and avoid accidents and conflicts), as well as

through knowledge of the cosmological order of things and through the loyalty and dependency on mining. Consequently, young members like Felico are usually called by their first names by more experienced members, while Felico always refers to the more experienced members using the respectful 'Don'.

Marlene, The Cooperative's secretary, is critical of the relations that some members have with their lead labourers – called 'second-hands' because they act as the second set of hands for the members (see Chapter 3) – and refers to *El Verde* as 'Don Pedrito', and to *El Flaco* as 'Don Richarcito'. In so doing, Marlene stresses their differentiated statuses as second-hands, distinguishing them from the rest of labourers and from the members by adding the Spanish diminutive *-ito* to their names, since they have been permanent labourers in The Cooperative for over 15 years. In fact, as this example of Marlene shows, these naming usages are flexible depending on who refers to whom at what point in time or in which situation. As I explore in this chapter, in the same sense, miners' work relationships are neither fixed nor solely 'shaped by their work roles' or by their 'type of affiliation' to The Cooperative (Sauter et al, 2002; Larkin and Gound, 1999; Eakin and MacEachen, 1998; Holmes et al, 1998; Grundberg, 1983). For example, male members were once labourers and also had nicknames, which other miners may use without causing offense. For instance, Don Román usually refers to Don Adrián as *casca*, his old nickname (meaning bell, from Spanish *cascabel*) that Don Adrián earned for 'being noisy' during the miners' revolts against the privatisation of the mining industry in 1985. Don Adrián and Don Román are in-laws. Similarly, Don Pablo is sometimes called *planchón* ('slab') because of his large size, something he does not like, but which he will accept if coming from a member or labourer he has a working agreement or a good relation with. Likewise, Felico often refers to *Mono* by his name instead of calling him *Mono*. This reflects a relationship, between member and labourer, that is not only determined by their differentiated work roles and statuses (cf. De Neve, 2001). *Mono* is a labourer, but friendship ties with Felico and his brothers give him more privileges than other labourers. Correspondingly, *Mono* refers to Felico without using the respectful 'Don'.

I have explained this naming system to introduce the complexities of workplace relations and labour organisation within The Cooperative. The combination of workplace solidarities, multiple hierarchies and distinctions, and flexible patterns of relationships that these name usages reflect is essential for understanding how miners relate to each other in the workplace and with what effects for how they individually and collectively respond to risks. Analysing

these relations and how they shape the distribution of risks within The Cooperative and miners' perceptions and behaviours towards OHS risks is the objective of this chapter.

With this purpose, this chapter presents an ethnographic account of the negotiations, conflicts and relationships involved in making things go well at the mine, and explores the dynamic and complex system of conditioned solidarities and inequalities that orders the miners' preparedness and responses to risk. I show how miners build solidarities and conflicts as a strategy to respond and cope with risks and uncertainties that affect them individually and collectively. I also demonstrate that these relationships are not fixed, but constantly evolve as the challenges and opportunities that miners find in their personal and work spheres also change. As the miners' particular circumstances change, so do their work relationships, and, as these change, so do the different miners' organisation of production, their ability to respond to risks and the particular risks they each face.

In so doing, this chapter explores how miners' relations and associated work arrangements influence OHS practices within the workplace on the one hand, and the various factors and relations which, from within and beyond the workplace, shape these happenings on the other. This serves to demonstrate that a focus on workplace structures and on OHS risks within the workplace at a given time (ILO, 2011; OSHA-EU, 2011; Mitropoulos and Cupido, 2009; MEDMIN, 2007; WHO, 2002; Swartz, 2001; Cooper, 2000; Grundberg, 1983) is not enough to understand institutional OHSM (see Chapter 1). Instead, the chapter argues that an emphasis is to be placed in understanding workplace arrangements and relations 'in production' (Burawoy, 1985, 1989; Ostrom, 1986), and on the factors and relations that, external and internal to the workplace, determine these happenings in the workplace.

4.1. Welcome to The Cooperative: Foundation, organisation and modes of production

Although the current cooperative mining boom in Bolivia is due to rising commodity prices and to the MAS government's encouragement of cooperatives as a means to tackle the high levels of poverty, inequality and unemployment in the country (see Chapter 6), the creation and rise of Bolivian mining cooperatives has been historically associated with periods of economic crisis (see Chapter 2). The first cooperatives were initially established in Potosí's Cerro Rico in response to widespread unemployment, low wages and high production pressures from private mining entrepreneurs to mine workers resulting from the 1930s great depression in

the USA. Cooperatives offered jobless and injured miners an opportunity to collectively safeguard their labour and subsistence rights, and liberated mine workers from the patronage relations that restricted their options and rights (Absi, 2009). The second spike in the creation of cooperatives relates to a minor drop in tin prices in the 1960s and associated layoffs of COMIBOL's workers in response to diminishing profits. The third corresponds to the 1980s global economic crisis, when falling international mineral prices resulted in the bankruptcy of COMIBOL, the lay-off of thousands of state-miners and significant welfare cuts. Since then, cooperatives have been recognised as equal players in the mining sector alongside private companies – and now, alongside COMIBOL (Mining Code, 1997; Marston, 2013).

The Cooperative finds its roots in this third period. It was created in 1986 by a group of ex-COMIBOL's miners as an alternative means of livelihood for their subsistence (cf. Mogrovejo and Vanhuynegem, 2012; Lima; 2007). After losing their jobs with COMIBOL, migrating to the Cerro, and working a year as labourers, Don Adrián, Don Juan and nine more miners organised themselves and jointly created a new cooperative. According to Don Juan, in this manner they continued eking out a living by doing what they knew, but being 'in control' over their earnings and able to make 'choices' regarding their working time and organisation of production.

The formation of cooperatives is regulated by the 1958 Cooperative Law (LGSC), which establishes the three preliminary requirements: a minimum of ten people aged at least 14, to formally register with the Ministry of Mining, and to affiliate to the regional and national cooperative mining federations (respectively, FEDECOMÍN and FENCOMÍN). These federations act as co-ordinating bodies; they liaise with social and labour issues within and between cooperatives and channel cooperatives' demands and needs to the government³⁰ (Markland, 2012; see Chapter 6 for more discussion on this). Once The Cooperative was constituted and legalised – therefore made liable for non-compliance with existing environmental, labour and OHS legislations – its members could request a concession or piece of land from COMIBOL to rent, and then self-organise production and trade.

³⁰ Although there is a women's representative within FEDECOMÍN, *palliris* and *guardas* are largely disregarded by the Federations and cooperative miners. *Palliris* are also affiliated with the *Asociación de Palliris*, association created and sponsored since 1996 by a local NGO. While the *asociación* builds up a sense of belonging amongst *palliris*, with regards to their work, each *palliri* organises production using her own assets. The *asociación* does not liaise with FEDECOMÍN or the government.

Each mining concession is constituted by one or various fractions of 500m² of land, and a cooperative can request as many concessions as its members think they can afford and handle in accordance with their productive capacity and economic assets, as the main condition for continuity of the lease is that cooperative members continue production at all times (LGSC, 1958; Mining Code, 1997). For cooperatives to retain their concession/s, in addition to 'complying' with applicable labour and environmental legislations (see Chapter 6), members must strictly comply with a yearly rental payment of 300Bs (43.5US\$) per 500m² of land and, nowadays, with a 1% of monthly production earnings to COMIBOL. To control this, COMIBOL demands monthly production reports from cooperatives.

Cooperatives can request a concession in any part of the country where its members wish to work and where they think they can find ores, but the quality and quantity of mineral content in their concessions is always uncertain. Not only there is no mineral exploration made by the government before renting a concession, but cooperatives generally only have access to marginal mineral deposits not exploited by either COMIBOL or private mining companies (Markland, 2012; Michard, 2008; Godoy, 1987). In turn, the uncertainty of miners' earnings – which depend and fluctuate with internationally-dictated mineral prices and with the amount and quality of the ores miners can find in their rented concessions (discussed more below and in Chapter 5) – together with the cooperative miners' low returns of state loans during the 1950s (see Chapter 2) impede cooperatives' access to formal credits from banks. For this reason, the founding members of The Cooperative requested a mineshaft previously operated by COMIBOL after visiting the mine and seeing that it still had minerals and, as Don Juan said, they 'then hoped for large amounts of these'. In so doing, they also benefitted from the infrastructures and extractive materials that COMIBOL was unable to sell and had abandoned with the mine.

According to Don Adrián and Don Juan, The Cooperative's founding members initially worked together, pooling resources and dividing gains, centralising mineral extraction and trade. However, conflicts over the different assets members were able to bring in and over the redistribution of earnings resulted, in 1987, in the members decentralising production, as do all other cooperatives in the Cerro. They divided the concession in individual work-areas or *parajes*, and then members individually or in groups, independently organise production in accordance with their personal relationships and their individual or collective assets. Thus, several technological levels coexist in The Cooperative, and different modes of organising production and labour are simultaneously operating at any given time.

Members create their own *parajes* by opening tunnels and following a mineral vein or by looking for the veins, and each can have as many *parajes* as they can handle. The rights of exploitation of a *paraje* belong to the member who first discovered and exploited it, assuming he or she has the means to do so. If the member does not have these means, he or she may forge an agreement with other members or investors in exchange for shares in the profit or the payment of one-off or recurring returns (cf. Grätz, 2009).

As some members' individual earnings grew, they started hiring labourers, both to increase profits and to secure continued production by increasing their chances of finding ores. With this, members also decentralised the previously centralised trade, as well as the contributions to Social Security and retirement (respectively, 1.8% and 13% of earnings), and their payments to the federations (1%). They also started to individually pay 10% of their gross earnings to The Cooperative,³¹ from which The Cooperative would pay to COMIBOL, and each member would then individually decide and organise his or her Social Security contributions. To ensure that members' contributions are truthful, The Cooperative demands that they provide monthly 'Certificates of Contribution' (proof of the ores they have sold). These certificates, issued by mineral buyers, specify the payments received by a member (see Chapter 5).

According to the LGSC (1958), which 'orders' also the internal organisation of cooperatives (Michard, 2008, see below), all members have the same rights and obligations, and decisions are made following the principle of 'participative democratic control' (cf. Chavez, 2003: 11), with each member having the same voting rights. The main formal decisional body is the Assembly or meeting in which all members gather, and which takes place every 3-4 months, as well as when specific conflicts or problems arise. Members' participation in assembly and in cooperative decision-making processes is not voluntary; rather, non-attendance is subject to fines (100Bs, or 14.5US\$) and can lead to expulsion.³² Decisions agreed in assembly are recorded in the Cooperative's statutes, and must be implemented by the elected leaders. In The Cooperative, leaders are elected onto a board of directors which consists of a president

³¹ This ranges among cooperatives (according to management costs) and is usually between 5 and 25% in the Cerro.

³² Members may be expelled for diverse reasons: conflictual social relationships, aggressive and selfish behaviour, being untruthful with their contributions to The Cooperative, failure to produce ores and repeatedly failing to participate in cooperative decisions and social meetings (unless justified by disease, injury, or exclusion). The president will usually issue a first warning (verbal), then a second and third (written) and, thereafter, members will vote in assembly.

and vice-president (who liaise with internal issues and with FEDECOMÍN), a treasurer (who controls payments and the members' contributions to The Cooperative), an OHS representative and a Social Committee representative in charge of social events.

There are 31 cooperatives operating in the Cerro, and the number of members varies from ten in the smallest to 1500 in the largest. The number of labourers employed by members also varies greatly within and amongst workgroups, from none to over 150. The Cooperative is considered a medium-size cooperative in the Cerro, with 35 members and about 120 labourers at its peak.

Figure 4.1. The Cooperative



4.2. Hierarchy, authority and risk management decision-making

On 25 June 2010, members exercised their right and obligation to take part in the 'participative democratic management'³³ of The Cooperative through the election of the new board of directors. Such elections take place every couple of years to rotate the managerial roles amongst members with no outstanding debts. A new president (Don Juan), vice-president (Rafael), and treasurer (Felico), as well as ombudsmen for the safety (Don Román) and social (Don Pablo) committees were elected after seven hours of candidates' presentations, deliberations, votes, and finally consensual agreement. As stipulated by the statutes of The Cooperative and by the Cooperative Law (LGSC, 1958) this is a process in which only members' voices are acknowledged and accepted.

While The Cooperative's members were gathered in assembly, most labourers were working, and only two second-hands, *El Flaco* and *El Ruso*, were waiting outside Marlene's office to hear the results. As explained above, second-hands are labourers who, for their skills, experience, loyalty to a cooperative or member and lack of involvement in conflicts, have earned their promotion from labourers to managing both production and other labourers on behalf of one or more members who do not enter the mine. In exchange, the second-hands share the costs and benefits of production with the member/s who employ them, and may have a chance of becoming cooperative members in the future, mainly if a member dies, retires, or if the cooperative decides to rent a new concession from COMIBOL.³⁴

I asked the second-hands present why other second-hands had not come to hear the results. They replied that, with the changes in the board and with the members meeting together, it

³³ Bolivians call this mode of institutional governance *funcionamiento orgánico* (organic functioning), according to which institutions must be managed from their bases upwards, and decisions within institutions (and among them, namely, within FEDECOMÍN and FENCOMÍN) must be agreed by deliberative consensus. In practice, it results in candidates presenting programs that are not closed, but open to discussion with voters and other candidates in consecutive meetings. The consensus arrives when all conflictive points have been agreed and modified to meet the concerns of all members. Once the modifications are agreed, the final program is voted upon and, to be moved forward, it needs a two-thirds majority. Otherwise, the discussions will be re-opened.

³⁴ Second-hands have a higher status than other labourers; they enjoy higher job security, can hire and fire labourers, and their earnings depend on production rather than on a weekly or daily wage. Yet, second-hands are considered to be labourers in relation to all cooperative decision matters and thus, have no decision-making voice (although they do have some in the members' *parajes*). If a cooperative has enough mineralised areas available to be exploited, it may be proposed, or a second-hand may request, becoming a member. This will be voted upon in assembly by the members. While second-hands have certain autonomy in the decision-making in the mine, their situation is entirely dependent on the members' decisions and needs.

could happen that some members would establish new working alliances and would no longer need a second-hand, but that not all second-hands were at risk of losing their jobs. 'Some second-hands' jobs are secured through godfathering and camaraderie ties that unite them to members', they said (see below).

Their response reminded me of Marlene's nervousness minutes before the electoral assembly, when she confessed that, depending on who was elected as the next president, working relations could change a great deal. 'Nothing is set, even my own job, I rather not get my hopes up and expect the worse', she told me just before asking me to take a picture of her posing with the figure of the *Tatakachu*. She wanted to have the picture taken as a remembrance of her four years with The Cooperative, in case things did not work well for her. 'Why would you lose the job?' I asked her thinking that her status as a formal employee gave her entitlements different to those of informally contracted labourers (cf. Kantor et al, 2006; Lund and Marriot, 2005). 'Not all members are the same', she said, 'some want things to be done their way, and want people they trust to work with them'.

After talking to Marlene and to the second-hands, it struck me that no other labourers seemed curious or concerned about the election results. In fact, although Marlene had previously advertised the meeting, most labourers did not even know about it, or why (or if) the members had congregated. Only three labourers, *Mono* and Don Pablo's sons (subcontracted by Felico and Don Pablo, who through friendship and family ties granted them the privileges³⁵ of being members within the *Malditos*' and Don Pablo's groups) were following the outcome of the meeting. *Mono* stressed the lack of repercussions of the elections for labourers:

'This [the assembly] only affects members... and perhaps sometimes second-hands because they can lose their job... or be proposed as new members but, for us [the rest of the labourers], everything will remain the same... Don't you see? We're paid to get the job done; this is all they [members] expect of us. If they make changes and we don't like it... too bad for us; we're free to leave'.

This statement not only indicates labourers' detachment from members' and cooperatives' decision-making processes, but also *Mono*'s conviction that a change in the running of the cooperative would not affect most labourers. It further illustrates labourers' embodiment of

³⁵ These entitlements vary, but usually involve greater job security, either higher wages or a stake in the overall production, being assigned to less risky jobs or areas, and the responsibility of managing other labourers.

their marginalisation from cooperative decision-making, and the role of this marginalisation in reinforcing their position at the bottom of the pile. Members do not feel the need to explain to labourers what is going on in The Cooperative, and they do not encourage labourers' involvement in cooperative matters. Since labourers, as Felico says, 'have no responsibilities other than getting the job done and they're paid to do so', it does not matter, from a cooperative member point of view, who they are, unless they have some sort of affiliation, through friendship, camaraderie or godfathering, to the members. In these cases, as illustrated above by the second-hands, should changes in the running of The Cooperative mean a member no longer needs a second-hand, this will not imperil their jobs, as the second-hands will remain as labourers with greater privileges within their relative's or friend's *parajes*.

As the end of the assembly arrived with the election of the new leaders and with the members arriving at a consensus on what was demanded and expected from the new board, the members opened Marlene's door announcing the outcome of the voting and inviting the waiting second-hands and labourers to join the celebration of the new board with the traditional *ch'alla*.

The meeting had been conducted in the presence of the *Tatakachu*, who had repeatedly been offered coca, for whom candles had been lit throughout the electoral and decisional processes, and who was now being offered individual *ch'allas* by members and labourers. This celebratory *ch'alla* at the end of the meeting was also dedicated to the *Pachamama*. It was conducted not only as a symbol of closure of the elections and of the members' resolutions, but also, and perhaps more importantly, as a sign of the miners' acknowledgement of their interdependency with these deities and of the importance of their mutual collaboration 'for things to go well'. By sharing the election and celebration with second-hands and labourers and with the *Tatakachu* and the *Pachamama*, members request, and expect, that the deities' will reciprocate their offering by protecting the outcomes of the meeting, for the common good of The Cooperative. For this reason, and although only members have decision-making power and even though most labourers are not interested in the election outcome, they too can join the celebration, symbolising the harmony of inequalities and reciprocities amongst miners and between miners and deities without which, according to Andean traditional values, things cannot go well (Estermann, 2009). For labourers, in turn, participating in the *ch'alla* is both a chance to mingle with members and to socialise and build personal relationships (which can help their job security and being allocated in less risky jobs), and an opportunity to offer their respect to the deities. The ritual thus reinforces both the miners' sense of group

solidarity and of mutual reliance and the distinctions between members and labourers, since through financing the ritual the members become the cosmological guarantors of the safety and prosperity of labourers (Absi, 2009).

As I entered Marlene's office and joined the members,³⁶ I saw *las viudas* (the widows). Cristina, Anabel, Prima and María were the widows of members who had died a year ago in two separate gas accidents. They had all participated in the election, and had supported Don Cirilo's presidential candidacy (Cristina's father, leader of one of the most productive groups at the time). After their husbands had died, these widows had decided to continue, not according to tradition as *palliris* (see Chapter 3), but as 'contractors' continuing their husband's work (see Table 1.2). They rarely entered the mine, and had instead, together, employed a second-hand to manage the production of their shared *paraje*.³⁷ As members, it was their obligation, and in their interest, to participate in the assembly. However, Doña Teresa (73), the only *palliri* of The Cooperative and the fifth female member, wasn't there. I asked her why she did not participate when I saw her scrapping mineralised rocks from under a buyer's truck few days later. 'It's useless to attend to these meetings', she said:

'They [members] are worried about their own things, their work is different [from mine] and they won't listen to me as I work outside... what I do they don't consider work... and my contributions are small... no, they don't care about us [*palliris*]... it would have been a waste of time... anyway... I wasn't even invited, I didn't even know...'

Interestingly, Doña Teresa was the only member of The Cooperative relieved from paying the 100Bs (14.5US\$) fine for not attending the meeting. Since she is the only member working outside the mine, it was generally understood that the matters discussed in assembly would not be of interest to her. Thus, despite being a member, she has no voice within The Cooperative.

³⁶ I could have been in the meeting, but Marlene told me that some members (who I had never seen) would not like it and my presence might cause tensions and suspicions among members, so I decided to wait outside.

³⁷ Their second-hand keeps 60% of production earnings (from which he pays the labourers' wages), and the four widows share the remaining 40%. The widows do not equally divide their 40%. Cristina keeps a largest percentage (20%) because she provides drills and controls the sale of the ore with the help of her father. This also means Cristina is the member with the most voice and decision-making power within the widows' group.

The celebration started with Don Adrián's emotive speech at the end of his mandate as OHS ombudsman, which he concluded saying: 'Comrades, I'm only asking you to be honest with each other and not to play double games'. This was followed by Don Juan's speech as the new incoming president:

'Comrades... each of us know what primary tasks we must do in this institution. In this instant I call for cooperation in this arduous job, starting from the presidency and ending with the *guarda*. We are all aware, comrades, that for a long time we've neglected our own lives, and I'm calling for collaboration in our jobs... only with everyone's help we can all move forward... I urge the cooperation of all for all... and I'll serve you all'.

During the celebration, I could ask members what issues were discussed and agreed and the reasons for their decisions. Don Román explained me that the election starts with the presentation of the settlement of accounts by the previous board. In two years of rising mineral prices, The Cooperative had accumulated a surplus of 6000Bs (868US\$). Half of this was due to members' contributions, and the rest came from the entry of two new members to The Cooperative³⁸ and from tourist agencies' payments.³⁹ They had already deducted Marlene's and the directors' salaries⁴⁰ and the materials for the maintenance of the common areas (see below). According to the Cooperative Law, this surplus is meant to go to the cooperative's Social Fund, which is supposed to be used for purchasing extractive technologies, implementing safety measures, and compensating miners or their relatives after accidents (LGSC, 1958). However, in practice, due to the uncertainty of members' earnings (see below and Chapter 5), and to avoid issues of corruption (cf. Argandoña-Calderón, 1978), members normally divide the surplus among themselves according to their individual contributions to the cooperative at the end of each mandate. On this occasion, and since mineral prices were good, they decided to use this money to invest in the renewal of the rail system, in maintaining the main passage of the mine, and in enlarging The Cooperative's

³⁸ The entry fee for The Cooperative is 300US\$, but this fee changes over time, depending on the mineral contents and prices and on who enters. In the largest cooperative in the Cerro, the entry fee is 1000US\$.

³⁹ The Cooperative receives 2Bs (0.3US\$) per tourist (1Bs if students, or 0.15US\$), whilst tourists pay 50-110Bs (between 7 and 14US\$) for visiting the mine and the guides receive 60-100Bs per visit (8-14US\$). This means that The Cooperative received about 2,000 tourists in two years. During my stay, I calculated an average of 14 tourists per day, including weekends. The rest of the tourists' money is held by tourism agencies and operators.

⁴⁰ The Cooperative pays 1000Bs/month (or 145US\$) to the president, 700Bs/month (100US\$) to the secretary, 600Bs/month (87US\$) to the treasurer and to the vice-president, 350Bs/month (or 50US\$) to the vigilance committee representative and 200Bs/month (29US\$) to the representative of the social committee.

headquarters, taking advantage of the fact that CEPROMÍN was building a new house for the guard.

During the meeting, Don Adrián had proposed investing the surplus in renewing and maintaining the COMIBOL's old water pipes, thus enabling the miners to drill with water, and so to control dust and prevent lung problems (Chen et al, 2001; NIOSH, 1992). His proposal had however been widely rejected because 'drilling with water takes longer than dry-drilling', because this 'requires labourers to learn new drilling techniques', because of 'the economic investment required for the pipe system', because 'wet-drilling increases the risk of unsynchronised dynamite explosions' (see Chapter 3 and Annex 4), and because this would also require individual members, who had already voiced their intention to continue with dry-drilling, to invest in water pipes for their *parajes*.

On the other hand, Don Cirilo had suggested the need for renewing the rail system. Unlike Don Adrián's, his proposal had been very well received, since most members had realised that it had become increasingly hard for labourers to handle the wagons, as the wooden rails had been eroded by use and the *copagira*. Members approved the renewal of the rail system for two main reasons. First, various members had found that many labourers, upon seeing the condition of the rail system, demanded higher wages. Secondly, members agreed that with a better rail system, labourers would be able to work faster and would get less tired; so more labourers would be able to work a double shift, which in turn would increase both labourers' and members' earnings. 'If we renew the rails, for the same wages we are paying now, they can work more', said Don Cirilo.

In this statement, Don Cirilo was proposing improving labourers' working conditions as a strategy to reduce production costs, to maximise economic performance, and to reduce members' risk of having to compensate labourers for occupational injuries (cf. Shinn, 2011). At this point, Don Pablo clarified that this was not entirely true since, as reflected in The Cooperative's statutes, when an accident occurs in the main passage, the responsibility for compensation rests on The Cooperative. 'That's what the Social Fund is for!' he said. To this, Felico (who had just been appointed as the new treasurer) replied that 'it's always the member's responsibility what happens to his or her labourers, despite the fact that The Cooperative may be able to help the member in certain circumstances' (that are not set and mainly depend on the economic and political power of the member within the cooperative).

This debate led the members to discuss the need to organise a *laboreo* (roughly translated as day of communal work) to maintain the main passage in order to avoid accidents. Don Román had noted that the roof of the main passage was descending because of the work that other cooperatives were conducting both above and below The Cooperative's concession. He had called for the need to reinforce and support the rooftop to avoid collapses 'which not only can injure someone, but might also block the access to the *parajes*'. Don Pablo added that he had noticed some loose rocks in the roof, pointing out the need to either secure them with wooden beams or remove them by blasting the roof. Cristina had also suggested the need to replace the cables that supply electricity to the *parajes*, since she had observed that 'the *copagira* had eaten some cables leaving bare wires in the open'. While members agreed on the immediate need to secure the roof and renew the railing in the main passage, they decided not to replace the electric wires, 'since not all members use electricity in their *parajes*'. 'It's each member's responsibility to ensure that electricity arrives to their *parajes*, should they need it', said Don Juan. It was then decided that, as per The Cooperative's statutes, the cooperative would supply the material needed for the maintenance job at the main passage, and members would be in charge of organising and doing the required work, dividing the main passage in 35 equal areas of work, one for each member of The Cooperative.

The Cooperative's labourers are aware that they often face most of the OHS risks, and that their lack of decision-making power imperils their safety (see also OSHA-EU, 2012; ILOCIS, 2012; HSE, 2010; Gunningham, 2008). However, as illustrated with the labourer *Mono*'s comment above, they have come to understand their OHS risks and lack of voice both as a normal part of the job and as a strategy to keep their jobs (see below and Chapter 6). Contrariwise, having a higher status than most labourers and being responsible for managing production, not all second-hands tolerate this marginalisation. Their tolerance depends on the particular relationships that they have established with the member/s who employ them. Second-hands with good relationships with their members are better able to withstand their lack of voice within The Cooperative, precisely because they have a greater decision-making power within their particular members' *parajes*.

As members were explaining, and somehow reproducing, the debates they had had during their meeting, *El Flaco* suddenly stood up and cried: 'second-hands also have rights!' capturing everyone's attention. A member called Laurio told *El Flaco* to 'shut up and leave the room, as this celebration is only for members'. This was something the rest of the members did not approve of, but they did not interfere – *El Flaco* was Laurio's second-hand. Don Pablo kindly

put his arm on *El Flaco's* shoulders, offering him another glass of beer and recommending him not to bring up conflicts when drunk, but rather to wait to talk to his member on another occasion. 'We've all been in your position', he told him, 'be patient, and this is not the place or way to sort things as you'll only make it worse'.

As *El Flaco* continued trying to make his voice being heard, Laurio stood up verbally threatening him and brusquely forcing him out of the office. Felico restrained him, and Don Román told the member that he was wrong to treat the second-hand in such a way, while other members and labourers simply kept observing, as did I. Don Juan finally intervened, reminding Laurio that 'in here we're all comrades and the door and the celebration is open to anyone that wishes to join', asking the member to keep the problems of his workgroup within his workgroup and to treat the second-hand with respect; ending in this way the uncomfortable situation. As the celebration and the drinking continued, *El Flaco* fell asleep in a corner of the office.

Renewing the rail system, organising a *laboreo* to 'secure' the main passage and enlarging The Cooperative's office constituted the three main tasks Don Juan was to achieve within a period of three months. But these were not the only requests made by the members. The fourth task, supported unanimously, was to conduct a *q'oa* (or offering to the Pachamama, see Annexes 1 and 2) to formally celebrate the newly-elected board. This request was associated with the deaths of four miners during the previous administration, which members attributed to the previous president's failure to conduct a *q'oa* after his election. Other issues were also pointed out as important, and Don Juan declared that he would do his best to respond to his comrades' concerns. These included: looking for new concessions 'as the *parajes* are increasingly being exhausted, there is no room for more members, and the existing members are finding themselves with increasingly reduced options for continued exploitation'; and looking for agreements with buyers that would pay a fair price for their minerals (see Chapter 5). As I further describe in the following chapters, members conceptualise the depletion of the mineral veins and their disadvantageous relations with buyers as 'occupational risks', since these affect their production, the security of their livelihood and earnings, and their own assets to further manage production and its associated risks. I asked various members how they decided who to vote for and how they prioritised risks and why. They all gave me the same answer: 'I don't vote for the candidate's programme, I vote for my own interest' (see below), and 'The Cooperative is only to manage the issues that affect us all... then each one of us is to deal with our own problems within our own *parajes*'.

The above discussion has focused on The Cooperative's collective approach to risks and how decisions get made and who is excluded. The following section examines how members deal with risks and uncertainties that affect them individually and how this, in turn, affects their OHS and that of other miners.

4.3. The production of flexibility and the management of risks

As described in Chapter 3, Felico's streak of bad luck, considered by many miners as a punishment from the *Tío* 'for not complying with his promises' (or his part of the 'pact'), had only started when the dynamite cartridge had failed to explode. The following week, the *Malditos* lost their best *paraje* after it merged with the *paraje* of a group of miners of the neighbouring cooperative following an explosion. As I explain in more detail in Chapter 6, as miners advance the tunnels (often beyond their concessions), it is common that neighbouring *parajes* (belonging to the same or to different cooperatives) combine after drilling, collapsing or after explosions. When this happens, the problem of who keeps the vein and the *paraje* is normally solved by racing to claim the space. The first group or member to reach the mineral vein becomes the new owner of the converged area and its minerals. Felico lost the race, and with it, his access to his best ores and most of his investments.

Then, after three weeks of blockages and strikes in Potosí during August 2010 (see Chapter 1), when Felico returned to the mine, he sadly realised that his lower *paraje* had fully collapsed, impeding the access to his only remaining mineral vein. Having already lost his investments, becoming indebted with his buyer and with his subcontracted workers, and without the technology that the buyer took back from Felico as he was unable to continue the agreed production (see Chapter 5), Felico found himself without having clear options for further mineral extraction. He could not clear the collapsed area because he would be unable to sustain his family or afford labourers if his mineral production (and thus earnings) was nil.

With these events, Felico's situation changed from being the leader of one of the most successful groups in The Cooperative to having to depend on other members' solidarity, goodwill and patience for his continued membership since, as explained above, failure to continuously extract ores imperils the members' permanence within cooperatives, as failure to produce risks The Cooperative losing the concession rented from the state (see also Chapter 6). Felico's bad luck not only affected his own production and assets, but also those of his

labourers (who lost their jobs and were not paid for their last working days), as well as other cooperative members with whom Felico had reciprocal agreements, alliances and exchanges, and The Cooperative as a whole, as it greatly relied on the *Malditos'* contributions to renew the rail system.

Felico initially considered looking for a new mine outside the Cerro and starting from zero in another place with his brothers Claudio and Lucho. But this was not possible because 'I'd have to move my family' and because 'opening a new mine from scratch requires an investment I cannot afford'.

Looking for options to help Felico and his brothers, Don Juan came to know of a member of another cooperative that due to illness was not exploiting his *paraje*, and initiated negotiations for this member to informally allow the *Malditos* to manage the production of this *paraje* in exchange for a stake in the profits. The following day, we went with Don Juan and Felico to explore the possibilities of this *paraje*. The mine was located in Caracoles, the middle part of the Cerro where neither water nor electricity is supplied. Once inside the mine, we realised that there were neither rails nor ventilation pipes (or holes). We found the *paraje* by following a map drawn by its owner. The Cooperative's members explored the area: the strength of the rock, existence of natural ventilation, and the location of the thin but multiple mineral veins. The members were thrilled as they found different minerals in the *paraje*,⁴¹ and started talking about making a 'joint-venture' (from Spanish *riesgo compartido* or 'shared risk') to co-manage production. We collected samples of the minerals to be analysed in a laboratory, so that Felico could know its quality and hoped for the existence of large quantities of mineral in the *paraje*.

Despite its promise, Felico did not go through with this agreement for the *paraje* for four reasons. First, the laboratory analysis indicated that the mineral was not 'good enough'⁴² so the

⁴¹ The Cerro is a multi-mineral site, and members may find only one or several minerals in their *parajes*. For commercialisation purposes, it is best to have a large vein of a single mineral, but having different veins with different minerals is well received. Although it requires more work for exploitation, it also means that miners will be able to alternate exploitation of the different minerals according to separate international prices, selling the mineral with higher prices while keeping the other (if possible) for when their prices rise (see Chapter 5).

⁴² When the quality of the mineral is low, miners have problems selling it to buyers, who say that processing costs more because of the lower percentage of mineral in the extracted rocks, the resulting poor quality of mineral after being processed, and the fact that these low quality mineral deposits are seldom pure and tend to be mixed with other minerals. Members have different strategies to deal with this. For example, when the quality is low, Don Adrián mixes it with mineral of higher quality until he finds a buyer that will buy (see Chapter 5).

costs of production were not justified. Secondly, the member from the other cooperative requested a 40% share of profits, something Felico found excessive. The member was not going to work nor invest in the production and, consequently, and since cooperative miners do not have access to formal loans and credits, Felico would have to either work manually or enter into another 'shared risk'⁴³ agreement with a buyer or another member to be able to pay for a petrol-fuelled air compressor and a drill. 'The investor will also demand another cut in the production... no, the numbers won't work', he told me. Third, Felico had already sold his van to be able to repay some of his debts, so it would take him and his brothers too long to travel to the mineshaft each day, as there were no bus services (or road) to the upper parts of the Cerro. Finally, given the low quality and uncertain mineral content in this *paraje*, Felico was unable to obtain an advance payment from a mineral buyer with which to initiate mineral extraction. Don Juan did offer Felico drills and some labourers 'to help him start', but Felico was reluctant to accept the 'offer', as with these partnerships, members do not equally share earnings, but split earnings according to the specific assets they each can provide. Since Don Juan would 'provide' the *paraje*, drills and labourers, the *Malditos* would only contribute their physical strength and managing labourers, ultimately informally becoming 'labourers' working for Don Juan with this alliance (see below and Chapter 5).

Felico decided to continue looking for other, 'less risky', options. The following week, Don Juan informed Felico of the possibility of working in Cotavi, a silver mining site a few miles from Potosí that is exploited by private companies. Don Juan knew of a private mining entrepreneur who was open to forming joint ventures with cooperative members by renting a part of his mine and extractive technologies in exchange for a share in the production (see Chapter 6). As the *Malditos* refused this opportunity to avoid moving their families, Don Juan took the offer himself, sending his labourers and *El Verde* (who reluctantly accepted the transfer as strategy to keep his job and his position) to work there and hiring a small team of labourers (most of whom, like *Mono*, had been Felico's previous labourers) to continue minimum production of his *paraje* at The Cooperative's mineshaft. With this, Don Juan secured his mineral production and earnings whilst slowing down the depletion of his own *paraje*.

⁴³ A shared risk means that an investor lends a mine, extractive material, technology or money in advance, allowing the member to get started and to hire labourers while expecting a share in the production and, if the investor is a mineral buyer, the miner's obligation to sell the mineral exclusively to him.

The *Malditos* decided instead to continue looking for options within The Cooperative, either looking for a new *paraje* (thereby returning to the manual work they started with, see Chapter 3), through establishing new alliances with members, or trying to open a parallel tunnel to reach the collapsed area. Unable to sustain his family if mineral production was nil, Felico asked Don Adrián to ‘form a society’, since Don Adrián was working manually and alone in his two *parajes*. The relations between these two members were tense since Felico had previously tried to expel Don Adrián from The Cooperative because of his low contributions to it as a result of being a lone manual worker. Despite their past conflicts, Don Adrián accepted a partnership with the *Malditos*. This was not an act of solidarity, as Don Adrián resented Felico’s haughtiness when his production was high and he did not care about the *Malditos*’ fate, as he considered it to be the work of the *Pachamama* in return for Felico’s actions. Rather, because this alliance would increase his income, Don Adrián accepted a trial.

For a month, Don Adrián and the *Malditos* worked together as a single group, dividing gains, respectively, 60%-40%. Claudio and Don Adrián did the mechanical drilling and the explosions, and, since Don Adrián refused doing the heaviest work as well as the riskiest (drilling) and Felico’s mandate as treasurer did not allow him to spend too much time in the mine, Claudio, Lucho, *Chacal* and *Huayta* worked as wagon-pushers and *chasquiris* (shovelling and lading the wagons).

This alliance changed the miners’ previous productive roles, the way decisions had been taken within each group, the group dynamics, and the miners’ means and modes of production and organisation of labour. It also changed the decision-making power of the different miners within the group and the risks they each faced. While Felico and Don Adrián used to be the main decision-makers within their separate groups, with this new alliance, decisions were negotiated between them. In addition, Lucho and Claudio lost their previous decision-making power, since Don Adrián had very clear ideas of what was needed in his *paraje*, including the location of the mineral veins and how to reach them while minimising the OHS risks for the group, and they were not in position to contradict him. *Chacal* and *Huayta* simply accepted their new designations, which shifted them from managing labourers, to being managed labourers. With the new alliance, they came to face more OHS risks than before and simultaneously saw their decision-making power and earnings decreased: ‘that’s what the mine is like; either you take it or... then what else do you do?’ *Huayta* said.

Since Felico and Don Adrián did not agree on how best to sell the mineral, they decided to divide production before commercialising it, and then Don Adrián could organise his trusted buyers to collect his mineral while Felico had his compulsory buyer, as he had to pay his debt and the drills.

Each day, the *Malditos* worked from 9am to 4pm with Don Adrián and again from 8pm to 2am clearing their old *paraje*. However, the alliance did not last long, as when Felico demanded a larger share of the mineral 'because we're five and we provided the drills, he's making money because of us', Don Adrián broke the agreement 'because it's my *paraje* and my mineral vein'. With this, Felico lost again the access to minerals and his technology, which was borrowed from his buyer.

Felico then asked Cristina (as head of the widows' group) to fire their second-hand and labourers and to go into an alliance or partnership with the *Malditos*. While Cristina (who had previously individually agreed a joint-venture with the *Malditos* for exploiting their lower *paraje*) wished to accept his proposal, María, Prima and Anabel refused it. This made the alliance between the two groups impossible. According to María, the widows did not trust Cristina, and they were afraid that, in partnering with Felico, the two 'more powerful members' of the potential new group would end up pushing out the other three widows, who were contributing neither technology nor social assets and who had no support from Don Cirilo, Cristina's father and The Cooperative's most productive and powerful member. In refusing the alliance, the widows felt that they were securing their 20% share of their *paraje*'s production instead of risking losing it all 'just for wanting more'. As María said, 'I've my children to think of and, still, 20% divided into three is better than the earnings and life as *palliri*'.

Finally, Don Pablo offered the *Malditos* an opportunity to work with him in his *paraje*. Don Pablo had met Felico years ago when he was a member of the La Salvadora cooperative and Felico was his labourer (see Chapter 3). When Don Pablo's *paraje* had been depleted, he was expelled from La Salvadora after months of being unable to produce mineral. Felico was already a member of The Cooperative when this happened, and he had helped Don Pablo become a member too, preventing in this manner Don Pablo from becoming a labourer. Don Pablo considered the *Malditos* to be 'good boys' who had been 'unlucky' and deserved a second chance. For him, helping them was both an act of solidarity with someone who 'deserves to be helped' (see Chapter 6), and a way to reciprocate and 'return the favour'.

They celebrated their alliance by making a *ch'alla* in Don Pablo's hut and inside his *paraje* to share with the deities for the alliance to go well. They had not done this with Don Adrián, as the *Malditos'* personal relationships with Don Adrián were not as good as the relationships they had with Don Pablo, and miners are reluctant to be untruthful with the deities, since they fear they may be punished for being dishonest with the deities just to find ores. In addition, while the *Malditos* had wanted to make a *ch'alla* to the *Tío* for him to help them find ores, Don Adrián had said that things had worked well for him with the *Tatakachu*, and was unwilling to challenge or disappoint 'his' deity.

The *Malditos* and Don Pablo worked together, in a group without labourers other than Don Pablo's sons and Felico's loyal mates *Chacal* and *Huayta* (who were not considered labourers by either member), pooling resources and sharing the gains equally between the two groups (and within them). All miners alternated drill-work with efforts as *chasquiris* and wagon-pushers as a collective OHSMS, and decided to jointly sell the ores to a member of La Salvadora cooperative whom they all knew and who had started buying mineral and selling it to larger buyers as a livelihood diversification strategy (see Chapter 5). Two months later, during which time the *Malditos* had worked day-shifts with Don Pablo and night-shifts clearing their own *paraje* while also hiring three labourers to clear their *paraje* during the days, the *Malditos* regained their autonomy, dissolved the partnership with Don Pablo and started working, this time without labourers, their own *paraje*.

4.4. Workplace relations and OHS

Felico's story shows the importance of flexibility in miners' everyday work practices and relations. Activated both as response to and as strategy to cope with concerns, risks and uncertainties that affect miners individually and collectively, the 'production of flexibility' (cf. Prentice, 2007) is neatly enmeshed within the miners' daily work. It continually transforms the work-related and OHS risks presented to the miners and their ability to respond, and gives shape to constantly changing configurations of power (cf. Gaventa, 2005). As a result, the organisation of labour and production in The Cooperative is neither fixed nor static, but rather a dynamic process of configurations and reconfigurations, solidarities and discords that continuously order and re-order the risks presented to the miners and their preparedness and response. At any given time one can find many coexisting modes of organising labour and production within The Cooperative (Absi, 2009; MEDMIN, 2007), as well as various miners

simultaneously working in different groups that differently frame the risks presented to them, their decision-making power and ability to respond. This is not only determined by the particular work processes and distribution of tasks within each group (cf. OHSA-EU, 2011; Antonsen, 2009) or by the miners' 'risk awareness' (cf. Lesego-Herr, 2007; Fonteyn et al, 1997), but also by the particular group dynamics established within each group (cf. Kramer and Cook, 2004; Eakin and MacEachen, 1998; Greenberger et al, 1987), by the existence of social ties, the miners' gathered assets and subsequent modes and means of production (cf. Feyer and Williamson, 2004; Swartz, 2001), and by the particular assets that each miner brings to each group.

Labour and OHS research on workplace flexibility stresses the adverse effects that organisational restructuring resulting from market changes and trade competitions has on workers' safety, health and wellbeing (EUROFOUND, 2013; Rodgers, 2007; Robinson and Smallman, 2006; Landsbergis, 2003). This literature relates changes in workplace arrangements to increased workload (Sauter et al, 2002), OHS risks exposure (WORKSAFE, 2005), stress related to uncertainty (Benach et al, 2010; Quinlan, 2007, Rodgers, 2007) and OHS disparities (Landbergis et al, 2012). Research in this area also indicates the negative psychological and physical outcomes of workplace flexibility in terms of role ambiguity (ILOUIS, 2012; Jackson and Schuler, 1985) and of the higher levels of injury associated to multi-skilling (Robinson and Smallman, 2006).

My research however indicates a more complex scenario, in which workplace reorganisation is not only articulated as a response to the impacts of market or trade changes on the workplace as a whole (see Chapter 5). It is also the result of how the different miners build solidarities and conflicts as a strategy to fulfil their personal motivations for mining and to cope and respond to concerns, risks and uncertainties that affect them individually or collectively not only within the workplace, but also in their personal lives (i.e sickness or increased household needs). In addition, the effects of these flexible work arrangements on the miners' OHS are mixed, since, as illustrated with Felico's temporary alliance with Don Pablo, these flexible practices can occasionally benefit some miners' exposure to OHS risks and ability to respond, but this is not uniform and many other miners benefit far less.

Indeed, this institutionalised flexibility (Gereffi and Korzeniewicz, 1994) hampers OHS in that it impedes the miners' ability for longer term planning necessary for OHSM (cf. WORKSAFE, 2005; Royal Society, 1992). It compels miners to live in the present to the detriment of an

uncertain future and thus, to react rather than plan (cf. Phakathi, 2002), and this, in turn, ultimately shapes most miners' OHS risk tolerance (cf. Grätz, 2003). However, in this context of overlapping economic, social and geological (Godoy, 1987) pressures, risks and uncertainties that the miners are unable to control, setting up a robust economic activity is extremely difficult, and requires flexibility and the ability to adapt to quickly shifting situations (cf. Sullivan-Taylor and Branicki, 2011; Weick and Sutcliffe, 2007; Rodgers, 2007; Sheffi, 2005; Lazar, 2004; Grätz, 2003).

Members thus build resilience through becoming flexible economic and social actors (cf. Prentice, 2012), through institutionalising flexibility, and by building solidarities and conflicts and making 'shared risk' agreements with members of The Cooperative, with members of other cooperatives and with private entrepreneurs. They also build resilience through employing labourers, through accepting some risks upon themselves and transferring others to other members and labourers, and through reinforcing inequalities and distinctions whilst simultaneously fomenting a sense of solidarity and group belonging that is necessary for things to go well.

Social relations become the members' most reliable asset, and thereby a risk management tool. Within The Cooperative, helping each other is frequent, essential, considered appropriate and encouraged. But members also compete for the access to the minerals, and often, workplace solidarities become a strategy through which empowered members secure access to ores, a share of other members' earnings and political support in Assembly. This is reflected in Don Juan's 'offer' to Felico (see above), in Don Román's confirmation that he does not vote for a candidate's programme but for his own interests, and in Don Adrián's request for the members 'not to play double games'.

In fact, for many members, these 'double games' mean that workplace social relations and the members' alliances and reciprocities become both a risk management strategy and a work-related risk. They allow some members to continue eking a living, but also reinforce power imbalances and hierarchies and allow some members to use their power to the detriment of others in actions which appear to be in solidarity. In turn, such situations often drive members to establish very secretive personal arrangements, thereby ensuring that nobody really knows the whole truth or situation. As Don Pablo says, 'keeping things to one-self' is necessary to prevent others from 'knowing too much' about one's challenges and opportunities and 'taking advantage' of these to their benefit. This, in turn, further damages the members and their risk

management options, in that this 'secrecy' decreases trust, solidarity and mutual help (cf. Alli, 2008; Slovic, 2006; WHO, 2002), even when alliances are in place.

Indeed, the relationships amongst cooperative members question the assumed universal principle of democratic rule reflected in the Cooperative Law. There are various levels of decision-making simultaneously operating within The Cooperative (Michard, 2008), and The Cooperative's 'formal' rules often have little in common with its 'working rules' (cf. Ostrom, 1986: 148). The same occurs with the relationships members have with their labourers, which are not the same in all cases and change greatly within and between groups, since despite not having voice within The Cooperative some labourers may have more entitlements than other members, and the relationships between members and labourers may not necessarily be what one might assume.

Members' authority stems from the fact that they control the access to the minerals and that they can hire and fire labourers as they need and please. Most members transfer their OHS to labourers by employing labourers to do the job for them (Michard, 2008), whilst they engage in livelihood diversification strategies, mineral trade or to simply preserve their health while they pursue dreams of becoming wealthier (Francescone and Díaz, 2013). In fact, of the 35 members affiliated to The Cooperative, only seven entered the mine on a regular basis; five entered on a monthly basis to control the advance and work carried by their second-hands and labourers and the rest went to the shaft only for meetings.

Members are responsible for the OHS of their labourers, but, in practice, OHS responsibilities are shared between members and labourers – regardless of their experience and of their temporary or permanent engagement to mining. When members do not enter the mine, labourers identify the OHS risks whilst working (usually after accidents or incidents) and then either individually or commonly decide how to sort them out with the means and tools at their disposal, sometimes by making a *ch'alla* and sometimes combining it with a physical OHSMS (i.e. covering a hole in the floor with a large rock). If labourers cannot resolve the risk themselves or additional material is needed, they will ask the second-hand, who will help them and either purchase the required materials himself or ask the member for his opinion and contribution. Members usually pay for the necessary preventive material, sharing the costs with the second-hand, and occasionally deducting the costs from the group's wages. If the member is unable (or unwilling) to pay for the preventive material, labourers can either leave the job or simply accept the risk (sometimes asking for higher wages). In these situations,

labourers usually do a *ch'alla* in the *paraje* in the hope that the tutelary deities will protect them when working there.

In contrast, when members work with their labourers, the hierarchies and uneven distribution of entitlements outside the mine becomes less significant. Not only can no differences be observed between these members and their labourers regarding their PPE. These members work with labourers, facing the same risks, and dealing with them in the same way, using the same individual and collective preventive equipment and working together to put in place the material and spiritual OHSMS purchased by the member. In addition, although labourers do the heavier work (shovelling and pushing wagons), it is often the member, second-hand or their relatives who undertake the most risky tasks (such as drilling or handling the dynamite), both to prevent the risk of compensation and to protect their labourers (who are often their relatives and friends). As Don Pablo says: 'it's my mineral and my livelihood... why should I make others pay for what I've to do?'

In both cases, members and second-hands discourage labourers from taking unnecessary risks, and this can cause a labourer to lose the job. Nevertheless, labourers and members may voluntarily take some risks upon themselves, and this is accepted if, for example, taking certain risks to life might result in increased gains or acceptance. For instance, taking the risk of falling from high up when they think they saw a spark that may point the discovery of a new mineral vein, or when the miner has no other option but to accept a known risk in order to produce mineral, such as a driller drilling where he might find a pocket of gas retained within the rocks. However, for most labourers, as it is for disempowered members, voluntarily taking risks to their health is a means of keeping their livelihoods (cf. Kantor et al, 2006), alliances, assets and entitlements. It is also a strategy to try to change their luck by finding a vein, or aimed at showing their commitment to The Cooperative or to a particular group, member or labourer. Accepting both the OHS risks transferred to them by second-hands or by powerful members and their lack of decision-making power within The Cooperative and within some members' *parajes* is also labourers' way to earn what the miners call their *derecho a piso*, or 'their right to have rights', which is gradually achieved by being promoted from labourer, to privileged labourer, to second-hand, and then, perhaps to being a member. For this to happen, as illustrated with Don Pablo's advice to *El Flaco* during the meeting described above, it is essential for labourers to maintain harmonic relations with the members who employ them and avoid creating conflicts by, for example, complaining of lack of safety or power abuses.

However, their efforts may not yield results. Miners cannot fully control the success of their individual and collective strategies and thus, their ability to develop a sustainable livelihood through mining is conditioned by luck (Absi, 2009; Nash, 1992). A drop in mineral prices, a *paraje*'s collapse or depletion, envies, conflicts and theft, an accident or disease and losing a race can cause a member to lose all assets and investments and to become a labourer again. Such a shift, which occurs in the space of a day or two, can cause labourers to lose their jobs in spite of their previous efforts accepting OHS risks and building social ties to 'earn their rights'. Miners manage the risks of this happening through reinforcing group solidarity and a sense of belonging, by accepting and voluntarily taking OHS risks upon themselves whilst their present circumstances last, by having faith, and by trying to be on good terms with other miners and with the deities hoping that they will protect them whilst at work and help them in their endeavours, because they know that they, themselves, are unable to fully control what happens in their lives.

4.5. Conclusions

This chapter explored how miners engage with each other within the workplace and how this affects their ability to respond to risks and their OHS risk perceptions, as well as shaping the actual risks they face. Miners commonly refer to themselves as *compañeros mineros* whatever their status within The Cooperative and regardless of the personal entitlements associated to their different statuses. As this chapter illustrates, this common denomination orders the miners' sense of belonging, their common identity and group solidarity, but also hides inequalities and distinctions among them.

Miners build solidarities and engage in conflicts as a response to, and as a strategy to prevent, risks and uncertainties that affect them individually or collectively in accordance with their personal motivations, needs and concerns, sometimes reproducing hierarchies and inequalities and sometimes challenging and transforming them. These alliances and discords influence the miners' livelihood security (Gratz, 2003; Godoy, 1985b), their assets to secure mineral extraction and manage work-related and OHS risks, and the distribution of risks and of decision-making power within The Cooperative. They continuously shape and transform the miners' means and modes of production and their work processes – and thus the OHS risks presented to them (Landsbergis et al, 2012; ILO, 2011; Feyer and Williamson, 2004; Stellman, 2004; Landsbergis, 2003; Swartz, 2001). They also continuously redefine the group dynamics, and thereby, the distribution of risks amongst the miners (cf. Landbergis et al, 2012) and the

different miners' decision-making power and ability to respond (cf. Kramer and Cook, 2004; Eakin and MacEachen, 1998). As a result, the organisation of labour and production in the mine is neither fixed nor static, but a dynamic process of configurations and reconfigurations, of solidarities and discords that continuously order the risks faced by the miners and the miners' preparedness and response towards the risks they each face.

Unable to access formal credits or loans and exploiting a marginal mineral deposit of uncertain mineral contents, miners rely on themselves, and their group cohesiveness (cf. Simard and Marchand, 1997; Seashore, 1954), in order to build resilience, adapt to changes in circumstances and make ends meet (Godoy, 1985b). However, miners also compete for the jobs and for the mineral, and veil their individual interests and motivations. Thus, if not influenced by social ties such as friendship or family relationships, their solidarities, 'shared risk' agreements and work alliances generally only happen when they are mutually beneficial, leaving miners like *palliris* and others with scarce assets marginalised and disempowered. Nevertheless, as argued above, the extent to which each miner benefits from these reciprocities is mixed. Workplace social relations become then both a risk management strategy and a work-related risk. They allow some miners to make ends meet, but also enable some miners to take advantage of others' misfortunes to their own benefit through actions that appear to be in solidarity. Such relations allow miners either to access ores that would otherwise be out of reach, to secure a workforce, to increase their political power in cooperative decision-making or simply, to 'be owed a favour'. However, as shown, developing such a double-stranded social behaviour is for most miners a way to cope, withstand and rebound from surprises (cf. Wildavsky, 1988), and to navigate and respond to the overlapping uncertainties, challenges and opportunities presented to them (cf. Douglas, 1987).

As this chapter makes clear, contrary to OHS' experts assumptions and prescriptions, miners do not solely evaluate and balance amongst OHS risks before deciding which risks are to be managed (Swartz, 2001; ILOCIS, 2012; WHO, 2010; see also Chapter 1). Rather, they include a broader array of risks and uncertainties in their risk evaluations. Analytically, in addition to bringing the miners' personal relationships, circumstances and concerns to the understanding of their OHS perceptions and behaviours at work (see Chapter 3), it is important to differentiate between OHS risks and the wider range of occupational uncertainties, such as power imbalances, mineral races and uncertain economic or geological opportunities, that also affect the miners and which shape both the miners' responses to OHS risks and the construction of certain OHS risks.

Certainly OHS' experts focus on OHS risks in the work environment and on the specific work processes, structures and technologies used in the workplace (Feyer and Williamson, 2004) brings important insights about the direct causes of OHS risks and about their management. However, as I have shown, there are various levels of decision-making simultaneously operating within The Cooperative, and The Cooperative's 'formal' rules often have little to do with its 'working rules' (Ostrom, 1986: 148). In addition, these workplace arrangements do not occur in a vacuum, but are associated with the fragmented and unstable economic (cf. Prentice, 2012) and geological (Godoy, 1987) opportunities available to the miners – over which individuals and The Cooperative often have little or no control (cf. Sparks et al, 2001). Furthermore, the boundaries of the workplace are not as clear-cut as OHS experts assume since, as shown, the workings of other cooperatives affect the OHS risks encountered in the cooperative's shaft. Similarly, the same relations and alliances that occur amongst the miners affiliated to The Cooperative also take place with miners of other cooperatives and with mineral buyers and investors, and these relations, as I will further discuss in the following chapters, also shape the workplace arrangements, dynamics and risks within The Cooperative.

The next chapter continues this theme of exploring external factors and relationships that shape the internal workings of The Cooperative (cf. Ostrom, 2005). It analyses the miners' relationships with mineral buyers and the effects of these for how the miners perceive and respond to OHS risks.

5. Beyond 'cost-benefit': The market, the buyers and the commodification of OHS

'Its silvery glow confuses the most skilled eye.
When it rises, it makes *Patiños*; when it descends, it destroys countries'.
(Mitre, 1993: 1)

One morning in June 2010, as I was chatting in Marlene's office with Don Juan, Felico and another of The Cooperative's leaders, two mineral buyers arrived at the shaft. They wanted to speak to 'the President' (Don Juan) or, in his absence, to 'the Treasurer' (Felico). The two men said that they were representing a Korean mining company that was very interested in buying the minerals produced in the Cerro. They wanted to be The Cooperative's exclusive buyers, and were offering a two-year contract, at fixed prices, for both tin and silver. The buyers explained that the fixed rates would fluctuate according to mineral purity⁴⁴ and that they would not accept a quality lower than 40%. They were unable to clearly state what the fixed rate was going to be for each quality level, but reassured miners that 'it would always be within the margins established by the law'.⁴⁵ They admitted however, that if The Cooperative was to produce less mineral than initially agreed, an amount that, they said, they were not in position to disclose at the time of the meeting, the fixed rates would decrease 'as an incentive to increase production'. Don Juan explained to the entrepreneurs that The Cooperative's members produce and sell the mineral according to independent workgroups, asking the Korean buyers to give him some time so that he could call Extraordinary Assembly since he was not able, nor willing, to speak and decide for all members. In turn, Felico asked the potential buyers whether they would provide any technology for The Cooperative in order to help production, as many buyers do (see below). The buyers replied that they would only collect the produced mineral of The Cooperative, that they would not deal with each member separately, and that the production aspect was The Cooperative's responsibility. They also said that The Cooperative should cover the costs of transporting the mineral to their private depot outside town.

⁴⁴ Ore quality or 'purity' refers to the concentration of mineral in the rocks.

⁴⁵ Terms set by national law may differ from international rates, as happened in Bolivia during the 1950s. Also, national law establishes prices per mineral at the highest quality, leaving the lowest quality levels open to negotiation.

Putting the contractual agreement on the table, buyers told the miners that they had 24 hours to decide. 'We are offering you a good deal', said one before leaving, 'if you don't take it, other cooperatives with more 'business vision' will. We came to The Cooperative because we like how you work but we cannot waste our time convincing you. If you don't, others will take the offer'. The second buyer urged the miners to 'sign the contract now and deal with the internal production issues afterwards', telling them that mineral prices were 'forecast to decrease' following the current international crisis. As they left the office, the buyers recommended that the miners hurry up and sign in to avoid regrets in the coming months, 'when you'll see the mineral prices drop and you'll remember our offer while you'll see other miners selling their mineral whereas you won't find anyone to sell your mineral to'.

As the buyers left, an uncomfortable silence took over the room. Don Juan and Felico remained thoughtful with their heads down looking at the ground as Marlene was pushing me, with her eyes, to talk them out of the deal. As I started catching breath to ask Don Juan his view on the matter, he said:

'No... I won't do it... I won't decide for our *compañeros*. This decision can have severe consequences for each one of us and it is therefore for each and every one of the comrades to decide... not for me... If I was another kind of leader I'd make a personal agreement with the buyers in a way that this would benefit me, but I'm here for the good of the cooperative... for the comrades, not only for my own benefit...'

To which Felico added:

'If we stop providing [mineral] to our buyers... How are we going to produce if the Koreans don't supply technology? No... This isn't good... Even if they were to pay more...'

Don Juan's and Felico's decision to dismiss this offer was based on reasons that I had not focused on. I had identified the 24-hour deadline and the lack of clarity on the production rates and on the buying prices as disempowering and problematic. Nonetheless, I was very glad to hear these miners' choice. Both Don Juan and Felico were firm in their decision not to go against the principles of the cooperative; that it was not for them to decide by themselves, alone, on the future of each one of The Cooperative's members. Their decision would obviously have affected the productive capacities and arrangements of all members, who usually obtain the access to technology from individually-chosen buyers. However, they were also aware that the 'what if' of this decision would remain with them for a while and perhaps even 'turn against them' if mineral prices were to decrease in the near future.

Convinced and yet simultaneously uncertain about the rightness of their decision, the miners decided to make a *ch'alla* with the *Tatakachu* and the *Pachamama*. They did this not as a symbol of their alienation from the capitalist economic order in which their lives and livelihoods are embedded and dependent (Taussig, 2010). Rather, as shown in Chapters 3 and 4, rituals offer a means of managing 'unknown' (cf. Stirling and Gee, 2002: 117; Cashdan, 1990) and general risks and allow the miners to mentally cope with the unintended effects of their choices. In this instance, the *ch'alla* symbolised the miners' complete awareness of the impacts of global economic relations for their individual and collective wellbeing, as well as recognition of their powerlessness to fully control this situation. With the ritual, they hoped to obtain the sympathy, blessing and help of the deities so that things would go well.⁴⁶ For a while, things went well: in August 2010 (two months after the buyers' visit) mineral prices reached a 30-year historical high (Cambio, 2010) and, in February 2011, a 70-year record in prices (América Económica, 2011). Mineral prices did decrease slightly in August 2011 (Lazcano, 2011) – 14 months after the buyers' visit – and since then have been roughly maintained despite the current international crisis due to newly industrialising countries' high demand (i.e India, China) and by demand for warfare purposes around the globe (OBIE, 2012).

Everything in the Cerro, in Potosí, and in Bolivia revolves around the price of the minerals. This obvious statement involves three interrelated concerns that miners, regardless of their differentiated statuses within the cooperatives, conceptualise as 'occupational risks': a) their dependency on international mineral prices, b) the actual prices local buyers will be willing to pay and c) miners' uneven relations with buyers. This statement also invites reflection about the role of global economic dynamics and interdependencies in shaping miners' lives and livelihoods and, consequently, their OHS risk management choices and opportunities (cf. Beck, 1992; Viscusi, 1983). I have described the above vignette because it illustrates some of the tensions, uncertainties and dynamics surrounding the commercialisation of minerals in the Cerro. Analysing and describing miners' relationships with buyers and the ways in which this in turn impacts on and shapes OHS in the Cerro is the objective of this chapter.

⁴⁶ Since their decision was ultimately aimed at preserving the 'common good' and wellbeing of miners, the miners believe that they are likely to receive help from the deities. The *ch'alla* reinforces the miners' declared intention of maintaining harmony among all living things, both amongst miners and between humans and the tutelary deities and this is, for Andean believers, key for things to go well.

5.1. Mineral sales

According to the current Bolivian Mining Code (1997), ‘trade of minerals is free and unrestricted’ (Art. 30). It is ‘completely liberalised to local and long distance markets’, to ‘any individual or collective group of persons, national or foreign’. This is explained by historical global events that still frame the personal and work-related risks and uncertainties encountered by miners in the Cerro, how they perceive and seek to manage these and with what effects in their OHS choices, and the failure of the current state and NGO attempts at improving OHS (see next chapters). As described in Chapter 2, the international crisis initiated by the Bretton Woods breakdown in 1971 drove Bolivia into depression in the 1980s due to a dramatic decrease in tin prices which was exacerbated by the emergence of Brazil and China as mineral producers (Fox, 1996). The introduction of structural adjustment, formulated by the IMF, was a condition for Bolivia to receive international aid for its economic recovery. Structural adjustment was implemented with the promulgation of Decree 21060, which replaced the previous nationalist state protective policies with the privatisation, deregulation and liberalisation of the mineral market and with a reduction in social benefits. This process, called in Bolivia *privatización*, meant that the previous monopoly of the state as the only mineral buyer was eliminated and, with the consequent closure of BAMIN (the Mining Bank) in 1991, the cooperative miners lost their access to extractive technologies and to formal forms of loans and credits (Araníbar, 2005). Private buyers and investors quickly abused the rapid rise in numbers of cooperative miners and their lack of access to capital by lending extractive technologies to some cooperative miners in exchange for a share in the production and by obliging the miners to sell exclusively to them, at often very questionable prices. As discussed in more detail below, there are now more than 60 formal and informal mineral processing plants in Potosí, plus a changing and uncountable number of unregulated mineral buyers, investors and intermediaries. They have seen in the uncontrolled mineral market (Michard, 2008) and in the cooperative miners’ lack of access to formal loans and credit from the state or commercial banks,⁴⁷ the opportunity for a profitable business. However, this market liberalisation and the double role of buyers as also investors in miners’ production has come to determine miners’ uneven relations with buyers in ways that directly and indirectly affect the distribution of risks and OHS in the Cerro.

⁴⁷ The uncertainty of miners’ production and earnings, together with the miners’ low returns (see Chapter 2), represent risks that commercial banks are not willing to take.

5.2. Miners' relations with buyers increase production but 'shorten life'

There are many different types of mineral buyers in Potosí, with very diverse assets and positions within the trade hierarchy. There are locally-run mineral processing plants, international buyers, cooperative members who act as buyers, university professors, government officials, hotel owners, NGO workers and local businessmen and women (*rescatiris*) who buy the minerals. They, in turn, sell to a never-ending chain of intermediaries or export directly. Each buyer thus offers different prices, tailored productive agreements and trade opportunities as he (or she) seeks to build up relationships with different miners in accordance with the assets and productive capacities of both the buyer and the miner.

Generally linked to processing plants and to exporting companies, larger buyers normally demand from the miners, as illustrated above, an exclusive sale contract involving large amounts of good-to-average quality ore. They offer better prices than smaller buyers and typically lend technology (air compressors and hammer-drills) as part of the agreement. In contrast, most small intermediaries buy mineral on sight or 'as seen' (without weighing or analysing the mineral content of it), at very low cost and then sell it to larger buyers at a higher price. Miners are aware that smaller buyers give the lowest prices. They buy low-quality ores, and then incur higher processing costs. Although these smaller buyers pay less and do not lend machinery, many miners use them because there are no strings attached and miners receive the money immediately. Some miners also occasionally use smaller buyers for low-quality ore because this is otherwise hard to sell. For the many miners who have low productive capacity or who find only low-quality minerals, these small buyers are their only choice. *Rescatiris* are for instance the habitual buyers of *palliris*, who, gathering the rocks rejected by underground-members because of their low purity (see Chapter 3) can only sell the minerals to the smallest buyers. However, selling to smaller buyers helps these disempowered miners avoid transportation costs (and efforts) that, as illustrated in the introduction of this chapter, larger buyers usually do not cover, since small buyers tend to go to the Cerro with their trucks collecting minerals.

Larger buyers frequently provide technology in exchange of a share of the production or, if the borrower is a miner, for reciprocal exchanges of labour, *parajes*, working tools or favours. Machinery can also be borrowed, and this fosters *compañerismo* (camaraderie), or is secured through family ties. In these cases, some form of reciprocity is expected either at work or household level. This delayed reciprocity offers a form of insurance for the donor.

Buyers and workplace relations

These relationships between buyers and miners have shaped the inequalities amongst miners, since the most powerful buyers lend extractive technology to the most powerful members (or second-hands), who have larger productive assets and are able to employ labourers. The less powerful and less 'lucky'⁴⁸ (Nash, 1992: 184) members and second-hands are marginalised from these agreements with larger buyers. This means not only do they get less money for the lower quantity of ore they manage to produce, but they simultaneously become 'victims' of the strategies used by the more powerful miners to ensure a workforce and a constant access to mineral veins. As illustrated above, the agreements with larger buyers are conditional on the miners constantly supplying pre-determined amounts of mineral, of a particular quality, to the buyer. In this sense, miners' relations with buyers not only foster inequalities within cooperatives, but also compel some miners to produce ore at all costs and, consequently, some miners' use of their power over other miners as a strategy to secure their own production.

Miners' relationships with buyers also influence the productive alliances (and thus conflicts) within cooperatives. As discussed in Chapter 4, these alliances and conflicts determine both the miners' ability to collectively get through their days, and the distribution of risks, challenges and opportunities amongst miners. In fact, to secure their mineral supply, some powerful buyers (such as Roberto in the *Malditos'* group) have become members of the cooperatives (or informal members with membership rights within some groups) as part of their agreements with miners. This intrusion not only limits these miners' opportunities to look for better buyers, but it also affects OHS in the Cerro because of buyers' role in forging alliances with specific members and groups in accordance to their productive capacities. Seeking to maximise their supply of minerals, buyers prioritise alliances between more powerful members and groups that can produce more minerals. However, as explained in Chapter 4, not all miners emphasise production over other values and some are eager to build collaborations that may not increase production, but that instead promote mutual help, camaraderie or family ties. Nonetheless, buyers have considerable power to control miners; and they not only encourage, but also discourage, certain alliances. For example, Don Román

⁴⁸ As explained in Chapter 4, the ability to develop a sustainable livelihood through mining often depends on 'luck' given that miners cannot fully control the conditions that will determine their success. These conditions include the quality, type and amount of ores found in each *paraje*, mineral prices, the occurrence of races and accidents and so forth.

could not enter into a productive alliance with his brother-in-law Don Adrián because Don Adrián refused to sell the minerals from his *paraje* to Don Román's buyer, who was paying less. Unable to access extractive technologies without the collaboration of his buyer, Don Román decided not to help Don Adrián with his production, which resulted in Don Adrián having to work harder and longer in order to pay for his children's school uniforms. In this sense, the buyers' relations with miners hamper OHS because of their role in diminishing mutual help and solidarity within cooperatives (cf. Alli, 2008; Burton, 2010), something that according to miners, did not happen during the 1950s when the state was the only legal mineral buyer.

Buyers clearly intentionally influence the productive agreements between miners to maximise their benefits. But the miners' relationships with buyers also indirectly influence workplace relations and OHS in the Cerro through the strategies most miners use to compensate for the additional costs which are embedded in the use of technology; for instance, in terms of workforce, electric and fuel bills. To meet these costs (and to maximise profits), members tend to rent 'airtime' or drills to other members and labourers at predetermined rates (80Bs/hour of air (11.5US\$), or the equivalent of an experienced labourer's day rate when mineral prices are high). Miners book 'slots of airtime' through Marlene. They normally reserve one 'air-hour' per drill-work and pay to Marlene in advance on a weekly or monthly basis. Afterwards, it is up to the miners who booked the airtime to ensure compliance with the schedule. Alternatively, if they cannot afford to pay, they might enter into reciprocal exchanges of workforce or *parajes*. These exchanges, also used by some powerful miners as a strategy to secure their constant access to minerals and a continuous supply of labour by using other members' assets and labour, often result in some members and groups becoming occasional labourers for other members. These 'reciprocal' exchanges negatively affect OHS because they prompt some miners to intensify production and work longer hours, both of which are associated with an increased risk of accidents (Golden, 2011; Harrington, 2001) and with mental and physical ill-health (Sparks et al, 1997). These 'indebted' miners will work overtime, increase their working speed, and accept greater OHS risks in order to secure their own production and *parajes* while simultaneously returning 'the favour'. This is because, for these disempowered members that cannot enter into technological agreements with powerful buyers, accepting greater risks and decreasing their decision-making power is a strategy used to maintain or temporarily increase their productive assets, which ultimately depends on being on 'good terms' with the more powerful members. In addition, they feel compelled to work overtime because, in accordance to the current Mining Code and to the Cooperative Law and statuses of The Cooperative, if a

member does not exploit his *paraje* he or she can be expelled from the cooperative (see Chapter 4) – which will usually transfer the vacant *paraje* to the most powerful members with larger productive capacity.

These relationships with buyers and the subsequent strategies used by miners to balance the additional production costs ultimately hamper miners' safety through conflicts generated over the renting of airtime. This was the case for Don Osorio, a cooperative member and a lone-worker who, seeing that his airtime had started and aware that Don Felipe's group had the next 'air-hour' booked, decided to redirect the air to his *paraje* for him to drill despite the fact that the *Malditos* were still drilling. This resulted in Claudio in the *Malditos*' group experiencing a sudden drop in the air pressure while drilling, which often causes fractures, dislocations, and deep wounds (drill-piercing). Claudio collapsed due to the sudden lack of air and consequent increase in the dust concentrations in the confined space where he was drilling. Felico did not raise the issue with The Cooperative, but as Don Juan heard about this he immediately called Don Osorio to Marlene's office (allowing me in). Don Osorio confirmed that he had redirected the air because 'he had paid for it and others were using it'. He complained that he was 'tired of paying for airtime other groups would not allow him consume in full', and added that if needed, he would pay for the air-time he was accused of taking from the *Malditos*. Don Juan replied that the issue was not 'a matter of money' but rather about 'respecting' other members and not 'acting against their welfare', and he told Don Osorio that he felt he had no other option but to issue him a 'written warning' for 'acting against his comrades to his benefit'. As explained in Chapter 4, after a member is given three written warnings, cooperative members gather in Assembly to vote for the expulsion of the 'problematic' member or decide upon the conditions by which he or she can remain in the cooperative. In this sense, these airtime conflicts not only imperil miners' lives; they often become a strategy through which empowered miners pressure disempowered members to enter into alliances or to get them expelled and then take over their *parajes*.

Buyers, production rhythms and work-technologies

The importance of miners' relationships with buyers for OHS in the Cerro is not only linked to the buyers' influence on the alliances and conflicts between workgroups, but also to the organisation of production and to the production flow, rate or speed among those miners that have technological agreements with buyers. As illustrated with Don Adrián in Chapter 3, miners who are marginalised, or who refuse agreements with larger buyers produce less ore

because they tend to work manually. However, they sell ores with a frequency that varies according to their own needs (Michard, 2008) and thus, are generally able to work at their own pace. In contrast, the technological agreements between miners and larger buyers not only increase miners' production costs, but they also cause the miners to organise work flow as per the buyer's productive demands, which prompts miners to 'rush work' or *trabajar a destajo* (roughly translated as piecemeal or output-work). In fact, as illustrated in Chapter 3, most members and labourers use the number of wagons or the number of buyers' trucks rather than the actual working time as units of measurement to define both the work-shifts and the labourers' wages, since workers are paid per unit of production. On one hand this results in members and second-hands applying increased pressure on their employed labourers to ensure the amount of production agreed with buyers. Failure to meet agreed production levels will, as demonstrated in the introduction of this chapter, decrease their earnings, and can ultimately cause the miners to lose their access to technology. On the other hand, this predisposes members and labourers to accept and take OHS risks in order to ensure (or double) their earnings. This is because the measurement of wages and shifts as productive goals reduces the chance of payment to labourers who do not finish their shift (as explained in Chapter 3 when *Changuito* was injured during a shift), and the same applies to the labourers who do not manage to produce enough mineral during a work-shift. The intensification of production associated with piecework (Hart, 2005) and the subsequent increased workload and longer hours have been linked to cardio-vascular disease, musculoskeletal and psychosocial disorders (Lacey et al, 2007), as well as with increasing exposure to accidents and injuries (Tucker and Folkard, 2012; Mayhew and Quinlan, 1999) due to fatigue and to workplace conflicts caused by stress (Oxenbridge and Moensted, 2011; Barnetson, 2010). In addition, since earnings are dependent on achieving production targets, both members and labourers often make sure that they complete a full shift despite being injured or feeling unwell. As *Mono*, a labourer of the *Malditos*, puts it; this further affects miners' OHS because:

'12 wagons make a truck... depending on the buyer's requests, a workday ends when a group of three reaches the two trucks... but it can be more... Then if we need to leave work earlier or if we want to earn more money... we just need to work fast'.

Note that, in Chapter 3, the *Malditos'* labourers referred to a work-shift as '12 wagons' whereas in the above quote *Mono* refers to his shift as '24 wagons' or two 'buyers' trucks'. This is because, whilst buyers' productive demands shape miners' work-rhythm and work-shifts, as I will explain below, their demands are not fixed or static, but determined by and fluctuate with international mineral prices. The workday explained in Chapter 3 took place in

May 2010 while the above statement corresponds to October 2010. Mineral prices were 20% higher in October (CMPI, 2013).

Indeed, despite helping to increase production, these technological agreements with buyers bring more challenges than benefits in terms of the miners' OHS. This is not only due to the role of these technologies in shaping the miners' production rhythms and to the effects that the uneven access to technologies in the Cerro have for workplace relations and thus for the different miners' ability to respond to OHS risks. Since technology shapes the miners' means and modes of production and these in turn determine the OHS risks faced by the miners (cf. Landsbergis et al, 2012; ILO, 2011; Landsbergis, 2003; Loewenson, 2001; WHO, 1994, 2002), these technological agreements also define the OHS risks faced by the miners. Some research in this area seems to accept that work-technologies bring both challenges and opportunities for workplace safety (Brun, 2011; Alli, 2008; Snashall and Patel, 2003). For instance, dispelling the old assumption that technology reduces OHS risks and the probability of accidents, the OSHA-EU specified that while work technologies might have reduced the probability of accidents, their severity is markedly higher (2001: 3). Yet, within the literature, it seems generally accepted that 'if workers are properly trained technology does not suppose higher risks' (Stellman, 2004: 52, see also OSHA-EU, 2013; Flaspöler et al, 2006). For Stellman, since the technology used by workers defines their ability to accomplish tasks and the extent of the physiological or psychological load, and this is something which training can help to offset (2004: 52); using technology will therefore improve workers' safety whilst increasing productivity by reducing workload and fatigue. Similarly, according to the OHS paradigm, since work-technologies increase production, they proportionally improve workers' wellbeing (Adishesh, 2003).

My fieldwork findings however suggest that the use of machinery has increased both the severity and probability of accidents and ill-health, and that these negative impacts cannot be 'offset with training'. In earlier chapters, the descriptions of Don Adrián's and Felico's work-days illustrate that miners using motorised drills are at higher risk of developing lung diseases, circulatory, hearing and eye problems due to the high levels of dusts, vibrations and noise accumulating in the confined spaces where they drill, something that does not happen in the case of manual workers. This is not because of the miners' lack of knowledge on how to use these technologies. It is due to the increased risks to the workers' health that this technology poses when it is not accompanied by infrastructural and personal protection measures which most miners cannot afford. In addition, the use of these technologies has also increased the

possibility of accidents due to collapsing roofs and walls. Vibrations generated while drilling are passed onto pistons (that drill-operators use to buffer vibrations and hold the heavy machinery while drilling), which are embedded in often thin and unstable walls that have been drilled and exploited for over five centuries.

Miners are well aware of these risks, as drill operators are known to have shorter life expectancies and the worst end-of-life quality of life in the Cerro. Most wealthy members like Don Cirilo and Don Juan and some second-hands manage this by hiring labourers to drill and extract the ores for them, transferring their OHS risks to the less powerful miners. They compensate for this by paying the highest salaries to the drill-operators (100-150Bs or 14-30US\$ per drill, depending of the miners' experience and on the mineral prices). However, young members, like Felico and his brothers, and second-hands, like *El Verde*, that have fewer economic assets chose to operate the drills themselves in order to avoid unaffordable costs of accident compensation. Hence, while the miners' relations with larger buyers bring increased access to technology, which contributes to miners' increased production, this does not in turn translate into better OHS. The shared assumption that raising labour productivity will *de facto* lead to improvements for workers (Barrientos, 2007; Adishesh, 2003) is thus not straightforward. Instead, these relationships and the need to meet certain productivity levels results in higher risks to certain miners' health and in the transference of OHS risks from better-off miners to the less powerful ones who are less able to decide and manage risks.

5.3. Buyers' corruption and miners' defiance

As shown above, miners' relations with buyers shape OHS in the Cerro in many ways. These relationships galvanise inequalities and an individualist ethos within cooperatives; influence members' productive alliances and competencies, and encourage some miners' exploitation of others. These relationships also define the extractive technologies which, in turn, determine the different miners' means and modes of production. Thus, miners' relations with buyers determine many of the risks miners face whilst at work and their different assets and capabilities to respond to these. Large buyers also directly and indirectly affect miners and OHS through the many tricks they use to decrease their payments to miners. These 'cheats' or *trampas*, as the miners and government call them (see below), go beyond the verbal contracts which stipulate payments according to predetermined levels of production. I witnessed several cooperative miners' transactions with buyers. As explained, smaller buyers pay for mineral 'as seen', but larger buyers, which pay after analysing the ores, frequently reduce their payments to miners. They do this by altering the scales to their benefit, by paying for only one or two of

the many minerals contained with the ores collected by miners,⁴⁹ by shifting the percentages of each mineral content to pay only for the cheapest minerals,⁵⁰ by decreasing the ore-purity and by lying about current mineral prices. These buyers also maximise their financial profits to the detriment of miners by inflating the tax withholdings and retentions from their miners' payments. This is because, since BAMIN's closure in 1991, buying enterprises (instead of the state) have become the retention agents for the cooperative miners' contributions. Buyers are to withhold the miners' contributions to the state, mining federations and cooperatives and then transfer them to the respective institutions. For instance, Michard (2008: 48) found that some buyers deducted a 40% mining tax from miners, a tax which buyers were supposed to pay to the state at a 2.5% rate. He also found that buyers often fail to transfer to the state the contributions that have been retained from the miners, such as their Social Security (SS) payments. I also found buyers tend to inflate the retention of these payments; for instance, retaining 10% instead of the legal 1.8% for SS and 20% instead of 13% for retirement contributions.

These cheats significantly reduce the members' incomes, which consequently negatively affects their living conditions and those of their labourers, whose wages fluctuate according to the members' earnings. In turn, this damages the members' economic assets and ability to invest in collective safety within their *parajes* and hampers both members' and labourers' willingness and ability to purchase quality PPE. Furthermore, the buyers' deceptions and illegal retention of miners' contributions to SS and retirement pensions negatively affect miners and OHS because of the hardships caused in terms of their reduced sick allowances and disability pensions (cf. ILOCIS, 2012; ITUC, 2010; WHO, 1999; Holzmann and Jorgesen, 1999; Jeyaratnam, 1992). This drives many miners to work despite being sick or injured and despite receiving their (insufficient) stipends. In fact, the buyers' failure to transfer miners' contributions often causes miners to find themselves without access to health care and social benefits. This was the case of Doña Mercedes, a 67-year-old *palliri* who could not retire because her buyer had not transferred her contributions to the AFP. Similarly, a 23-year-old

⁴⁹ As explained in earlier chapters, the Cerro is a poly-metallic deposit and thus the rock usually contains variable amounts of different ores (mainly tin, zinc and silver). When the buyers and processing plants buy or process one or two specific minerals they also gain other minerals free of cost.

⁵⁰ Since the various minerals have different market prices, it is common for buyers to incorrectly assess the actual percentages of each mineral and to argue that the mineral with the lowest price predominates and to pay accordingly. Miners are aware of the different mineral content in rocks, but unlike buyers, they do not have the means to process and analyse the ores, and thus, often find it hard to clearly determine the exact percentages of each mineral they provide to the buyer.

member called Edgar found that he was not affiliated to the national health system (CNS) only when he was refused 'free' emergency treatment after breaking his arm whilst working. According to Edgar, he did not appear in the registry of SS contributors (see below for more discussion on how miners seek to deal with these issues). In this sense, buyers' corruption further damages the miners and OHS in the Cerro because it ultimately drives many to stop their SS and retirement contributions to prevent the buyers taking advantage of their role as retentive agents.

In reducing the cost, type and content of the mineral, buyers also damage the miners' OHS because they indirectly lessen members' contributions towards their cooperatives. This, in turn, affects cooperatives' economic ability to compensate miners or their relatives after accidents or diseases, to maintain the common areas to ensure workers' safety and to purchase their own extractive technologies because, as explained in Chapter 4, their finances depend almost exclusively on members' contributions. Finally, buyers negatively affect miners and OHS because they often fail to make miners' payments to the state, which limits the scope for the state to redistribute taxes and mining royalties⁵¹ (see Chapter 6 for more discussion of this). In this sense, buyers' strategies to maximise their financial gains negatively impacts not only the miners' relations with the government and the state's capacity to intervene, but also the structures and relations which shape miners' lives and livelihoods and which frame miners' emic awareness of risks and their OHS risk choices and opportunities (cf. Barnettson, 2010; McDaniel and Small, 2004; Viscusi, 1983).

Members are well aware of this, and they have developed some strategies to deal with buyers. At a collective level, the cooperatives through FEDECOMÍN created EMMPSA, the Potosí Mining Metallurgical Company, in 1996 with the aim of processing and directly exporting minerals themselves and thereby avoiding intermediaries.⁵² However, EMMPSA has come to be simply another option among the many buyers, retailers and intermediaries already

⁵¹ This is further influenced by the buyers avoiding export taxes by declaring high quantities of cheap minerals. 50% of mineral is estimated to be illegally exported and, according to estimates by the Ministry of Mining, buyers' corruption and illegal export amount to losses of 70 million US\$ annually (Industry, 2007).

⁵² EMMPSA is fully managed by the cooperatives, which undergo biannual elections to decide the directors amongst their members. They export to Brazil, China and Europe. A member from The Cooperative currently manages EMMPSA, and subcontracts a second-hand to manage the production of his *paraje*. These EMMPSA duties are, for many members, a livelihood diversification strategy which, through networking, allows them to establish alliances with powerful members that will benefit them in years to come.

coexisting in Potosí. It has only benefited wealthier miners, since EMMPSA does not provide technology, requires minimum quantities of quality-ores, and involves transportation, processing and exporting costs that only few miners in the Cerro can afford. Led by FENCOMÍN and by FEDECOMÍN, miners have also repeatedly orchestrated episodes of social unrest demanding that the state intervene. This resulted in the state creation of SENARECOM (National Service for the Registry and Control of Mineral and Metals' Trading) in 2007, an institution proposed by the cooperativists and initially intended to control buyers' operations and transactions. However, as acknowledged by the Secretary of Mining Royalties of the Potosí prefecture, SENARECOM's role in the Cerro has been, in practice, reduced to controlling the ores produced by the cooperatives and the buyers' payments to the state. 'It has done nothing to control or improve the miners' relations with buyers; not even exposing the tricks buyers use to decrease their payments to miners and subsequently to the state'. Continued mobilisations by which Bolivians in general and cooperative miners in particular have demanded the re-nationalisation of the mining industry and of the processing plants and the reopening of BAMIN, aided the election of Evo Morales in 2006 (see Chapter 2). But the miners' initial hopes for changes in the Cerro have not occurred as expected. Instead, as will be further discussed in Chapter 6, Morales' promised nationalisation has been reduced to the uneven coexistence of private and state enterprises which compete with cooperatives.

Cooperativists, with the COB and other left-wing sectors of the population, did influence the government to re-nationalise the tin smelter VINTO in 2007. VINTO has indeed increased state incomes from mining, and also allows cooperative miners to sell their production to the state at usually better prices than private buyers. But this has had no impact for miners in the Cerro because the additional costs associated to transporting the mineral to Oruro (where this smelter is located) and because this would mean royalties accrue to Oruro to the detriment of Potosí (see Chapter 6). Repeated episodes of conflict and social unrest have thus continued in Potosí with, not only miners but also Potosinos in general, demanding the opening of the Karachipampa processing plant in Potosí so that the benefits from Potosí's mining remain in the region. In fact, this was one of the six regional demands that caused the 23 days of strikes during August 2010 in Potosí, during which Potosinos demanded that Morales open the Karachipampa poly-metallurgical processing plant, which was built, but never operated, in the outskirts of the Cerro in 1982.

The effects of miners' uneven relations with buyers also led FENCOMÍN to propose, in 2009, the creation of COMERMIN (the Cooperatives' mineral buying company) with the aim of

eliminating the middlemen and allowing the cooperatives to sell minerals directly to foreign markets and thus, to improve miners' incomes. COMERMIN became operational in June 2010 'for the people of Bolivia to commercialise their own products ensuring a fair price and leaving behind the buyers' cheats of theft' (Evo Morales's speech at COMERMIN's opening ceremony, 21 February 2010). However, as it threatens miners' access to extractive technologies because selling mineral through COMERMIN breaks the miners' relations with buyers, it has, so far, had no impact in the Cerro. Finally, Morales has also delivered technologies and processing plants to the cooperatives in response to their demands for greater state intervention. But as discussed in the following chapter, these technologies are largely inappropriate and have become part of the problem, since they do not address the uneven power relations and co-dependencies between miners and buyers and amongst miners themselves.

Some cooperatives try to manage buyers' exploitative relations with members by centralising sales. The idea is that the cooperative, as an institution, makes an agreement with a single buyer (sometimes the buyer is a member or group of members of the same cooperative or of another cooperative), ensuring that the entire cooperative benefits from the borrowed technologies. It is also a strategy aimed at obtaining higher prices, since the prices that miners receive are dependent not only on the ore-quality and mineral prices, but also on the amount of mineral they are able to provide to buyers. However, this strategy has brought conflicts and inequalities regarding the use of the shared technologies, as technologies often come to be used exclusively by those members with more decision-making power and productive capacity. In addition, this has also led, as pointed out by Don Juan in the introduction of this chapter, to some elected cooperative leaders making agreements that benefit them individually, either by taking a cut in the other members' production in the cooperative's agreements with buyers, or by becoming entrepreneurs and acting as if they owned the cooperative. For example, the Cooperativa Fiscalización has not held elections for ten years. Consequently, less successful members have no options to look for fairer buyers or better agreements, since the decision-making has been monopolised by the elected leaders. This process was experienced by José, an ex-member from the *Urqu* cooperative who, having no decision-making power over his own production or commercialisation, decided to leave the cooperative after spending two years working as a paid labourer for another member in his own *paraje*. To avoid these inequalities and conflicts, most cooperatives, like The Cooperative, maintain the decentralised sale of mineral. These cooperatives are mandated to undertake, at random, laboratory analyses of the mineral content supplied to buyers. However, in practice this very rarely happens. Aimed at controlling the members' truthful declarations in their Certificates of Contribution and thus

their payments to the cooperative, there is little these controls can actually do in terms of challenging buyers and their assessments of mineral content.

Left to yield their own luck, members and second-hands individually manage, as best as possible, their transactions with their buyers. Most miners regularly check the local newspaper *El Potosí* for current mineral prices. However, this does not help with the variation of prices according to ore-quality. Neither does this help with ensuring miners' final payments, since the local mineral prices are in fact not only regulated by the current prices and by the logic of supply and demand, but are also heavily influenced by the particular agreements between the miners and buyers. Many members and second-hands try to manage buyers' cheats by separating minerals and selling them individually. Some employ women as *llamphiras* (see Table 1.2), who jump into the members' bins separating the best ores and removing the lowest-quality ones. Many members also separate the ores collected directly from the mineral vein (removing them in 50kg sacks) from the rest of mineralised rocks which are loaded into the buyers' trucks and taken straight to the processing plants. They then try to send the sacks, hiding them from their buyer, to other buyers hoping to obtain better prices. However, unlike the buyers, miners have absolutely no way to controlling or measuring this ore content and rely on their mental calculations. In addition, this can cause them a loss of payments and technologies if their buyers were to find out.

To control buyers' assessments, most miners, like the *Malditos*, jump on the buyer's scales to weigh themselves, and thereby to check the accuracy of the buyer's scale before weighing the mineral. If the scale shows that various miners have lost weight, it is for them an indication that the buyer has altered the scale to his benefit. Miners also closely follow the buyer's calculations, noting the weight, the type of mineral and, when possible, the ore quality as per the buyer's records. A few members can afford to seek independent laboratory analysis of the samples taken. However, these independent analyses do not help with the mineral prices. Thus, in most instances, the miners usually note the quantity and quality stated by the buyer to mentally compare it to what they thought they extracted and delivered and take a sample 'simply to appear as if they are actually overseeing the buyer's honesty'.

Regardless, the fact is that buyers are very aware of these strategies and have responded by, for example, becoming members of the cooperatives⁵³ as part of their agreements with miners. This not only lowers the miners' supervision of this process – in that the buyer is seen as a member of the group – but simultaneously reduces the miners' opportunities to look for better deals with other buyers. This was the case of Felico, who after finding his buyer Roberto was untruthful with his payments through altering the scales, was unable to change buyer because Roberto was already inside The Cooperative and had developed agreements with other miners and groups, on which Felico's production also depended.

Buyers also take advantage of miners' beliefs in the role of the tutelary deities in determining mineral production and safety. In fact, at the end of each week, as the miners arrive at the enterprises with their minerals, the buyers give them large amounts of alcohol for the ritual *ch'alla* whilst they wait for their mineral to be processed and analysed. For miners, the end of the week *ch'alla* is their way of thanking the *Pachamama* for the mineral she has revealed and for her help in preserving their health (see Annex 2). Through the ritual, miners share with her their earnings, reciprocating so that things will continue 'going well' in the following weeks. This strategy not only gives miners a misleading sense of harmony and camaraderie with the buyers who, by financing the ritual, become 'cosmological collaborators' in the miners' endeavours and plight for safety. It also results in the miners paying less attention to the buyers' proceedings as they drink. Finally, buyers have also developed strategies to manage the possibility of a member doing independent laboratory analyses. This was explained to me by *Chico*, the assistant of Felico's buyer, who decreases the ore quality by 5% before actually writing it on the enterprise records. As I asked him what would happen if Felico found this out, he said:

'Not much. Look... now I write a quality of 60%, if a miner comes telling me that his analysis indicates 65%... I'll offer him to raise it 2,5%, half for him and half for me... Then we'll just agree for me to pay a final quality of 62,5%... I'll anyway win...'

⁵³ Elaborated in consultation with FENCOMÍN, the new Cooperative Law will prohibit buyers from becoming cooperative members. However, this may not change much for the miners, since many members are informal buyers and other buyers also control miners through becoming informal miners with membership voice and decision-making-power within groups.

Figure 5.1. *Chico keeping records after analysing the Malditos' ores*



The situation is not better for the members who, like Don Osorio, have been left out of these agreements with larger buyers or who, like Don Adrián, have voluntarily opted out to avoid, as illustrated in Chapter 3, 'becoming indebted' and, as he says, to 'prevent others benefitting from his own sacrifices'. This has indeed allowed these miners to 'freely' organise their own production modes and rhythms, avoid dust from dry drilling and to constantly look for the best prices offered by the different buyers in the Cerro. But it has resulted in Don Osorio refining the ores manually, accepting the risks associated with the use of chemicals in his struggle to increase ore-quality and enter into an agreement with a buyer. It has also resulted in Don Adrián working longer and harder, intensifying his manual production and accepting and taking OHS risks to secure his place in the cooperative.

5.4. The miners and the market: Price volatility? Safety fluctuations!

Despite the fact that buyers seek exclusive contracts with miners, these relations and situations are neither fixed nor static since mining investment, linked to commercialisation, is temporary and conditional not only on the miners' productive capacities, but also on internationally-dictated mineral prices. I have explained in Chapter 4 how changes in Felico's access to the minerals caused his buyer to break their technological agreement, which resulted in the *Malditos* facing and accepting greater risks to their health whilst at work. The opposite happens when an impoverished member suddenly finds a rich and abundant mineral vein,

which often results in the member either facing greater OHS risks or transferring these to other members and labourers after reaching an agreement with a buyer. Similarly, as mineral prices change, so do the cooperative miners' relationships with buyers and, as these change, so does OHS in the Cerro. The above-described relations and situations are based on my observations and discussions with miners between February and October 2010, a period in which mineral prices were steadily rising after a crisis that had lasted from 1982 to 2003, but they were not yet high enough to produce a mining boom similar to those of 2006 and 2011. The relations and circumstances explained here emerge out of my conversations with miners and buyers about how their needs, priorities and relationships change along with variations in mineral prices.

The lower the mineral prices, the higher the OHS risk-tolerance

A decrease in the mineral prices initially results in the buyers paying less while asking miners to increase their production to compensate for the lower prices. 'The lower the prices the higher the production!' recommended the Vice-Minister of Mining Cooperatives to cooperativists in a press conference that discussed state strategies to meet the fall in prices (La Razón, 2011). This affects OHS in the Cerro not only because of the resulting work intensification (cf. Oxenbridge and Moensted, 2011) and associated pressures passed on from members to labourers, but also because of the strategies miners use to reduce production costs. To ensure continued profits, members and second-hands fire labourers, lower wages and reduce other production expenses such as airtime and length of fuses, while simultaneously demanding from the remaining workers (and from themselves) an increase in production. Even the sizes of the passageways are significantly reduced to save on dynamite (Absi, 2010: 36). These strategies increase the actual OHS risks faced by miners who, for example, will have less time to seek shelter before explosions due to reduced fuse lengths and narrower corridors (see Chapter 3). They also increase the probabilities of miners suffering from accidents and ill-health due to their prolonged working time (cf. Golden, 2011; Sparks et al, 2001, 1997; Danna and Griffin, 1999) – which increases the workers' exposure to the OHS risks – and to the effects of accumulated tiredness (cf. WORKSAFE, 2005). Parallel to this, the miners increase their efforts to find high-purity ores to compensate for the lower prices, which results in increased conflict over miners' access to the mineral, mainly in terms of racing for the veins that contain better-paid minerals. In turn, as members fail to pay labourers, conflictive episodes of theft increase.

As mineral prices continue to decline, the number of buyers and retailers proportionally decrease. Initially, this affects miners and their safety because, as smelters shut operations and buyers abandon the Cerro, they take with them the extractive technologies, which they sell elsewhere.⁵⁴ Consequently, most miners find themselves struggling to increase production while simultaneously losing their technological assets. This results in miners doubling or tripling working time and increasingly accepting and taking risks while simultaneously seeing their productive capacities and their chances of selling the mineral reduced alongside their SS contributions and ability to purchase collective and PPE. In turn, miners' uneven relationships with the few remaining buyers are galvanised due to the miners' increased requests for payments in advance, which will set the conditions for these miners' agreements with the buyers when prices rise again.

As happened in 2001, as earnings no longer cover the costs of production and as most miners see their incomes reduced to the point that mining cannot even ensure their survival (Madrid-Lara, 2003), they migrate⁵⁵ and engage in livelihood diversification strategies. Most members abandon the Cerro, leaving their relatives, comrades or trusted experienced labourers (second-hands) in charge of managing their *parajes* to ensure continued mineral production in exchange of a percentage of their gross earnings.⁵⁶ The same happens with the labourers who, unable to find paid jobs in the Cerro, return to the countryside, migrate or struggle to engage in temporary livelihood diversification strategies in an impoverishing Potosí while waiting (and hoping) for the mineral prices to revive. Only those who are left with no options for livelihood diversification (i.e. retired, injured, diseased and laid-off workers) will ultimately remain in the Cerro. Indeed, these changes in the composition of cooperative mine workers during times of crisis reduce inequalities and alter miners' relationships at work in ways that seem to increase collective solidarity for a common survival. But the critical circumstances also trigger miners' 'risk-acceptability' (cf. Wilson, 1984: 11) and risk-taking behaviours. They also increase generational transmission of mining risks, as miners' dependants (wives and children) are

⁵⁴ Some miners may purchase these technologies, but this is uncommon given that they are facing a decrease in prices for an uncertain length of time.

⁵⁵ There are no records of internal migration in Bolivia. My conversations reveal that many migrate to Argentina, El Alto, Santa Cruz, and to coca growing regions.

⁵⁶ Things deteriorate if the second-hand, for reasons of sickness or otherwise also leaves the Cerro, assigning a 'third-hand' in charge. In these cases the member keeps 50% of gross production, the second-hand 25% and the third-hand the remaining 25%. The third-hand is expected to cover the production costs from his 25% and, as a result, the OHS and wages of the labourers will be much worse.

pushed (cf. Tschakert, 2009) to informally work in the mines, helping the husband and father to secure sufficient income for the household to survive (CEPROMÍN, 2009).

The higher the prices, the greater the OHS risk-acceptance

While reductions in mineral prices are indeed devastating for the miners' living and working conditions and push them to behave in ways that appear to enhance their OHS risks, ironically, rising mineral prices also present challenges for miners' wellbeing and for their OHS. Some research in this area assumes that social and economic upgrading will inevitably lead to improvements for workers and an upgrading of their employment conditions (Rossi, 2011; Knorringa and Pegler, 2006; Nuwayhid, 2004; Sen, 1999, 2000; WHO, 1994), and the same reasoning underlies Morales' supply of technologies to miners, as discussed in the next chapter. However, in the Cerro, Pascale Absi (2010) observed that the collapse of mineral prices in 2009 was less critical than the price rise that preceded it in 2006. My observations and conversations with miners suggest that this is a complex issue, since some miners benefit from price rises, but this is not uniform and others benefit far less. In this sense, my findings agree with Absi in that, while good mineral prices improve some miners' situations and OHS, this is often at the expense of others.

In fact, although through different processes, episodes of growth are also associated with decreased OHS in the Cerro. First, as mineral prices rise, so do the number of mineral buyers, investors and intermediaries. This initially allows some miners to look for better and more equitable agreements or simply to access machinery from which they were previously marginalised. But the favourable prices and the resulting technological agreements cause most miners to nonetheless intensify production and to increasingly accept and take risks to their health whilst at work. They accept these risks, this time, to take advantage of the high prices whilst they last. In the previous section, in which miners took on additional OHS risks because of the low mineral prices, the emphasis was on 'working quality rather than quantity'. However, when prices are favourable, it becomes a struggle to maximise all production, regardless of which minerals are being extracted or their purity. This affects OHS because of the strategies miners use to increase 'any type' of production. Miners will repeatedly drill and dynamite large areas inside the mines in order to extract as much as possible without investing time or effort in securing the increasingly weakened roofs and walls of the rapidly-expanding cavities in the already unstable and collapsing Cerro (SERGEOTECMIN, 2011). In turn, mineral races, theft and issues of conflict and violence associated with the miners' desire to access the

natural resources increase. This is accompanied by additional alcohol consumption and the escalation of rituals and celebrations.

While the 'lucky' members invest their growing incomes in rituals, in starting or engaging in other businesses, and in buying expensive houses, clothing, cars, as well as providing allowances for their lovers,⁵⁷ their increased earnings are not invested in their *parajes'* safety or in improving working conditions for their employees or themselves. On the contrary, most of these lucky members come to manage the OHS risks associated to cooperative mining by stopping entering the mine and hiring labourers to do the job for them while they dress in humble clothing when visiting the mine to mislead other members and labourers – avoiding being asked for economic favours, safety investment, higher wages or accident compensations.⁵⁸ In fact, a continued growth in prices does not ultimately forge, as happens during prolonged or intense crisis, miners' solidarity. Instead, as mineral prices rise, so do the inequalities, individualism, uneven power relations and some miners' use of power to the detriment of others and for their own benefit. The wealth gap amongst miners is widened and with it, the distribution of OHS risks in the Cerro, with wealthier members and second-hands transferring their risks to less powerful ones that find themselves without decision-making power or assets to respond. The 'new rich' become new buyers and start investing in other members' operations whilst ensuring their own gains and safety by hiring labourers – who return to the Cerro in droves as prices increase. These new rich encourage new alliances and agreements with other members and with private mining entrepreneurs (see Chapters 4 and 6) to secure the sustainability of their productive capacity. In turn, for the vast majority of members, the favourable prices will result in their loss of decision-making power, in higher risk

⁵⁷ Miners often abandon their wives and children when prices go up and to live with younger women. Many of them return to the household when prices drop again and their wives accept this because their husbands provide money for their children. Some husbands do not return. These women are in a difficult position as the informal social protection schemes of the cooperatives, which allow members' and labourers' widows to engage in mining (see Chapter 3) also go to the new partners or wives. Similarly, most women's access to government social benefits is through their husbands. If the husband abandons the wife or if after widowhood, a wife remarries or lives with another man, she will lose her retirement and widowhood pension entitlements.

⁵⁸ In 2008, Don Cirilo was making 2,000Bs profit (300US\$) on a truckload of tin. In early 2009, it did not reach 500Bs (72US\$) per truckload, while in 2007 he was making more than 10,000Bs or 1,150US\$ per day! Similarly, Don Juan was making 50,000Bs per month (7,235US\$) during my time with The Cooperative whilst his second-hand (and godson) *El Verde*, after covering the production costs and labourers' wages, made less than 3000Bs or 435US\$ per month (labourers earning an average of 1500Bs, or 217US\$). Indeed, *El Verde's* aim was to cut production costs in order to increase his earnings, which often meant that he reduced his workforce and worked double shifts himself accompanied by his 72-year-old father in case of accident.

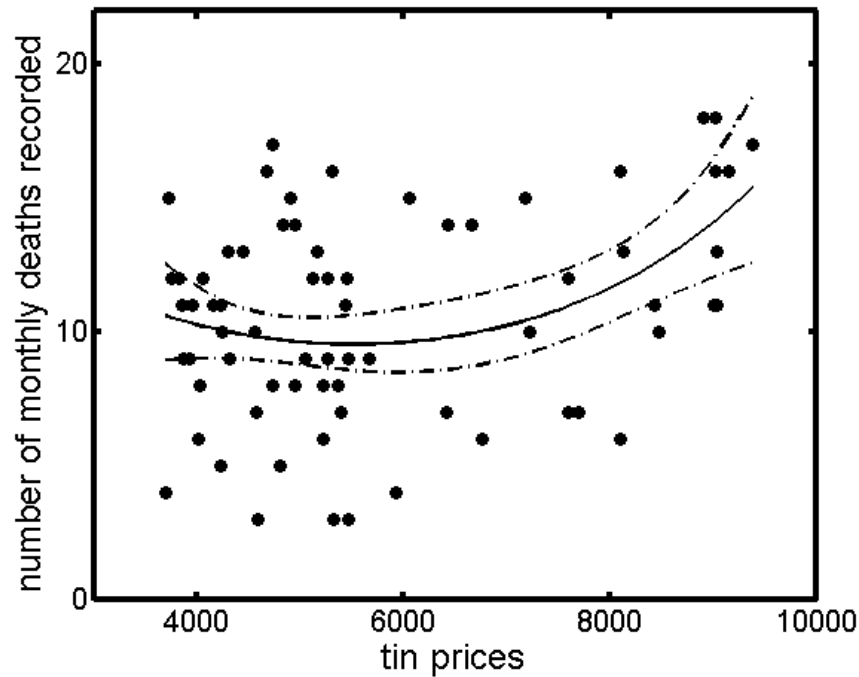
acceptance, and in higher risk-taking behaviours forged both by their own efforts to find a good vein to 'change their luck' and by the agreements (and strategies) made with the newly rich and politically empowered members to secure their access to the natural resource and to a constant supply of workforce. Finally, for the bulk of labourers, the growth will represent a chance to get a highly risky job which they accept because it allows them more earnings than any of the livelihoods available in the city. For most of these workers located at the bottom-end of the decision-making hierarchies, the favourable prices will not be reflected in their OHS. In addition, although there is potential to generate high earnings, this is regulated by the increasingly available workforce rather than by the actual mineral prices, and wages will not even allow many to purchase PPE. Labourers earnings are not translated into a higher acquisitive power because, as mineral prices rise, so do the local prices in Potosí. For them, accepting the increased risks and conditions imposed by better positioned labourers and members is a strategy to secure their livelihoods and living.

Uncertainty, conflict, and the security of taking OHS risks

As demonstrated in this chapter, both increases and decreases in mineral prices negatively impact most miners' OHS. But this is not only due to the effects that changes in mineral prices have on the miners' relationships with buyers. With a national economy primarily based on exporting raw materials (mainly hydrocarbons and minerals) changes in the mineral prices greatly affect Bolivia's national incomes, and this in turn influences the risks and uncertainties miners face in their lives and livelihoods and their OHS choices and opportunities. As a result, as miners say, both periods of 'thin and fat cows' (correspondingly, decreases and increases in prices and reduced or enhanced state services) directly triggers voluntary risk-taking amongst the miners. This is respectively justified by the need to 'extract whatever in order to survive and feed my family when prices are low', as explained by Don Román, and by the need 'to extract as much mineral as possible while prices are good' as *El Verde* puts it. In addition, it is not only the economic situation of Bolivia, Potosí and of the miners themselves that is affected by (and changes with) the fluctuations in the mineral prices, but also, and with it, the social and political context. Prolonged low mineral prices negatively affect state and regional incomes and eventually reduce state capacity, the services provided to miners and redistribution of the resources (cf. Shandro et al, 2011; UDAPE, 2010; Godoy, 1985). For example, I have explained how the fall in tin prices during the 1980s caused rises in inflation, of local prices and of unemployment that were accompanied by a decrease in the welfare state and social expenditures. Moreover, as illustrated by June Nash, (1992, 1993), changes in

mineral prices further affect miners' living and working conditions because they alter national politics. In fact, changes in the mineral prices are associated with episodes of social unrest (Laserna and Villaroel, 2008), and have traditionally determined the political changes in Bolivia, with socialist-nationalist governments reaching power during periods of rising prices (1952, 2005) and neoliberal ones during periods of crisis (1900, 1985). As illustrated in Chapters 2 and 6, these changes in national politics affect miners and OHS in that they differently frame the miners' relations with the state and with other productive sectors operating in the country – which are determined by the particular type of mining prioritised by each governing party. In addition, these changes realign the distribution of the mining royalties among the different regions and the allocation of funding to different state programmes. For example, the fall in tin prices during the 1980s also resulted in the privatisation and liberalisation of the nationalised mining industry, the removal of state support with the cooperatives' commercialisation and production, in reduced state involvement in production (Nina and Brooks, 2001) and in reduced state interventionism in economic matters (Sanabria, 1999). These changes ultimately influenced the situation experienced today in the Cerro. In turn, high mineral prices negatively affect miners' OHS because they increase local corruption (cf. Davies, 2010; IISD, 2008) and rent-seeking behaviour (Ballard and Banks, 2003; Ross, 1999) at both the national and local sphere. Furthermore, the Potosinos' tend, as various businessmen and street vendors explained, to respond by increasing rents and prices for necessities 'to make sure cooperativists are not the only ones benefitting from the natural resources that belong to us all'. This in turn decreases most miners' acquisitive power despite the high prices, and triggers local conflict regarding 'who benefits from mining'.

As explained in Chapter 2, Bolivians have historically referred to their resource curse by bitterly saying that the metal belongs to the devil and by making reference to its 'diabolic nature'. This diabolical nature has not only traditionally impeded Bolivians from benefitting from mining (Córdova-Claure, 1986), but has also subjected miners to an exploitation that shortens their lives, both during periods of crisis and boom. In fact, according to miners' accounts and to the statistics that I collected, the number of work-related deaths in the Cerro oscillate according to fluctuations in the mineral prices (see Figure 5.2):

Figure 5.2. Miners' deaths and tin prices (2000-2005)

Using data from the Potosí's cemetery and from the IMF (CMPI, 2013), the graph illustrates six years of monthly data on the number of miners' deaths and tin prices between 2000 and 2005 (inclusive). The graph shows the number of death increases when tin prices are both low and high ($p\text{-value} < 0.05$, based on Poisson regression with log-link function); the solid and dashed curves represent the predicted relationship and its 95% confidence interval.

It is thus clear that more accidents occur both when mineral prices increase and when they decrease, and slightly fewer accidents happen during periods of steady prices regardless of whether prices are high or low. This suggests that it is the 'periodization' (Mitre, 1993: 9) and 'volatility' (IISD, 2008: 1) of the mineral prices rather than solely the specific chain of reactions and relations developed during particular episodes of rises or decreases that ultimately shapes OHS in the Cerro. At an individual level, this becomes clearer with *El Verde's* and *Felicos'* accounts on how an episode of high prices pushes them to take and accept risks because they 'must take advantage of the situation while it lasts'. Similarly, it is the uncertain temporality of the prices that limits the effectiveness of the miners' strategies to prevent the effects of decreasing prices in their livelihoods and lives. For example, Don Pablo keeps bagged minerals of high purity buried in his *paraje* with the intention of selling them as their individual prices rise. However, as he says, 'the problem is that sometimes one keeps the mineral and prices, instead of improving, they worsen'. Doña Francisca also keeps bags with, what is for her,

‘good-quality’ mineral at her home for when prices decrease. ‘The problem’, as she puts it, ‘is that we never know when prices will increase again and, in the end, one has to eat’. Like many other miners in the Cerro, she ends up selling before prices increase.

The ‘periodization’ thus hampers miners’ OHS in that it limits the success of their individual strategies for managing these risks and restricts their ‘forward planning’ (cf. WORKSAFE, 2005; Wood, 2003). Hence, it pushes individuals to live in the present, continuously accepting and taking risks to their health, which ultimately increases their threshold of risk. The periodization further affects miners and OHS in that it increases the political instability of the country (see Chapter 2 and Annex 4), and complicates governments’ financial planning (Kaup, 2013; Wanderley, 2009; Gereffi, 1999; Ross, 1999; Auty, 1993). Thus, it determines the ephemeral nature and rapid expiration of both public services and the strategies and programs that the governing parties make available specifically to cooperatives. As the following section shows, this too affects OHS in the Cerro because of the miners’ reluctance to use and rely on the opportunities and services offered by the Morales’ administration despite the fact that they themselves admit that these strategies ‘might actually help’. For example, aware that state support and their relations with the state are highly dependent on international mineral prices, the current government’s attempts at re-enabling mining cooperatives’ access to credit through FOFIM is having little success. For cooperative miners, continuing with their agreements with buyers instead of moving onto the new opportunities offered by the current government is a risk management strategy they justify by making reference to previous changes in the behaviour of the state. For example, during the 1980s, when it suddenly removed miners’ access to credits and stopped providing extractive technologies, leaving them with nothing but their hands and creativity to extract the mineral with (Möeller, 2007).

5.5. Building resilience through defiance and risk-acceptance

Miners are well aware of their multidimensional dependency on buyers and supply chain relations (cf. James and Walters, 2011; Walters and James, 2009; OXFAM, 2004). Their memories on how things were different during the 1950s when the nationalist state was, via BAMIN, buying minerals at fixed rates and protecting them from price fluctuations moulds their agency. After BAMIN’s closure in 1991, the state did not provide or endorse alternative financing mechanisms for small mining (Araníbar, 2005), until 2011. The state did create (during the first increase in mineral prices since 1989) the Mining Investment Fund (FOMIN) in 2003 in order to promote economic recovery and transformation of the production for the

cooperatives (Araníbar, 2005). However, mainly focused on exploration, FOMIN had no effect in the Cerro. For miners, co-funding with the state for exploration of their concessions meant that 'any other miner, cooperative or private mining-entrepreneurs would have access to the resulting report'. The type, quality and quantity of mineral left in their concessions and *parajes* is something they are very eager to keep to themselves to avoid conflicts regarding access to the vein. Persuaded by FENCOMÍN, Morales replaced FOMIN by FOFIM (Mining Financial Fund) in 2009. Operative since October 2011, FOFIM offers access to credits to the cooperatives. It is too early to say how FOFIM will change things for the miners. During conversations with miners, some declared their reticence to rely on what they consider to be 'temporary state support' while others seemed more concerned about the effects of these credits on their productive capacities. In addition, given the disparities among miners and the fact that miners build productive alliances in order to secure technological assets, it could be that these credits will reinforce inequalities between the miners. Despite acknowledging the potential benefits, the miners I spoke to preferred continuing with their agreements with the buyers. This predisposition is influenced not only by the miners' reluctance to rely on what they perceive as a temporary state-service, but also by the fact that many members are themselves (or dream of being), buyers and investors.

Social unrest thus has continued, with cooperativists and state-miners led by the COB demanding the reopening of BAMIN. However, fearing this would jeopardise the national economy when international mineral prices drop again (as happened in 1956, see Chapter 2), Morales and the MAS party are disinclined to repeat the protectionism of the 1952 nationalist government. Instead, to preserve revenues (Sanabria-Rocha, 2009), and in response to these demands, Morales created in 2008 (during the last mineral prices crisis) a Mining Stabilization Fund (FCM). The FCM's role is to maintain stable internal mineral prices regardless of the international dynamics and fluctuations. However it is only, so far, working on zinc and in the form of credits that the miners have to repay afterwards. It has therefore had no impact in the Cerro, where the main minerals are tin and silver and where miners (whose productive capacity depends of the mineral they find in their increasingly depleting *parajes*) are reluctant to embark in such a credit venture as they wish to avoid becoming indebted and because the majority of them cannot ultimately afford such a venture.

The effects of Bolivia's dependency on the fluctuations of the international market have resulted in miners and Bolivians joining together and demanding that the state industrialise the mining sector and nationalise processing plants. This is seen as key to retaining the added

value in the country and thus, decreasing Bolivia's dependency on the internationally-dictated mineral prices and reinforcing its resilience to these fluctuations. Morales' government has included the industrialisation of the mining sector as one of the objectives of the Ministry of Mining in the NCPE. However, in practice, industrialisation has been little more than a repeated theme of both regional and national electoral propaganda and a cause of repeated episodes of social unrest for years in Bolivia (see Chapter 6).

5.6. Conclusions

Theorising workers and workplaces as people and institutions embedded in stable socio-political and economic environments and, perhaps subsequently assuming that since OHS hazards can be harmful people will seek to eliminate or reduce them, OHS experts predict that decision-makers will spend on OHS up to the point where marginal benefits equal marginal costs (Wooden et al, 1998, in Shannon et al, 2001). For these experts, OHS risk management decision-making is the result of an institutional or individual cost-benefit analysis in which the economic (and human) costs of managing or not managing particular OHS risks have been carefully weighted (Meijster et al, 2011; Arrow et al, 1996). In fact, the desirability of equating marginal costs and benefits has long been recognised as the OHS decision-making guiding principle (see Lahiri et al, 2005; Dorman, 2000; Royal Society, 1992; WHO, 2002). This chapter has challenged this reductionist economic approach to OHS by illustrating how it overlooks the broader economic considerations and actors involved in people's OHS choices. OHS decisions involve balancing the costs and benefits of managing (or not) particular OHS risks (McDaniels and Small, 2004), just as they involve the weighing of overlapping personal and work-related risks and uncertainties, as well as broader national and international factors. Yet, as shown in this chapter, individuals and cooperatives often have little or no control over these broader and overlapping factors, and OHS risks are only a small group of factors.

In this context of overlapping risks and uncertainties, OHS becomes the result of risk trade-offs (cf. Graham and Baert-Viener, 1997; Viscusi, 1983). Miners seek and build alliances with large buyers despite their awareness that these incur greater OHS risks, higher production costs, and the added possibility of buyers taking advantage of their role as retentive agents because these agreements provide access to machinery and secure mineral extraction, enabling miners to protect their livelihoods and earnings. Miners build resilience by decentralising mineral production and commercialisation according to different workgroups. They are aware that this decentralisation reduces their common earnings (as illustrated in the introduction of this

chapter with the miners' encounter with the Korean buyers), fosters individualism, increases inequalities and decreases mutual help and solidarity. But it also allows them to flexibly adapt to withstand shocks and trends that would otherwise impede their collective survival.

Miners and the mining cooperatives are, as Knapp and Pigott (1997) say, workers and firms answering the call of supply and demand from a global economy. The miners, and more generally Bolivia's dependency on internationally-dictated mineral (and hydrocarbon) prices and on trade competitions largely shape the challenges and opportunities that miners experience. As these international prices change, so do the miners' personal circumstances, their relationships with buyers and at work, and the actual risks they face at work and beyond. This in turn influences their scope for OHS risk management. The indeterminacy that is associated with the resulting overlapping uncertainties that the miners face hampers OHS in that it prompts miners to seek individual gains to the detriment of others and also impedes longer term planning, compelling miners to react rather than plan. In turn, mineral price fluctuations and the associated insecurities in the miners' lives and livelihoods have two overlapping effects on the miners' 'feelings' (cf. Slovic, 2010: 21) and behaviours towards OHS risks: they push miners to take and accept OHS risks they know of, both when mineral prices rise and drop. Simultaneously, the uncertainty of the duration of the prices compels miners to continuously live the present in order to try and stave off an uncertain future, further shaping in this manner their high degree of 'risk acceptability' (cf. Wilson; 1984: 11) and their high threshold of risk.

In turn, these multiple economic factors and relations that determine miners' OHS choices are also part of the challenge posed to the state by resource wealth (cf. Ballard and Banks, 2003). Market forces and competitions and their effects on national economy have determined the ephemeral nature of the support offered by the state. These fluctuations and their accumulative effects ultimately mould the 'hazardscape' (cf. Cutter, 2006: 9) in which particular living standards, work patterns, processes and specific social relations develop. These, in turn, further shape the particular conceptualisations of risk and peoples' scope for OHS risk management. In fact, rather than being elements of the past, these historical happenings and experiences continue to affect the miners' lives and livelihoods, both through the miners' memories on how things were different to them in the past and through socio-political and economic legacies, such as their dependency to unregulated buyers. As the next chapter shows, these historical experiences and legacies further affect OHS in the Cerro in that they determine the miners' relationships with the state.

Bolivia's current 'process of change' is based on the *suma qamaña* or *Vivir Bien* (in English, well-living), which calls for more egalitarian and reciprocal economic and socio-political relations within and beyond Bolivia as a pathway to achieving the 'living well' goal. The next chapter analyses the cooperative miners' relationships with the Morales' government and the effects of these for OHS in the Cerro.

6. 'They manage themselves': The miners, the state and the politics of OHS

'Nobody listens to the miner... they [NGOs, government officials] come to give us training and more training... they come, vomit what they came to tell us and then leave without ever listening to our concerns... We no longer attend to these trainings. What for? They don't bring any solutions... and to waste our time [on trainings] we [would] rather work. What the miner needs isn't people telling him the ideal of how things should be. Solutions! That's what the miner needs! You've seen it Mei, so you already know... That's why sometimes we take the streets... to be heard; if they don't want to listen we have to make them... Don't we?'

(Augusto, President of FEDECOMÍN)

On 29 May 2010, I accompanied COMIBOL's and CEPROMÍN's OHS experts to one of the very few OHS trainings conducted annually in the Cerro, aimed at decreasing the high rates of accidents and diseases among miners. We arrived at Mina Adela (a mineshaft operated by Cooperativa Imperial, one of the largest cooperatives in the Cerro) before 9am 'so that we can catch them just before they enter', said Don Ricardo, the man responsible for CEPROMÍN's OHS programme. For Don Ricardo, one of the major problems of the OHS programmes is miners' attendance, something that Mamani, COMIBOL's mining engineer in charge of the session, justified saying that 'these miners are only interested in producing mineral and refuse to invest in their own safety'. As miners were preparing for work doing the routine *akulliku* in front of the mineshaft, Mamani started the information session – exclusively focused on PPE, as indeed were all the meetings of this sort I attended – 'informing' them that 'as soon as you enter the mine you start facing several risks' and that 'to preserve one's life, the same as warriors in conflict zones, one is to be protected with helmets'. His childish approach to workers' personal safety reminded me of another OHS expert I had interviewed the week before. He had told me:

'I draw little pictures to show them what a hazard is, so that they learn... they have simple minds, don't you see? I hope that with my little drawings their memory will act on their behalf so that they'll behave differently... the problem is that I've to remind them often of what I taught them, because they easily forget'.

Mamani continued the 'OHS training' by informing the 25 miners present⁵⁹ that according to Bolivian legislations employers must provide workers with the PPE needed to work safely. He suggested that labourers should ask the members who employed them to comply with these legal responsibilities, ignoring the legislation, which reverts the concession to COMIBOL if there is evidence of subcontracting practices within cooperatives. At this point, the *delegado* or 'delegate'⁶⁰ of the cooperative which mined Mina Adela shot a pointed look at the engineer, and Mamani instantly shifted his discourse, saying instead to the labourers:

'Each one of you must invest in your own safety... If you have some self-esteem! You should ask yourselves... can I work without health? Without limbs? Where can I work if I lost my eye? You should keep aside some of your drinking⁶¹ money to buy yourselves quality boots, lamps, and helmets... that may eventually save your lives.'

Towards the end of the 'training', which lasted 20 minutes, Mamani handed out a leaflet containing instructions on how to manage OHS hazards by using PPE. On the front page, in bold, was written: 'If you think that Health and Safety is expensive, try ignorance'. Underneath, a carefully chosen picture showed a miner protected with a helmet and with his mouth full of coca leaves looking at the mineral in a rock that he was proudly holding whilst, it seemed, mentally estimating the earnings that this find involved. The following sentence was: 'We want healthy, whole and productive workers that return every day to their homes. This is our on-going challenge. Help us to make it happen'.

The OHS 'experts' then abandoned the shaft leaving the miners looking at the leaflets, and I walked with them to their car before returning to the miners. Entirely overlooking miners' say in OHS and COMIBOL's official disregard to existing legislation, Don Ricardo and Mamani

⁵⁹ Although OHS experts inform FEDECOMÍN and the cooperatives that they will be conducting OHS trainings around the Cerro, they do not advertise the sessions. On this occasion, they selected this mineshaft because it belongs to one of the largest cooperatives in the Cerro; they expected to find more miners in Mina Adela than in other shafts.

⁶⁰ Unlike The Cooperative, most cooperatives have their mineshafts spread across the different parts of the Cerro. In these cases, cooperative members nominate one or various members as 'delegates' in order to control production and social issues in each mineshaft and to liaise between each shaft and the board of directors. If members operating in a particular mineshaft encounter problems, they should report to their delegates, who in turn report them to the cooperative's board. Delegates are not considered members of the board of directors and are not paid for this job. Thus, this job does not affect their ability to continue mining, although it allows them to establish alliances with members that benefit them.

⁶¹ Alcohol consumption amongst cooperativists is frequently used by Potosinos and Bolivians to stigmatise miners for their lifestyle and to blame them for their OHS and choices. However, drinking amongst miners responds more to social and cosmological encounters and imperatives than to addiction (Bunker, 1987).

looked satisfied, as Don Ricardo told the engineer: ‘we are leaving them thinking about their safety, which is good’. This statement reflected the experts’ conviction that, in raising awareness of the likely health effects of mining and of the ‘simple steps’ through which to minimise and prevent these (HSE, 2011), the training would influence and persuade the miners to ‘reflect upon’ and ‘improve’ their OHS risk behaviours (Swartz, 2001; WHO, 2002; Feyer and Williamson, 2004; WHO, 2010). In contrast, the fact that the training took place just before work made the miners think of the possible health consequences, which is something they tend to avoid ‘because it causes accidents’ (see Chapter 3). In this sense, for miners, not thinking of what may happen is a risk management strategy, and they often also use this to justify their refusal to attend OHS training. As I returned to the shaft and sat with the miners, one of them looked at me with a bitter smile and said: ‘everybody tells us what to do, but nobody helps us do it’. This comment was echoed by the other miners who, with the same bitter smiles, started shaking their heads in disappointment. ‘You see?’ said another miner to me in confidence:

‘You already know us enough to understand how we work, what we live, do, and why... because you come to work with us and you have seen and lived with us. You know better now and it’s good that you witness it, so you can see that we’re not lying... We’re left to yield our own luck.’

According to the ILO, ‘because it requires a minimum level of skills, technical knowledge and resources, OHS in small-scale enterprises (SSEs) continues to be a daunting challenge’ (ILO, 2011: 11). The report concludes that ‘progress in this area is very dependent on easier access to basic OHS information and training, on the national OHS legislative framework, and on the national OHS system which contains the infrastructure to implement the policy’ (ibid). Similarly, OHS literature often stresses that ‘the problem of OHS in developing countries is that SSEs are left out of legislation’ (Jeyaratnam, 1992: 54) and hence, that workers ‘are not protected by the institutions that govern OHS’ (Alfers, 2009: 4). This emphasis on OHS regulation as a key strategy through which to influence miners and cooperatives to behave in ways deemed to be successful in improving OHS in turn shapes OHS experts’ efforts on formalising employment (Bluff et al, 2004; Aranibar, 2005; Lund and Marriot, 2005). My research however, shows a more complex scenario, in which relationships other than those established by OHS regulatory frameworks and legislation matter for understanding how cooperative miners relate with the government and how these relationships in turn shape OHS in the Cerro. Previous chapters have demonstrated that the miners’ OHS is not only determined by the formality or informality of their jobs, and that changes in Bolivia’s politico-

economic environment have historically transformed both the risks presented to the miners during their lives and livelihoods and their ability to respond to these. This becomes clearer when one observes that, in 1985, when miners' working conditions declined from bad to abysmal (Nash, 1993), changes in Bolivia's state policies and governance were not accompanied by changes in OHS law (which had been enacted in 1979; see ISAT, 2011). To explore these wider factors and relations that frame how cooperative miners relate to the government and how, in turn, these relationships influence how the miners perceive and behave in relation to OHS risks, I shall in this chapter unravel the politics behind Mamani's speech during the training just described. I discuss the cooperative miners' relationships with the Morales' government and analyse, from different angles, how these relationships simultaneously 'contour' risk and safety (cf. Kasperson and Kasperson, 2005) in the Cerro in spite of Bolivian OHS legislative framework and the OHS system in place.

6.1. 'Legislation we have, but compliance... this is another thing!' Technical assistance and organised irresponsibility

Written through an inclusive process of participation and approved by referendum in January 2009, the New Bolivian Constitution (NCPE) has placed cooperative mining at the centre of the country's 'Living Well' Development Plan. Seen as key for combating Bolivia's resource curse, by enabling inclusive development through broad-based access to natural resources and the means of production (with the economic and political power), cooperatives are now protected and encouraged under the new Bolivian economic model. Giving priority to the small and medium productive sectors, according to the NCPE (2009) and to the Ministry of Productive Development and Plural Economy (MDPEP, 2011), the role of the state is to promote, support and strengthen cooperatives while ensuring decent work practices, fair relations of production, and compliance with the national legislation and international conventions on jurisdiction. How does this play out in practice?

In the particular case of the mining cooperatives operating at the Cerro, the 'supportive and empowering' role of the state has primarily focused on the delivery of technologies aimed at increasing the productivity of this sector. In 2009, Evo Morales, as part of the Venezuela-funded, Bolivian development program *Evo Cumple* ('Evo Delivers'), bought two private mineral processing plants and handed their management over to FEDECOMÍN and to the Cooperativa Unificada (one of the largest cooperatives operating in the Cerro) with the intention of helping members by providing technology for processing ore before selling it.

While a good idea,⁶² the processing plant has come to benefit only ‘the haves’ (cf. Madeley, 1991: 4) due to the high processing costs (250-400Bs or 36-57US\$ per ton) that few miners in the Cerro can afford. This, in effect has led to deepening inequalities among cooperative miners. Similarly, allocating management to the largest cooperative – which questions the government’s prioritised support for smaller producers (see below) – has also limited the access to other, usually smaller, cooperatives, since preference has been given to the members of the Cooperativa Unificada and those members that have informal productive alliances with this cooperative or its members. This has created tensions and resulted in personal agreements between members being broken. As explained in earlier chapters, these agreements determine the risks some miners face and their means to manage these. In this sense, the delivery of processing technology has contributed to shaping some individuals’ particular OHS risk-acceptance and risk-taking behaviours, and has meant that less powerful members and most labourers encounter more risks over longer periods of time, which they are simultaneously less capable of preventing or responding to.⁶³

Morales had also delivered air compressors and hammer-drills to various cooperatives in the Cerro in 2008 but, this too did not accomplish the objective for the following reasons. First, as explained in Chapter 4, cooperatives are highly decentralised and each member organises his or her own assets and production. The injection of technology has therefore led to intra-cooperative tensions over the use of the technology given, as within most of the cooperatives the drills and compressors were being exclusively used by elected leaders and empowered members and their allies. In addition, many of these compressors can still be found within the original packaging, aside the mineshafts. They are largely unused because only the base of the Cerro, where COMIBOL based its extractive infrastructures from 1952 to 1985,⁶⁴ has electricity. If the miners do use ‘sophisticated’ technology such as hammer-drills, then these have to be powered by petrol-fuelled compressors. Second, this machinery is already being supplied by

⁶² This decision was based on the assumption that ‘technology improves the miners’ earnings and investment capacities needed to enhance production and OHS while simultaneously helping increase the cooperatives’ contribution to regional and national development through increased revenues’ (Vice-Minister of Mining Productive Development, interview 13/09/2010).

⁶³ A comparable situation happened with the *palliris*, who, marginalised from the technology delivered by the government, received through their *asociación* a small refinery donated by an altruistic donor through a local NGO. However, since the *Ingenio Palliri* led to increased conflicts amongst these women, they collectively decided to lend the smelter out to a local buyer and divide the rental money.

⁶⁴ There is also electricity in the top part of the Cerro, operated by *Manquiri (Proyecto San Bartolomé)*, subsidiary of Coeur d’Alene Mines Corporation, the largest U.S.-based primary silver producer in the world, but this is not shared with cooperatives.

mineral buyers, wealthy members or private investors, and breaking this cycle and its associated obligations and commitments, as explained in Chapter 5, needs more than a simple injection of technology. Furthermore, according to miners, the machinery provided by the government consumes more electricity and has less power than that the miners are already borrowing from buyers and other investors who, in most cases, are also responsible for repair and maintenance (since their profits are dependent on miners' production). Third, the lower power of the government air compressors results in lower oxygen supply to the *parajes* while miners are drilling. This increases the concentration of dust within confined spaces and hence miners' breathing difficulties, as well as the risk of accumulation of poisonous gases inside the mines due to the lack of ventilation. As I explain in more detail below, this is partly because miners tend to open tunnels further away than legally allowed, and because there is no effective government control over this. When interviewed, government officials say that 'some control comes from using GPS but the most efficient control system is miners themselves'. This transference of government responsibilities to miners becomes a source of conflict among miners and cooperatives who, striving to find minerals in an increasingly depleted Cerro, and under the threat of having their concession reverted to the state if they cannot produce, often drill beyond their concession areas and, in so doing, create situations of conflict when the diverse tunnels and *parajes* merge. Finally, since no check-ups or maintenance is being carried out by the few miners that have adopted the electrically-fuelled air compressors, the probability of accidents has increased. This was the case of David (26), a labourer of the Cooperativa Mayo, who dislocated and fractured his arm while drilling due to a sudden increase in the air pressure. Being a young miner, he now works as a mine tourist guide. While the government view is that these miners do not know how to use the technology provided, the fact is that the technology does not fit miners' actual needs, and miners do not dare to sell it to purchase needed material in case of government control.

Indeed, the government assumption that the delivery of technology will increase miners' profits and thus, their abilities to improve both production and OHS, has, in effect, deepened the already-existing inequalities among miners, further influencing the uneven distribution of power, assets and risks in the Cerro, as well as the construction of certain OHS risks. Government support is however not limited to the delivery of processing and extractive technology. Additional help is provided by the Department of Technical Assistance of the new (2009) Vice-Ministry of Mining Cooperatives. Yet, as officials from this department told me, this support is in practice reduced to 'guidance', to 'recommending to cooperative members how best to operate in order to increase production in accordance to the existing legislation'.

As I further discuss below, reflecting the government's disengagement regarding compliance and the disjuncture between written legislation, state support, and law enforcement, these government officials recognise that 'then, if miners do it, this is another thing'.

Aware of the irregularities within the mining cooperatives in the Cerro and acknowledging not only that 'mining cooperatives have limited OHS' but also that 'it's complicated for this sector to achieve major compliance' (Vice-Minister of Mining Cooperatives,⁶⁵ in El Potosí, 2010), the Department of Technical Assistance limits its activities to advising those cooperatives that request its services on how best to proceed, since law enforcement, according to these government officials, falls into the jurisprudence of the Ministry of Employment and COMIBOL (as the entity that rents the concessions to cooperatives). However, according to COMIBOL officials, COMIBOL's responsibilities end with the contract, as they are only authorised to administer mining exploitation. Thereafter they transfer the responsibility of auditing and improving the work of cooperatives to the Ministry of Mining and Metallurgy.⁶⁶ In turn, this Ministry hands over the control and enforcement responsibilities to the Ministry of Employment, that admits having no jurisprudence over the mining cooperatives which are, according to this Ministry, the responsibility of the Vice-Ministry of Mining Cooperatives and, for the specific issue of OHS, they refer to INSO⁶⁷ or National Institute on Occupational Health. Finally, INSO officials admit that since they receive no government funding, they charge for their services, and consequently, no cooperatives have ever requested these. For them, the working conditions of cooperative miners are the responsibility of the Ministry of Mining and COMIBOL, arriving in this way through the legally-backed chain of what Beck would term 'organised irresponsibility' (Beck, 1988), at a dead end.

For Beck (1988), the configuration of this system of organised irresponsibility is self-endangering; since it jeopardises the achievement of what safety regulations propose to solve, it guarantees the continuation of the relations that obstruct OHS despite government efforts

⁶⁵ This press conference was organised after two miners (aged 25 and 17) died in two separate work accidents in the Cerro due to (respectively) an explosion of dynamite and carbon monoxide gas. At the end of the press conference, the vice-minister 'reassured' the audience by saying 'the Vice-Ministry is working on *orienting* cooperatives to help them improve their OHS practices'. [emphasis added]

⁶⁶ Despite acting as autarkic units, COMIBOL and the Vice-Ministry of Mining Cooperatives are part of the Ministry of Mining.

⁶⁷ INSO was created in 1943 by USAID and passed to the Ministry of Health in 1962 with economic and administrative support from USA. Currently fully dependant on the Ministry of Health, INSO seems to be largely symbolic. In 2008, INSO announced that, during that year, 30 workers had died while working in Bolivia, while the statistics I collected in Potosí point a larger number just for the Cerro.

to ameliorate these (Elliott, 2002). Indeed, and reinforced by the lack of government presence in the Cerro,⁶⁸ this organised bureaucratic irresponsibility harms miners and their OHS in many diverse and overlapping ways: miners do not usually expect or receive governmental help when conflicts and unfair situations arise. In fact, when these happen, miners, regardless of their statuses as formal members or as informally subcontracted labourers, are usually told by the (national and regional) authorities to take their concerns to their respective cooperatives or to FEDECOMÍN, which is constituted and led by, usually empowered, cooperative members themselves. As explained in previous chapters, bringing problems to the cooperative may result in the miner (either the accused or the accuser, depending on the situation and on who is involved) being expelled for 'attempting [to go] against the harmonious running of the cooperative', in simply receiving a 'warning', or in losing his or her agreements with other members either as punishment or as a result of generated mistrust. In turn, FEDECOMÍN may be able to solve the issue but it will normally depend on 'who is involved'.

As a result of this very limited state engagement, few cooperative miners seek and receive governmental support. Deciding whether to do so or not usually depends on the personal relationship between the particular miner and the government official. Also, receiving government help does not always yield better results: As the authorities approach miners with questions, the questioned miners will first deny the case or the problem. These miners will then usually pressure the miner who sought governmental support to retract the statement from the authorities, and finally 'the troublemaker' will suffer the consequences of seeking external help for sorting internal (cooperative) issues. This was the case of Daniel (30), a subcontracted group leader⁶⁹ who, not being paid for a piece of work, lost his job and his group membership after requesting that the regional authorities provide support and help him recover payment. Daniel is now indebted to his subcontracted labourers and has struggled to

⁶⁸ The only state presence is a small health centre (initiated in 2006 by Coopi, an Italian NGO) and a symbolic (often closed) COMIBOL office at the very base of the mountain whose role is reduced to channeling cooperatives' requests for new areas of exploitation, controlling the mineral extracted from the Cerro, and organising a few yearly OHS informative sessions in collaboration with national and transnational NGOs and governmental agencies. *La Plata* Health Centre previously delivered free health care and medications, OHS trainings, donated PPE to labourers and offered health checks with the training as an incentive for the miners to attend. This however stopped in 2009, when the centre was handed over to the Potosí municipality. Since 2009, the centre no longer keeps records of miners' accidents and diseases, nor offers OHS trainings or free PPE or treatment.

⁶⁹ Members usually subcontract individual labourers for a certain job or time (day, weeks, 10 trucks, 12 wagons, etc.) according to their needs and assets. But they may also subcontract a team of labourers to do the full job. In these cases, the subcontracted group leader is the one that deals with the member (or, in his absence, with the second-hand), manages production, the workgroup and covers the production costs.

find a job as wagon-pusher in any mine in the Cerro. For him, reporting the situation to the authorities and receiving their attention has resulted in the loss of his status as the ‘labourers’ team leader’, meaning he now has to ‘start again from zero’: returning to the more physically demanding jobs where he has no voice nor power.

6.2. Left to yield our own luck? Taking matters into our own hands!

This organised irresponsibility and the associated informal processes often result in the miners taking matters into their own hands. For example, the way miners tend to resolve conflicts derived from limiting concessions and neighbouring *parajes* in the Cerro is with a race to the mineral vein. As explained in Chapter 4, each cooperative works the mineral concessions lent from the state and ‘allocates’ the rented space amongst its members. There are currently 31 cooperatives working in this mountain, with a total of 18,000 miners, and the tunnels inside the Cerro are estimated to be a total of 90km long, divided into 17 underground levels (SERGEOTECMIN, 2011). As miners advance the tunnels (often beyond their allowed concessions), it is common that neighbouring tunnels and *parajes* (belonging to the same or to different cooperatives) combine after drilling, collapsing or after explosions. In a gradually depleting mountain,⁷⁰ with an obsolete Mining Code that did not foresee the particular situation in the Cerro,⁷¹ and fearing that if there is no production the state will take back the concession, some miners see possibilities for personal gain in others’ misfortune. These individualised actions to secure personal gain are reinforced by buyers that pay and provide technology according to production (see Chapter 5), and by the way in which the government, through well-established organised irresponsibility, seemingly absolves itself of any responsibility. The miners thus determine ownership of these combined tunnels and cavities through an organised race. The first group or member to reach the mineral vein becomes the new owner of the converged areas. These races become authentic battlefields which result in favouring more powerful members (that have more technology and are able to employ larger workforces) and are thus more able to access the minerals. They also construct OHS risks through the strategies used by miners in the race, such as burning truck rubber tyres in

⁷⁰ 10% of the Potosí revenues from mining are, by law (DS 3787), to be used for mineral exploration, but no government exploration is being undertaken in the Cerro to discover if there are minerals in the concession areas. The responsibility falls instead on the cooperative members that request these areas for exploitation.

⁷¹ Elaborated in 1997 when private mining was prioritised by the government, this code does not fit the specific situation in the Cerro where cooperatives have various mineral concessions spread all around the mountain and where the underground limits between concessions are unclear and, if extended, often merge.

confined spaces to obstruct and disorientate other miners, intentionally collapsing accesses to the *paraje*, or working non-stop for several days and nights to win the race.

Miners occasionally reach intra or inter-cooperative agreements that the involved workgroups will pool resources and divide gains according to their specific roles in the production of the common area (and thus, according to their assets). These arrangements help, temporarily at least, to avoid situations of conflict. Nonetheless, the power relations established among the members, which reflect their productive assets, influence OHS and the different miners' choices and capabilities to manage risks, often ultimately resulting in conflict. More common and less extreme practices used to resolve disputes over access to minerals involve verbal threats, physical fights, bullying, and marginalisation from productive agreements. Miners also occasionally steal minerals or tools from other miners as a means to pressure them into taking agreements they would otherwise refuse or to impede their advancement towards the 'suspected' mineral vein.

Consequently, in allowing and prompting miners to take matters in their own hands, this organised irresponsibility allows some miners to freely use their power for their own benefit and to the detriment of others. It also encourages the individualist ethos of cooperative miners and contributes to some miners' acceptance of unfair situations (and their associated risks) as a strategy to avoid further problems. This is the case of Don Pablo, a member of The Cooperative who is frequently pressurised not to advance his *paraje* and secure his right to exploit a mineral vein. He often finds human faeces and urine in his *paraje*,⁷² rocks (without minerals) blocking the access, and occasionally has rocks and faeces thrown through the upper opening of his *paraje*. For Don Pablo, dealing with this situation himself instead of reporting it to his leaders or to those of the neighbouring cooperative (whose members are trying to stop and limit his mining activities) and accepting the risks involved to his health, is a strategy which avoids further conflicts, as these 'would bring no good and might even make things worse'. To manage this, Don Pablo has temporarily hired a group of labourers that work in his *paraje* at night, preventing in this manner other miners from blocking his *paraje*, and sharing and transferring, in this way, his OHS risks to less powerful workers that will accept them in order to have a job.

⁷² Within confined spaces, and given the temperature and humidity levels in Don Pablo's *paraje*, the smell makes it very hard to work as it produces nausea, vomiting and dizziness.

Organised irresponsibility thus ultimately galvanises the powerlessness experienced by some miners, as demonstrated in both the above-mentioned example of Don Pablo and in the case of Doña Margarita, who, the reader may recall from Chapter 3, has to repay a debt of 15,000Bs (2170US\$) when her monthly salary is 450Bs (65US\$, less than half the current Bolivian minimum wage), because drills were stolen while she was shopping for household goods. Helped by CEPROMÍN, Doña Margarita sought governmental help. But the regional government officials of the *Jefatura de Trabajo* (Regional Employment Bureau) told her that there was nothing they could do for her ‘because guarding the mine 24 hours per day, 365 days a year was part of her [verbal] contractual agreement’, and they referred her to FEDECOMÍN. In turn, FEDECOMÍN said it would not intercede because Doña Margarita, like most labourers, is informally employed by cooperative members and, as such, and since labourers are not members, they do not have access to the services offered by the Federation. She was told to take the issue to her cooperative, whose leaders reminded her that ‘if unhappy she was free to leave the job and repay the debt from elsewhere’.

While Doña Margarita ‘decided’ to remain in her job, this incident has changed her relationship with the miners in a way that directly imperils her health and that of her children. The theft and raising the unfair situation with local employment authorities has meant that, in addition to avoiding paying her, most of these miners no longer bring her gas, drinking water, candles and household goods, although some members started feeling sorry for her and would give her water or bring her gas, sometimes hiding these activities from other miners. This is because, while helping each other is frequent and well-regarded in the Cerro, miners are cautious about helping somebody who ‘does not deserve to be helped’ or who has altered the harmonic balance of life. This, as influenced by Andean cosmovision, may risk creating new enemies (and thus, the loss of productive agreements) through the act of helping somebody others label as ‘problematic’. This is what has happened to Doña Margarita over the repayment of the drills: while some members may be willing to decrease the amount she is to pay, if they do so openly it might reduce their standing with others members, who are likely to become suspicious of the member whose ‘action makes them look bad’. Such situations often drive miners to establish very secretive personal arrangements, thereby ensuring that nobody really knows the whole truth or situation.⁷³

⁷³ I have explained in Chapter 4 how this ‘secrecy’ simultaneously aids and hampers the different miners’ OHS; for instance, through helping protect the miners’ individual assets and decreasing solidarity and mutual help.

To repay the miners and regain their trust (by demonstrating her commitment to the cooperative), Doña Margarita has temporarily agreed to enter the mine to search for miners 'suspected' not to have exited at the end of the shift, whilst her 14-year old daughter Abigail works nightshifts as a wagon-pusher to help the household income. Seeking to hold the government to account, Abigail's experience was brought to the attention of the press by Jacqueline Pinto, the regional director of CEPROMÍN, together with CNN through a short documentary on the working conditions of children in these mines (see CNN, 2011). FEDECOMÍN's response was robust and immediate, demanding Jacqueline publicly withdraw her declarations, denying the (impressionistic) estimation of child labour made by the CNN, and publicly stating that these are practices FEDECOMÍN does not allow. As the NGO refused to issue a retraction, Doña Margarita was pressured by cooperative leaders into publicly stating that the 'CNN paid her to lie in the documentary'. The CNN reporters gathered funds to allow Doña Margarita to abandon the mine and instead live in the city with her children, but she refused and continues to work in the mine. According to Doña Margarita, moving to the city would not have helped her, as 'having five children she would have not been able to find a job and feed them'. To avoid further theft, Doña Margarita sleeps with her children over dynamite cartridges and often refuses to leave the mine despite being in urgent need of household goods (see Chapter 3). Having publically voiced her support for her cooperative by claiming that the documentary is not an accurate reflection of her life and by renewing her commitment to pay careful attention to the miners' equipment, Doña Margarita has been able to continue to work with the miners. Her story demonstrates both the futility of seeking government support and the need to constantly remain on good terms with cooperative members.

Bureaucratic irresponsibility and the consequent issues of power abuse, conflict and theft in the Cerro are thus, for many miners, important 'occupational risks' which shape their experiences of work and life and predispose some miners to accept risks and to act in ways which appear to jeopardise their health. This is not because of miners' lack of OHS knowledge (cf. ILO, 1999: 17), nor of because 'their unawareness of their rights and entitlements' (cf. Dorman, 2000: 5). Rather, these workers know that their rights will not be enforced, and, under these circumstances, the person who takes an OHS risk is aware of the potential losses, but also, of the potential gains of his or her decision. Managing OHS risks is dependent on having the power to do so. As illustrated above, in the Cerro, this power is determined by the sub-politics (cf. Beck, 1997; Little, 2000) which, increasingly taking over written regulations,

ultimately become the naturalised and legitimised decision-making arrangements that shape the different miners' actual entitlements. In this sense, organised irresponsibility makes most miners feel that they do not matter to the government they helped into power, and that the state, regardless of who governs and how, only cares about the royalties the miners accumulate. This shapes some miners' recognition of their powerlessness and overlapping risks as if these were the 'hold life has' over them (as illustrated with Doña Margarita in Chapter 3), while simultaneously enables others to continuously abuse their power. This also reinforces some miners' subversive character and their constant resorting to conflict as a way to solve problems, and this, in turn, further frames the risks faced by miners and their perceptions and thresholds of risk.

Research has long stressed the role of labour unions and worker representation in ensuring that workers have safe and healthy work environments (Partanen, 2002; Partanen et al, 2005; ILO, 2011b). This body of literature unanimously emphasises the importance of workers' collective bargaining for ameliorating OHS hazards (Dedobbeleer et al, 1990; Walters, 2003); addressing the OHS needs and concerns of workers (ITUC, 2010); ensuring compliance with existing legislations (Weil, 1991) and influencing employers and governments to actively engage in resolving OHS and labour concerns that may arise at the workplace (Bluff et al, 2004; ILO, 2011b). However, there is no labour union within Bolivia's mining cooperatives; as they are organised and managed by workers, unions appear not to make sense for this sector. While members are supposed to find representation through their respective cooperatives, FEDECOMÍN and FENCOMÍN, labourers are unable to unionise because they are not in legally-recognised jobs, as the Cooperative Law does not recognise sub-employment (Absi, 2009). This also means that these workers are unable to be legally represented. Their unionising efforts, often supported by NGOs, are further complicated by the contrasting interests and concerns of the different types of labourers (see Table 1.2), by the high temporality of mining for most labourers, and because these attempts have been traditionally obstructed by cooperative members and empowered labourers. The Cerro's labourers' last attempt at unionising was in June 2011, but as in their earlier efforts, after FEDECOMÍN publicly denied the subcontracting practices within cooperatives (see El Potosí, 2011) most of these 'subversive workers' lost their jobs.

6.3. The problem of ‘compliance only on paper’

While compliance with OHS and labour legislations – which COMIBOL officials admit is present in ‘some’ contractual agreements between COMIBOL, FEDECOMÍN and the mining cooperatives – is a precondition for mineral extraction,⁷⁴ in reality, as illustrated above and as indicated by CEDLA’s labour researcher Silvia Escobar (interview 12/02/2010), this represents little more than the ‘dead letter of the law’. Research in this area tends to explain precarious employment and OHS deficits by making reference to: states’ failure to ratify the ILO international conventions on labour standards (ILO, 2002); the lack of OHS regulations and infrastructures (ILO, 2011; Alli, 2008; ILO, 2002); to weak state capacity for law enforcement (Barnetson, 2010; Fenn and Veljanovski, 1988); and to some governments’ lack of motivation, sensitivity and will (Cappuccio, 2012; OXFAM, 2004; Ahasan and Partanen, 2001). For this body of literature, the pathway to improve workers’ OHS is to assist, train and guide governments to adopt the internationally accepted standards (Quinlan and Sheldon, 2011; Gunningham, 1998) via capacity-building programmes aimed at sensitising governments on the importance of these standards and at helping implementation (Evans and Gibb, 2009; WHO, 1995). OHS research also emphasises the importance of insisting that international standards and ‘good practices’ are obeyed (WHO, 2002) and of creating mechanisms for their compliance (LABOR, 2009). These mechanisms include economic incentives (Elsler et al, 2010), advice and persuasion strategies, inspections, compensations and rewards (ILO, 2011), as well as punitive sanctions, prosecutions, and penalties by national and international institutions when advice and persuasion have failed (Bluff et al, 2004; Bluff, 2004; Loewenson, 2001; SAFEWORK, 2000).

However, the fact that Bolivia has received international support for improving the working conditions of cooperative miners for over 30 years (ISAT, 2011; Bocángel, 2001), has ratified various ILO conventions (ILO, 2013), and has had an OHS law and system in place since 1979, brings into question not only the effectiveness, but also the appropriateness and ‘relevance’ (Walters, 2003: 1, see also Rinefort and Petrik, 2012; Turshen, 1986) of these dominant OHS prescriptions and their enforcement for really improving OHS. For Beck, the fact that ‘compliance is often just so much paper’ (1992: 42), is manifest of the contradiction between the fact that risks are produced by and within the social system and the lack of attribution of

⁷⁴ Art. 21 Mining Code; Art. 12. Cooperative Law; Art. 2. OHS Law (LGSOB, 1979).

this systemic causation within dominant risk management strategies (in Elliott, 2002). My research shows an even more complex scenario. I agree with Beck that OHS strategies need to account for the broader issues that are involved in OHS risks causation (and therefore management), and with Barnettson (2010) that this lack of compliance brings about the need to consider the pressures, options and constraints governments must navigate and which limit their capacity for law enforcement. Yet, as I will illustrate below, the 'lack of compliance' problem further points to the need to redirect attention from an strictly OHS focus to include contextual and global factors and interdependencies which, regardless of their role in OHS risk causation and management, are also key to achieve the health and safety goal.

In fact, OHS in the Cerro is also explained by many factors and relations, both historical and current, that frame the miners' and the government's actions and agencies, and which, in so doing, shape the actual relationships between the state and miners in spite of existing legislations and in spite of the diverse actors seeking to hold bureaucracy to account. First, the current relationships between mining cooperatives and the national government – which, in this aspect makes Morales' government, in practice, no different from the previous ones – are greatly determined by the historical role of miners in changing national politics. 'All governments have feared miners', explained two ex-ministers of employment and mining of opposing political parties in different interviews. This need for the government to avoid creating, as these ex-ministers said, *anticuerpos* (or 'enemies') with miners (who were, and are, among the fierce supporters of Morales), has historically helped justify the lack of government control and action over the working conditions of cooperatives in the Cerro. Second, the state's reliance on the royalties and taxes that cooperative miners bring in (see below) has led the government to choose to be strategically and 'consciously blind' to the situation in which cooperative miners work, to the hidden and overt politics in miners' relations of production, to their lack of compliance with existing legislations, and to the real impact of cooperative mining on most miners.

Through a combination of organised irresponsibility and conscious blindness, the government absolves itself of responsibility by saying that cooperative miners 'manage themselves'. This is illustrated in Evo Morales' speech during the ceremony to deliver the above-mentioned technologies to the cooperatives. He openly asked cooperative miners to reinstate 'workers' control' in the administration of these technologies, 'so that the technology serves the intended outcome' (ABI, 2009: 1). In so doing, Morales 'officially' positioned cooperative miners as the only responsible actors for their gains and losses while simultaneously making

reference to the social gain that stems from these miners' independence from national and private mining (see Chapter 2) and 'demonstrating' that his government fulfils the pre-electoral promises of support to the sector.

This is strengthened by the government view that 'it is best to keep miners occupied rather than having them blowing up dynamite in the streets and asking for jobs' (Juan Colque, interview 22/05/2010). Also, by the very limited cost of cooperative miners' disease, injury and death to the state (see below), and, according to the Minister of Mining, by the weakened state capacity for law enforcement 25 years after the IMF and WB's backed structural adjustment was implemented (in Erbol, 2010). As I will explain below when I discuss Bolivia's current transformations, this state capacity has now been further debilitated with the diversification of the mining industry into the different productive sectors encouraged with Morales' Plural Economy project. In turn, this situation is also reinforced by the lack of workers' unions within cooperatives and by partiality of the cooperative regulatory bodies, such as the Ministry of Mining, the Ministry of Employment, and other institutions directed and constituted by successful and empowered cooperative members that defend and protect the situation and conditions that allowed them to gain their political and economic power at all costs⁷⁵ (see below). Finally, this is coupled with the fact that less successful miners continue to hang onto and defend the livelihoods that allow them a living while hoping for 'their luck' to change and while constantly seeking to remain on good relations with cooperative members on whom they are totally dependent for work.

In effect, while accepting the royalties and revenues produced by this cooperative mining sector (which operates with little or no government investment) and using the rhetoric of the social economy and of 'workers' control' to defend the role of mining cooperatives in development – and thus their place within the new economic model and in Bolivia's development plan (PND) – there are no serious government attempts at promoting OHS or labour law enforcement within cooperatives (Gandarrillas, 2013; ErósteGUI, 2010; LABOR, 2009; CEDLA, 2009). Indeed, any attempt to do so, according to the interviewed government officials, would not only 'create enemies', that may imperil the continuity of the current governing party and Bolivia's political stability, but may also jeopardise national and regional

⁷⁵ Success within a cooperative (becoming *dirigente*) is the first step to become leader in national or regional politics (Absi, 2009). For example, the ex-president of the Cooperativa Unificada is now regional parliamentary for Potosí, and the current vice-ministers of mining cooperatives and employment are also cooperative miners.

incomes from mining which, together with gas, currently fund Bolivia's transformations. This is because, according to the Cooperative Law (LGSC, 1958, Art. 102), evidence of non-compliance necessarily means the automatic cessation of most cooperative mining operations (which account for 85% of mineral concessions assigned by COMIBOL) and the return of these mineral concessions to the state. This is especially important considering that, with Morales' new economic model, the number of cooperatives has increased by 433% since 2006 (Erbol, 2012). Employing over 96% of the mining workforce, and producing over 33% of Bolivia's mineral exports (MMM, 2011), cooperativists are increasingly becoming an important economic, labour and political force in the country.

In this sense, my research indicates that it is the selective enforcement of applicable legislations rather than lack of compliance with OHS regulations (cf. Hopkins, 2011) that hampers OHS in the Cerro. For instance, according to the Cooperative Law and the mining contracts between cooperatives and COMIBOL, evidence of non-compliance with current legislations (i.e. subcontracting and outsourcing) will result in the government taking back the concession. Yet cooperatives, members and second-hands informally employ labourers without risking their concessions, whereas labourers' illegal status does impede their capacity to unionise and claim their rights. Similarly, according to Bolivian labour and OHS legislations, employers are responsible for providing workers with PPE, for ensuring their safety, and for providing accident compensation.⁷⁶ However, since the Cooperative Law does not recognise subcontracting and the government chooses not to see these practices within cooperatives, labourers' safety and compensations ultimately depend on the cooperative members' 'goodwill' (Michard, 2008). Finally, while illegally employing labourers does not imperil cooperatives' or members' contracts with COMIBOL, failure to continuously produce mineral does (DS 21297 of 1987), and although the government may not enforce this, it indeed results in less productive miners being under social pressure from those with more capacity to produce. This, in turn, pushes members to hire labourers, to seek technological agreements with buyers, and to continue mining regardless of mineral prices. They do this not only to secure needed household income, but also to protect their livelihoods and to avoid pressures from other members which, with more assets, may be able to 'make better use' of their *parajes*.

⁷⁶ Art.3.2 and 6, OHS Law (LGSOB, 1979), Art. 43, Mining Code.

In fact, despite the existing legislations, the few rules that really apply to cooperative miners are the ones stipulating the economic aspects of the contractual agreements between the state and the cooperatives. These rules – which are not a reflection of how things really work in the Cerro, as this is something the state cannot publicly admit – pose mismatched requirements that reinforce power relations among miners and among cooperatives, and ultimately determine OHS in the Cerro. This is the case of the ‘Certificates of Contribution’. As explained in Chapter 4, cooperatives are to comply strictly with yearly and monthly lease payments for their mineral concessions (respectively, a fixed fee of 300Bs or 43.5US\$/500m² of land plus 1% of their monthly production). With this intention, COMIBOL demands monthly productivity reports from each cooperative. However, cooperative members do not collectively pool resources, nor do they share costs and gains equally. They therefore do not contribute to the required payments in the format reflected in the Cooperative Law, but instead work in decentralised, flexible and ever-changing production groups. Consequently, within cooperatives, each member’s contribution towards these payments is dependent on his (or occasionally, her) particular individual or grouped production; and each member pays a percentage (10-25%, depending on the cooperative) of their gross production to their cooperative, from which the cooperative will pay COMIBOL.

The economic reports and requirements of COMIBOL create conflicts among cooperative members due to their differentiated payments. This is particularly evident in the difficult relationship between Felico and Don Adrián (explained in Chapter 4) where the differentiated production of both members (since it represents different contributions towards the cooperative and COMIBOL) has created tensions that have limited their productive agreements and alliances and, in turn, reduced the reciprocal exchange of extractive technology, workforce and worksites. It has also imperilled Don Adrián’s place within The Cooperative because of his low contributions as a lone manual worker. To compensate for this, and while Felico is the treasurer of The Cooperative, Don Adrián is usually helped by his son Miguel, and he tends to prolong his working hours, sometimes taking more risks that he would otherwise take, to increase his production, and thereby to increase his contributions to The Cooperative and to avoid more productive members’ complaints and punishments. In turn, some cooperative members are pressurising Don Adrián to increase his contributions to the cooperative and, in order to do this, to accept agreements or partnerships which he would otherwise refuse. With this intention, some members seek to weaken Don Adrián’s ability to continue to work alone. As this pressure often takes the form of theft, Don Adrián has purposely made his *paraaje* a highly unsafe site through including a series of traps he constantly

prepares (such as loose wooden stairs or covered holes in the floor, see Chapter 3) to avoid theft by those who might wish to bully him for his small contributions or pressure him into accepting agreements he is not happy about. For Don Adrián, creating hazards in his worksite and consciously taking greater risks to his, and his son's, health is a risk management strategy aimed at securing his place within The Cooperative.

6.4. The weight of the past

The situation has not always been like this. As illustrated in Chapter 2, changes in the Bolivian political arena have historically altered the miners' working and living conditions, as well as their relations with the state. In turn, as these relations and as the miners' living and occupational uncertainties change, so do the workings of the cooperatives, miners' risk trade-offs, their risk perceptions, and OHS in the Cerro. Changes in the Bolivian political arena have historically transformed the risks presented to the miners and their challenges and opportunities to deal with these. Nonetheless, the state has, regardless of who has governed and how, through different processes each time, historically failed to secure and promote OHS amongst cooperative miners. As explained in Chapter 2, while the tin barons influenced legislation and its enforcement to their benefit through financially controlling the army and their own political representatives in the 1930s, death due to premature ageing continued to be high amongst the miners. However, with the state and the army under the control of the barons, not only did national policies play no role in influencing miners' working conditions (Quiroga, 2002), but workers' attempts to have their rights enforced were fiercely repressed. Cooperative miners, who had become diseased, injured and aged while working for the barons but were unable to receive retirement or compensation benefits, collectively eked out a living by extracting ores manually before selling them to the barons at very low and indisputable prices (Serrano, 2004).

The 1952 nationalist government that these miners helped bring to power rapidly expanded Bolivians' social and labour rights. The expansion of social welfare and implementation of 'worker control' in the mines and in government decision-making considerably improved the miners' working and living conditions. In addition, the state came to monopolise mineral trade, and offered good prices regardless of the international fluctuations, protecting in this manner Bolivians' living and working conditions from external fluctuations. The state also loaned extractive technologies and materials to the now legalised cooperative miners, and provided them with access to loans and credits in exchange for advance payments. Despite the low

mineral prices at that time and despite the fact that the compulsory use of helmets and dust masks was not introduced until years later, the revolutionary government improved the miners' OHS through decreasing their living and occupational uncertainties. The changes in the miners' living and working circumstances and in their relations with the state improved cooperativists' OHS through, for instance, increasing mutual help and solidarity, helping them achieve greater stability in their incomes, and through preventing the inequalities that currently exist. However, massive social spending and the low mineral prices at that time caused Bolivia to experience a galloping inflation that was exacerbated by a decrease in mineral prices in 1956. This caused the collapse of the nationalist government four years after its rise to power. And, with it, came the beginning of a series of dictatorial governments which worsened the miners' working and living conditions despite the rising mineral prices and the miners' demands for their rights to be enforced.

It was at the end of this dictatorial period that the first OHS law was enacted in Bolivia (ISAT, 2011). However, the return to democracy in 1978, accompanied by a drop in prices, drove Bolivia into a severe depression. The economic crisis, partly precipitated by the state's inability to overcome its dependency on and vulnerability to internationally-dictated mineral prices and by its subsequent over-reliance on foreign debt (Lazar, 2004), led to structural adjustment programmes. These greatly reduced the role of the state in the provision of economic security.

Trade and labour market liberalisation has been associated with worsening working conditions (OXFAM, 2004; ILO, 2002; Loewenson, 2001; Quinlan et al, 2001), and this is well reflected in Bolivia from 1985 onwards. The low mineral prices together with cuts and privatisation of social welfare and with the reduction of state interventionism in economic matters decreased the cooperative miners' acquisitive power and risk choices, pushing them to increasingly accept risks to their health whilst at work. Not only did the low prices and the subsequent cuts in public social spending worsen the miners' living conditions. With the state now prioritising private large-scale mining and conceptualising cooperatives at the margin of its economic priorities (González-Herrera, 2010), cooperative miners also lost their access to loans and credits and to extractive equipment. Gradually taking over mines of uncertain or marginal mineral content not exploited by private enterprises, the cooperative miners continued mineral production, this time using their own 'wit and creativity' (Möeller, 2007: 87). In addition, as the government liberalised mineral trade and established the *igualdad jurídica* (legal equality) of the different mining productive sectors operating in the country in 1997 (see

below), cooperatives entered into direct competition for the mineral market with other productive sectors at the national and global scales.

These changes in the political arena worsened OHS in the Cerro through deteriorating the miners' living and working conditions, their relationships with the state, with other mining productive sectors, and with mineral buyers. As the miners' living and occupational uncertainties increased, their previous communal labour organisation changed into the flexible and ever-changing arrangements that still today can be observed within cooperatives, and which, as explained, hamper OHS in that they limit the miners' ability for forward planning. In turn, as buyers came to fulfil the previous role of the state investing in some members' productive assets, those cooperative miners now vulnerable to trade competition and mineral price fluctuations increasingly came to accept and tolerate OHS risks and to use their power to the detriment of others.

These circumstances, coupled with the neoliberal government's reluctance to listen or respond to the demands and concerns of these miners (Chaplin and Crabtree, 2013; Artaraz, 2012; García-Linera, 2010), caused the cooperative miners to join other sectors of the population in support of Evo Morales' rise to power. They did so convinced that Morales' emphasis on change, voiced with the motto 'govern by obeying the people', would improve their lives and livelihoods more than the *criollos'* top-down approaches to development and neoliberal approaches had ever done.

Indeed, changes in the political sphere have always altered miners' relations with the government – and with mineral buyers and other mining productive sectors. These changes have in turn directly and indirectly determined the living and occupational uncertainties faced by cooperative miners and their means and capacities to respond to these. Ultimately, the political sphere and the nature of changes within it frames miners' relations at work and shapes their risk perceptions, trade-offs and OHS despite continuities or discontinuities in the OHS law. However, rather than being just past influences, these political experiences remain very evident in Bolivia, since the historical continuities still influence both risk and safety in the Cerro and in the miners' lives. In fact, Bolivia's process of change is deeply rooted in these past experiences, which help explain Morales' Movement Toward Socialism's (MAS's) emphasis on regaining control of mineral production and trade, on expanding welfare, on giving the ownership and control of the means of production to people, and on asserting people's full participation in state decision-making and procedures to ensure that Bolivia's wealth benefits

the different Bolivians (PND, 2006). These past experiences and their legacy also constrain the state capacity to deliver the promises of change now endorsed in the NCPE (Kohl and Bresnahan, 2010; Kohl, 2010; Crabtree and Whitehead, 2008). For instance, although according to the NCPE the state is to control mineral production and trade, the government's fear of repeating the conditions that led to the bankruptcy of COMIBOL and of the national economy in the 1950s has led the government to reduce its initial rhetoric of 'nationalisation' to a much more conflictual plural economy characterised by the uneven co-existence of state, private and cooperative forms of mining (see below). In turn, the legacy of unemployment, poverty and inequality in the country, coupled with the role of these historical happenings in defining Bolivia's current role as an exporter of natural resources (and thus vulnerable to international trade dynamics and competitions), influences the government's acceptance of the workings of cooperatives despite the emphasis on well-living. Not only do cooperatives provide much needed employment (Markland, 2012) and royalties, but cooperativists will continue mining even when mineral prices are extremely low, whereas state and private mining operations will not.

Moreover, not only are the current government's strategies informed and constrained by these historical experiences and their legacies, but also the miners' living and working conditions, their agency, and their current attempts to change their situations. History has forged amongst cooperativists a heavy tendency to solve their problems through conflict and dynamite and to protect their sectorial interests and sources of income at all costs. In addition, after eking out a living through two decades of low mineral prices and helping Evo's rise to power, cooperative miners believe it is now their turn to benefit from Bolivia's mineral wealth (AIN, 2007). They expect the government to support the cooperative mining sector in reciprocity for their political support, as happened during the 1950s (Godoy, 1985). Their relationships with the state and their demands on the state are shaped by their historically-learned militancy (Albó, 1996), by their memories on how things were different for them in the past (particularly during the early 1950s), and by the effects that the sudden changing relations with the state during the mid-1980s had on their living and working conditions. This explains their demands that the government reopen BAMIN to enable them achieve greater stability in their incomes, and their insistence on the state's responsibility in helping cooperatives increase mineral production. The miners' past experiences also constrain OHS through the mistrust that miners have historically built towards the state. As explained in Chapter 5, aware that cooperative miners' relations with the state are highly dependent on international mineral prices, Morales' government efforts at providing mining cooperatives with access to

formal credit are producing scarce results. For many cooperative miners, continuing their agreements with buyers instead of moving onto the new opportunities offered by the government is a risk management strategy aimed at the long-term preservation of their productive assets.

6.5. Bolivia's process of change: Facilitating and frustrating OHS

Indeed, protecting Bolivians' living and working conditions from the effects of global dynamics on the national economy is perhaps the main challenge of the Morales' administration. With this intention, the MAS sought to reverse the previous neoliberal economic policies. This has been pursued through regaining state control over previously capitalised assets and shifting foreign trade relations away from market-oriented competitions towards socially-oriented agreements that prioritise collective wellbeing and solidarity between nations (Kaup, 2013; Artaraz, 2012). Combined with good mineral and hydrocarbon prices since 2006 and with considerable debt relief in 2007, these changes have positively affected the economy, and Bolivia has since 2006 doubled its GDP (UNdata, 2013), maintained a growth average of 4.7% over the past seven years (World Bank, 2012) – the highest in Latin America – and passed from high public debt to accumulate surpluses (Kohl, 2010; Gray-Molina, 2007). Moreover, not only has this economic reform increased fiscal revenues, but it has also permitted establishing trading prices and import and export taxes in function of the poverty levels of the trade partners (BIF, 2012; Tockman, 2006), and enhanced collaboration and support amongst trade partners in the areas of health, education and gas industry (see Kaup, 2013; Artaraz, 2011; Cunha-Filho and Santaella-Gonçalves, 2010; Shultz and Crane-Draper, 2009). It is expected that these changes will help address Bolivia's vulnerability to global dynamics through protecting state incomes from market fluctuations and competitions (MEFP, 2011) and helping overcome Bolivia's reliance to foreign debt (Shultz and Crane-Draper, 2009).

Parallel to this, the MAS has sought to address Bolivia's high levels of poverty and inequality through consolidating citizen engagement in all government decision-making (see below) and changing the previous patterns of redistribution at the individual and regional levels. The establishment of non-contributory SS and pension schemes for the elderly, women and children, has been accompanied by modifications in the pension law, which includes the establishment of a Solidarity Fund that helps those with low and intermittent contributions access benefits. In addition, the redirection of state revenues to the poorer and traditionally marginalised regions and sectors of the population (Wanderley, 2009) has been coupled with

cash transfers to school children, with a fourfold rise in public investment spending on basic infrastructures and services (Fuentes, 2012), and with the legitimization of traditional forms of medical practice and integration of these into a unified new health system (McGurn Centellas, 2011; Johnson, 2010).

The early effects of these changes are already reflected in significantly decreased inequality and poverty – including extreme poverty (World Bank, 2012) – and in notably improved living conditions for most Bolivians (Chaplin and Crabtree, 2013), with water and electrical supply reaching many households for the first time (EU, 2011). Celebrated as a successful social protection floor experience (UNDP, 2011), these changes-in-progress have also benefited many miners and their OHS choices. For example, redirecting public spending to the poorer departments like Potosí⁷⁷ has helped mitigate the hazardscape in which many miners live, and which, I have illustrated, shapes their threshold of risk and risk tolerance. The recognition of Andean medicine and its incorporation within national health policies can also spur notable OHS improvements in the Cerro. This includes an increasing miners' affiliation to SS (cf. ILO, 2011; ITUC, 2010; Jeyaratnam, 1992), since the prominence of biomedical practices within the health system and miners' experience of disregard by health professionals often shape the miners' reluctance to use health services. Moreover, in representing a move away from considering different medical systems as closed or competing domains (cf. Mathez-Stiefel et al, 2012), Morales' intercultural policies will hopefully further promote OHS in the Cerro by easing the discordant encounters between the miners and OHS experts (cf. Kagawa-Singer and Kassim-Lakha, 2003), thereby favouring mutual understanding and trust (Slovic, 2006). Finally, expanding SS beyond formal employment as before (Cecchini, 2012) is also aiding the lives and risk trade-offs of many miners. The double role of income security in mitigating personal uncertainties, and in allowing miners to recover after an accident or disease before resuming work should help prevent risk-taking behaviours, non-beneficial agreements with buyers in exchange of advance payments, children from substituting their parents at work to secure household income, and additional accidents due to extremely long working hours or working while feeling unwell.

⁷⁷ In 1993, the departments La Paz, Cochabamba and Santa Cruz received 91% of such funding, and the remainder of the country only 9%; by 1996 these three departments received 68% (Wanderley, 2009). According to officials from Potosí's prefecture, the department's budget has increased more than 27 times since 2003, from 54.1 million Bs (or 7.8 million US\$) in 2003 to 1,464.5 million Bs in 2012 (212 million US\$).

However, although Morales' redistributive policies have improved most miners' OHS choices through addressing some of the risks and uncertainties they find in their personal lives, the MAS administration has, so far, failed to generate a sufficiently significant change as to allow the miners' risk trade-offs to benefit their OHS. Whilst the MAS' intercultural project has been frustrated by liaison with health professionals and governmental institutions where biomedical concepts prevail (Johnson, 2010; Zoomers, 2006), it is still very common to find government officials who, considering culture as a problem, argue that miners should give up their cultural practices and identities in order to 'assimilate and progress'. This is the case of the OHS ombudsman, who emphasising the importance of education in changing OHS behaviours and regretting that 'OHS trainings don't seem to change tradition', concludes that the main challenge to OHS is that 'miners don't have the minimum capacities for understanding'.

Similarly, although the Morales' welfare reform has helped miners like Don Adrián and Doña Francisca access benefits otherwise out of reach, these benefits are insufficient for these miners to live on, and have thus not enabled them to stop working, although, as illustrated in Chapter 3, they do occasionally allow some 'retired members' to 'take breaks when tired'. In addition, the positive effects of Morales' welfare expansion for the miners' OHS choices have been reduced by the cost of this (much needed) welfare expansion. With less than 20% of formally employed Bolivians actively contributing to SS and under 15% contributing towards their retirement (Cecchini, 2012), Bolivia's welfare expansion has mostly come to depend upon mineral and hydrocarbon revenues, absorbing 71-80% of Bolivia's fiscal incomes (Fundación Jubileo, 2011; PIEB, 2010). This, in turn, has restricted the state capacity for industrialising and diversifying the economy (Wanderley, 2009; Gray-Molina, 2007), and Bolivia continues as an exporter of raw materials and vulnerable to internationally-dictated prices, despite the progressive shift in trade agreements (CEDLA, 2009b; Seoane-Flores, 2008; Webber, 2007). Consequently, although SS coverage has the potential to prevent miners from working while feeling unwell, continuities in the living and occupational uncertainties experienced by cooperativists and associated issues of uncertain mineral trade and power relations drive most miners to continue working irrespective of their health assets and ill-health.

Perhaps for this reason, the MAS' economic reform promotes a Plural Economy instead of carrying forward the nationalisation rhetoric that aided Evo's rise to power. Advocated as a post-neoliberal move that replaces the previous hegemony of the private sector, Morales' economic model recognises and encourages the coexistence of state, private, cooperative and indigenous-communitarian forms of economic organisation in Bolivia. According to the NCPE

and to the Ministry of Productive Development and Plural Economy (MDPEP, 2011), giving priority to cooperatives, the role of the state is to simultaneously promote, support and strengthen the different modes of economic organisation and to ensure their harmonic coexistence through promoting partnerships between economic sectors. This economic model has indeed enabled an increase in formal employment and lifted thousands out of poverty (ILO, 2010). However, in a similar manner that government support to cooperatives has prioritised those cooperatives with the biggest productive capacity to the detriment of smaller cooperatives, in practice, the MAS has favoured state and private mining operations to the detriment of cooperatives. For example, while the state owns the mines and secures state mining with foreign or public investment, private mining companies operate through Joint Ventures, in which the state provides the mine and the entrepreneurs contribute the capital. In contrast, cooperatives continue renting from COMIBOL those mines of uncertain or marginal mineral content not taken by either state or private mining companies in exchange for a yearly fee and a percentage of their production. In turn, the cooperatives' inferior productive capacity detrimentally affects the cooperative miners' agreements with buyers when compared to large private or state mining. While the state processes its extracted ores at the now (2007) nationalised smelter VINTO before exporting, private mining operations either directly export or process their extracted ores in their privately-owned smelters. Cooperatives, however, are integrated into the global mineral market only via unregulated intermediate buyers.

These contrasts in the relationships between the state and the different mining productive sectors further hamper OHS in the Cerro due to the principle of *igualdad jurídica* (or 'legal equality') that regulates the Plural Economy. It forces cooperatives to compete in production and for the market with capital-endowed enterprises with geological (Godoy, 1987), financial and technical capabilities far superior (Michard, 2008).

As part of the Andean ideological principle enshrined in the concept of *suma qamaña* or *vivir bien* according to which *vivir bien* is not about 'living better than', but rather about 'harmonic coexistence' (Artaraz, 2011; Gray Molina, 2007b), the MAS encourages productive alliances amongst mining sectors as a strategy to foster cooperation as opposed to competition (MDPEP, 2011). These partnerships have however exacerbated inequalities, power relations, and conflicts within and amongst cooperatives in that they only happen with powerful members. Moreover, the MAS emphasis on 'mixed enterprises' has legitimised state and private mineral producers' tendency to outsource cooperative miners, officially positioning

cooperatives as the organisational shock absorbers (cf. Meyer, 1982), in that their role and voice within the productive alliances are subordinated to the interests of larger producers. This, in turn, has increased violent conflicts between cooperatives and other mining sectors, usually in the form of dynamite-in-hand mine take-overs (see Achtenberg, 2012; Möeller, 2007; AIN, 2007; BIF, 2007). It has also complicated the relationships between cooperative miners and the government, as the contrasts in the relations the government has with the different mining sectors and the effects of these distinctions for cooperativists' occupational uncertainties shape the cooperativists' recurrence to 'explosive politics' (AIN, 2007: 1) and their confrontational demands that the government provide them with better mines and 'real support'.

Precisely to guarantee both the government responsiveness to the needs and demands of the different Bolivians and that all Bolivians are jointly responsible for decisions about their own futures and that of the country (PND, 2006), the MAS has politically empowered the different sectors of the population, granting them some form of presence within government institutions and some engagement in government decision-making (see ALP, 2013; Schilling-Vacaflor, 2011; Stefanoni, 2011; Prada-Alcoreza, 2011; Pearce, 2011; Regalski, 2010; Postero, 2010b; CEDIB, 2009; García-Linera et al, 2007). Based on the Andean principles of deliberation, consensus and leaders serving their *bases* or grass-roots (cf. Lazar, 2008), the MAS assumed that public dialogue and negotiations amongst the different sectors would guarantee the 'harmony of inequalities' (Gray-Molina, 2007b: 2) necessary for achieving the 'living-well' goal.

Certainly, such an articulated citizen engagement is coming up with 'creative alternatives' to normative institutional democracy (Lazar, 2008: 11). These are becoming increasingly successful not only in undoing the political and social exclusion of the majority of the population (Cunha-Filho and Santaella-Gonçalves, 2010), but also in improving Bolivians and miners' living standards and OHS choices, as reflected with the solidarity pension, the intercultural health project, and with the improved communication between the government and the different social sectors (Chaplin and Crabtree, 2013; Artaraz, 2012; Postero, 2010b). However, securing consensus is in fact an uphill struggle (Buxton, 2008), and Morales' emphasis on citizen engagement has also resulted in increased conflicts amongst social groups and with the government (see Almaraz-Ossío, 2012; EU, 2011; Hatheway, 2010; Laserna and Villaroel, 2008; Gamarra, 2007; AIN, 2007), and in notable delays in the formulation of new laws. This is the case with the new Mining Code, for which deliberations started in 2008 but have not yet reached consensus. In addition, for the case of cooperative miners, the MAS'

emphasis on a participative and 'direct democracy' (NCPE, 2009; García-Linera et al, 2007) has resulted in most miners, particularly labourers, being excluded from the participative instances or in the case of *palliris* or weaker members, being included with no effective voice (cf. Leach and Scoones, 2006). In fact, the overlooked heterogeneities within the cooperative mining sector and associated mismatches between representatives and the represented, have hampered the potential benefits of Morales' political reform for most miners' OHS, since the demands of the elected leaders do not address the needs of the majority of cooperative miners. However, within the cooperative mining sector, mobilisation and protest are mandatory and controlled through a system of fines. Failure to participate in a protest incurs fines of 100Bs (14.4US\$)/day in the case of members and of 65Bs (9.4US\$)/day for labourers, leaving disempowered miners with no choice but to join in marches and protests organised by their leaders, despite their awareness that these mobilisations will change little or nothing for them. This, in turn, together with the government's bureaucratic irresponsibility and wilful blindness, reinforces the miners' tendency to take matters into their own hands, and enables some influential members to continue abusing their power while simultaneously pushing miners like Doña Margarita to continue conceptualising their living and working conditions and associated risks as inevitable, as simply, 'the hold life has'.

6.6. Conclusions

This chapter has analysed the cooperative miners' relationships with the state and the role of these relations in shaping risk and safety in the Cerro in spite of existing OHS legislation and infrastructures. In so doing, I have argued that OHS regulations do not, on their own, regulate OHS, and thus, that an emphasis on OHS laws and in their enforcement are not the key instruments for the protection of workers (Alli, 2008), or the 'driving force through which to promote healthy workplaces' (Swartz, 2001: 191). Instead, as this chapter has shown, OHS in the Cerro is explained by overlapping factors and relations, both local and global, historical and current, that frame the miners' and the government's actions and agencies, and which, in so doing, shape the actual relationships between the state and miners, in spite of existing legislations and of the various actors seeking to hold bureaucracy to account.

Despite not enforcing OHS regulations, the Morales' government has in fact helped improve most miners' OHS risk choices through consolidating citizen engagement in government decision-making and improving Bolivians' living conditions and personal assets. However, the

Morales administration has also, so far, failed to generate a sufficiently significant change in the miners' lives and livelihoods to enable the miners' risk trade-offs to benefit their OHS.

Yet, even with these improvements, the lack of government engagement with the real happenings within cooperatives and the subsequent instrumental bureaucratic irresponsibility (Beck, 1988) hinders the miners' OHS. This is not only because this well-established organised irresponsibility means that OHS regulations are not enforced (Barnetson, 2010; OXFAM, 2004). Rather, it is because it allows some miners to continuously use their power to their benefit and to the detriment of others whilst simultaneously reinforcing the powerlessness and risk acceptance of those many others.

OHS in the Cerro is also the result of the contradiction between historical global politico-economic dynamics and the pressure that these continue to put on state capacity to help miners achieve greater stability in their incomes and lives on the one hand, and the political pressures from global and local OHS experts who pursue the promotion of OHS amongst these miners by using notions, strategies and methods based on 'best practices' on what seems 'to work' in some other industries and places where different circumstances are paramount on the other hand (cf. Eyben, 2013; Nutley and Davies, 2006; Nuwayhid, 2004). As this chapter has shown and will be further discussed in the concluding chapter, current 'educational' and work-centred dominant approaches to OHS and diverse actors' efforts at holding bureaucracy to account will do little for promoting OHS amongst cooperative miners unless these circumstances that shape the miners and government agencies and actions are changed.

The main challenge that the MAS administration faces for improving OHS in the Cerro is to create the conditions to promote a sustainable growth sufficient to help the miners achieve greater stability in their incomes whilst enabling Bolivians to improve their living conditions and addressing the explosive politics between the state and cooperative miners and power relations within cooperatives. Morales' process of change has taken several steps with great potential for achieving this. Shifting trade agreements, expanding social benefits, increasing public investment and consolidating citizen engagement in government decision-making has improved the lives and livelihoods of many Bolivians. Parallel to this, the promotion of cooperatives has provided people with access to their means of production, whilst the preservation of private mining (tripling their taxes) and re-installation of state-mining operations has secured national incomes necessary to fund Bolivia's socio-political reforms.

However, although significant, these changes remain insufficient to truly decrease the living and work-related uncertainties faced by most miners, and thus, to facilitate their OHS choices. Bolivia is in a process of legal reforms to adjust current legislations to the NCPE, and cooperative miners' future depends on the elaboration and enforcement of these, as well as on the stability of mineral prices. The SS has been changed and a new labour law came into effect in May 2011. Similarly, a new Mining Code, a new Cooperative Law and a new Law on Occupational Health and Safety are currently being drafted in consultation with several national and international civil and sectorial organisations. However, at present, and despite being protected and encouraged by the NCPE, cooperative miners are, in practice, left to yield their own luck. With a national economy primarily based on exporting raw minerals and dependent on global economic trends, with a government investing most fiscal incomes in the much needed welfare expansion and leaving scarce resources available to promote and empower all the different productive sectors now protected with the Plural Economy model, cooperatives and cooperative miners continue to be the sole responsible agents for their production and health (Absi, 2010: 35). However, they compete in production and for the market with capital-endowed enterprises with geological, financial and technical capabilities far superior. Cooperative miners respond to this by enrolling in flexible and ever-changing labour arrangements, by accepting and taking OHS risks, and by intensifying production and transferring risks through outsourcing labourers. They also manage this by displaying their combativeness and socio-political power through continual episodes of social unrest when making demands on the state, and by making 'shared risk agreements' with mineral buyers and private-mining entrepreneurs reproducing the 'joint ventures' that the state makes with larger producers but from which cooperatives are excluded.

7. Conclusions: Looking at risk with both eyes so that ‘things go well’

‘Both thinking and facts are changeable;
if only, because changes in thinking manifest themselves in changed facts.
Conversely, fundamentally new facts can be discovered only through new thinking’.

(Fleck, 1935: 50-51)

During the course of my fieldwork, I was frequently told by government officials, OHS experts and by Bolivians more generally that the problem of OHS in Potosí’s Cerro Rico is that cooperative miners ‘do not handle production using the logic of science’ and instead do an ‘irrational’ exploitation of the minerals. This narrative of irrationality is also often found in the Bolivian media (for example La Patria, 2011; La Época, 1995) and in some Bolivian and international literature concerned with OHS amongst artisanal miners and SSEs (see for instance SERGEOTECMIN, 2011; MEDMIN, 2007; Lesego-Herr, 2007; WHO, 2002; ILO, 1999; Ackroyd and Thompson, 1999; Word Bank, 1996). It reflects a general conviction that applying scientific knowledge as a means to identifying and mitigating the OHS risks that arise within the workplace together with OHS training aimed at ‘addressing’ people’s ‘misunderstandings’ and behaviours towards these risks, is the best strategy through which to improve workers’ health, safety and wellbeing.

This thesis has challenged these assumptions by showing the much broader and complex nexus of factors and relationships shaping the construction and management of OHS risks in the Cerro. By exploring the everyday experiences, perceptions and practices related to OHS risks among the cooperative miners working in the Cerro and using the notion of looking at risk with two eyes explained in Chapter 1, this thesis has confronted these assumptions and narratives by demonstrating how OHS risks do not originate within the boundaries of the workplace, and why the miners’ OHS risk behaviours cannot be moulded by training. Instead, this thesis has argued that in addition to focusing on the internal organisation of workplaces and on raising peoples’ OHS risk awareness, attention should also be paid to the complex and dynamic socio-political and economic factors and relationships which contour both the risks presented to the miners in their lives and work and their ability to respond to these.

The different empirical chapters of this thesis have provided insights into the multiple factors and relationships that shape the miners' diverse and changing OHS perceptions and behaviours, and have demonstrated that these dynamics also contribute to the creation of the risks that the miners face. I started by examining the historical global and local events and contexts and their economic, political and socio-cultural legacies. I then focused on the miners' life-worlds and how these determine the livelihoods that are accessible to them, their motivations for mining, their positionality within the workplace and their OHS risk perceptions. From this, the thesis shifted to the miners' workplace relations and the associated distribution of risks, assets and decision-making entitlements within the workplace. I analysed the miners' relationships with mineral buyers and the effects of these for shaping the challenges and opportunities that the miners face in their lives and work, their workplace relationships, risk trade-offs and ability to respond to OHS risks in the short and long run. Finally, I looked at the role of the market and of historical and current events and legacies in shaping the relationships the Bolivian state has with cooperative miners and with other mining sectors and the effects of these contrasting relationships for the OHS and work-related risks and uncertainties faced by the cooperative miners; as well as for the government's ability to facilitate OHS amongst cooperative miners in spite of existing Bolivian OHS legislation.

I went to the Cerro, perhaps not thinking in terms of rationality but, nevertheless, influenced by my background in OHS. I arrived there convinced that people everywhere would conceptualise 'occupational risks' as undesirable work-related health and safety hazards and would necessarily seek to mitigate them. I was prepared to investigate the factors that limited the miners' ability to respond to these risks. I implicitly expected that this thesis would be some sort of evaluation of the miners' understandings and practices regarding OHS that would help me justify the high rates of accidents and disease in the Cerro.

This initial intention of mine is reflected in the research questions that have guided this research: The main research question (How do cooperative miners understand and seek to manage occupational risks?) and the first sub-question (What are the different narratives of occupational risks and how are these framed?) reveal a concern and interest with people's diverse responses to OHS risks that I developed working as an OHS expert in the UK. The second sub-question (How do different modes of organising labour influence miners' conceptualisation and management of occupational risks?) is heavily influenced by my OHS background and training, and by the notion that labour organisation (that is, work processes and workplace relations) determines both the OHS risks that are present in the workplace and

how people see and respond to them (see for example Stellman, 2004; Gunningham and Johnstone, 1999; Pidgeon, 1991). In turn, the third sub-question (In what ways do different livelihood strategies shape different understandings and management of risk?), is based both on my experience of how labour flexibility and temporary employment detrimentally affect workers' OHS entitlements, and on engaging with research on the negative impacts of temporary and part time work on OHS (Rodgers, 2007).

In response to sub-questions two and three, in Chapters 4 and 5 I demonstrate how a particular mode of organising labour does influence some of the OHS and work-related risks faced by the miners and the distribution of risks and decision-making entitlements at any given time, but does not frame how miners understand and seek to manage the risks associated with mining. Instead, I argue that, rather than the particular work processes and workplace relations at any given time, it is the nexus of overlapping factors – both internal and external to the workplace – that give shape to the constantly changing workplace arrangements that ultimately shape the miners' OHS attitudes. Similarly, I have illustrated how labour flexibility and temporary employment are not critical to the miners' OHS entitlements or to the OHS disparities in the workplace. Instead, I argue that the effects of livelihood diversification on the miners' OHS are dependent upon each miner's positionality and politico-economic power within the workplace: labour diversification does affect most labourers and disempowered members' OHS, but this is not the case for empowered members and labourers with privileges. However, I also demonstrate that miners' positionalities and power within the workplace change as the circumstances in their personal and work-spheres change.

As the course of this thesis has shown, the second and third research sub-questions ultimately became, rather than an end in themselves, a starting point for exploring both the nature of changes in work organisation and in the miners' livelihood strategies and how these impinge on workers' risk perceptions and ability to manage OHS risks. This is because it became increasingly clear during fieldwork that a focus on labour organisation and on temporary or part-time employment was insufficient to fully understand miners' OHS risk attitudes. Instead, the particular and changing work arrangements and livelihood strategies of the miners offered an opportunity to explore the broader factors and dynamics that impinge on individuals and which, in so doing, influence the miners' multiple and changing OHS risk perceptions and responses – their plural, and shifting, rationalities of risk (cf. Tulloch and Lupton, 2003; Douglas, 2003). In practice, I explored these research sub-questions through focusing on the ways that other, non-work-related issues and processes, shape different perceptions and

management of OHS risk. This approach enriched my initial plan of exploring how miners understand and seek to manage OHS risks by looking only at the internal characteristics of the workplace, and is the result of how the initial fieldwork findings challenged my own thinking.

I first encountered the complexities of OHS in the Cerro during my early days of fieldwork, during my initial attempts to get to know what miners considered to be ‘occupational risks’. As I approached miners asking them what they thought were the ‘occupational risks’ associated with mining (in order to start answering my main research question), the miners, regardless of their work roles and of their positionality within the cooperatives, talked about mineral prices, dynamite explosions and mineral buyers; about their responsibilities towards their relatives and about the rain. They also responded by talking about the uncertainty of ores in the mineshaft and about their scarce means to access them. They discussed their lack of access to good mineral deposits and the lack of government support; spoke about the dust inside the mine, about *copagira* and job uncertainty, and about collapses and gas poisonings together with their limited possibilities for livelihood diversification and with the deaths of their relatives.

Influenced by my background in OHS, I first thought that these miners did not understand my question, and was troubled by what I initially conceived as a ‘lack of focus’ and of concrete answers, which I regarded as a problem both for my research and for the miners’ OHS risk management.

In my field log, I wrote (11 November 2009):

‘The miners are very vague in their responses... they don’t seem to answer my questions and they appear to instead talk about other issues. Different mindsets? It is hard to understand what they mean when they answer my questions. It is not a matter of language, but about the way they seem to organise their thoughts... Their answers and comments are imprecise, broad and diffuse... even when they reply to a concise question... I often get answers that, to me, have nothing to see with what I asked for... it makes me wonder...’

My supervisors had strongly recommended me to refrain from ‘acting as an OHS consultant’ and to curb my desires or instincts to ‘correct’ miners or to interfere in OHS-related issues. Their advice was essential for me before comprehending, as I spent weeks with the miners and I shared pieces of their lives at home and at work with them, the importance of these first conversations for understanding OHS in the Cerro. The miners’ responses revealed both the

need to distinguish between OHS risks and other work-related uncertainties, and the futility of artificially separating the management of OHS risks from that of other issues that also affect and concern the miners and which, as this thesis has shown, shape both their OHS risk perceptions and ability to respond in spite of their understanding of OHS risks.

The ‘fuzziness’ in these miners’ views and in their responses is also present in the miners’ vague concept ‘for things to go well’, which reflects the Andean view that the solutions to a problem often exist outside of the boundaries of the localised problem (cf. Burns, 2011). It made me realise that I had been looking at OHS using only one eye: separating workers from their living environments, workplaces from the local and global arenas in which these are embedded and develop, and the causation and management of OHS risks from the other risks and uncertainties that also affect the workplace and workers. These first conversations came to shape my later understanding of OHS, since they made me realise the futility of artificially separating one aspect of life (such as OHS risks, their management and people’s attitudes towards them) from the interlinked whole that both determines and is determined by it. These conversations made clear the relevance of ‘looking at risk with two eyes’, as *El Verde* had told me months before in my first visit to the Cerro, and made evident the need for me to re-insert OHS risks, their management, and people’s responses and behaviours within the wider net of issues, actors and processes that both shape, and are shaped by them. Whilst I initially perceived the miners’ lack of focus as a problem for their safety, I later came to appreciate my excessive focus, and that of dominant approaches to OHS and some local OHS experts, as one more obstacle to the miners’ safety, in that the wider factors and processes that influence OHS risk causation and management remain overlooked. As such, they fail to provide adequate solutions to improve the miners’ OHS while simultaneously legitimise a tendency to blame the miners for the conditions in which they work (cf. Beck, 1992).

Many have argued that changing people’s mindset makes all the difference for improving OHS (see for instance Houdmont et al, 2012; Gatchel and Schultz, 2012; Leka and Houdmont, 2010), but I felt that it was indeed my mindset, and not necessarily that of the miners, that needed revisiting. Thus, while this thesis has aimed at comprehending how miners perceive and seek to manage the risks associated with their livelihoods, the theoretical starting point of my argument is not how miners struggle to manage OHS risks, but to question what is ‘occupational risk’, how is it constructed and how can it therefore be managed? This is the result of how fieldwork changed my notions and broadened the scope of my research. I have departed from the theoretical and functional structure of dominant approaches to OHS as

defined and used by OSHA, the ILO and the WHO and I have challenged these with my empirical findings and using the concept of looking at risk with two eyes in order to bring a constructivist perspective to the understanding of the construction and management of OHS risks.

Social approaches to risk stress that risks are socially, politically and economically constructed (see for example Waldman, 2011; Arnoldi, 2009; Caplan, 2000; Luhmann, 1993; Beck, 1992; Short, 1987), but there is a dearth of work that links the insights of these approaches to the understanding and management of OHS risks. By looking at risk with two eyes, this thesis fills this gap in the literature through bringing together the contributions of both OHS and social approaches to risk throughout the different chapters. I demonstrate that it is the combination of physical (or material) and socio-economic factors and processes that shapes both risk and safety in the Cerro. OHS risks are technical, physical and material problems that can be partially dealt with through attention to the particular work-processes and technologies used in the workplace and through workplace re-design, but they are also socio-politically and economically created and thus, any proposed OHSMS needs to be designed and implemented as part of multifaceted and deliberated pathways of change. Unless the contributions of both approaches to risk are combined into an integrated OHSMS, current approaches and tactics will do little to improve most miners', and indeed many other workers', safety.

Interestingly, recent OHS literature highlights the need to explore the 'new risks' arising from the fast changing nature of the world of work (ILO, 2011: 4; see also OSHA-EU, 2011b; Brun, 2011; ILO, 2010b; Rantanen, 2005), such as those associated with the discovery and use of new chemical substances and technologies, or with changes in the structures of economies and markets, new employment trends and demographic changes of the workforce. Lundt et al (2005: 2) for example talk about 'contemporary occupational health needs', and the WHO makes reference to the 'newly arising OHS risks and challenges' (2002: 5). Ironically however, despite acknowledging the transformational effects that societal changes and dynamics have for determining OHS risks (cf. Short, 1984), these experts continue to separate their proposed OHSMSs from the broader socio-political and economic factors and relations in which, they admit, these risks arise. In so doing, OHS's postulates and efforts are both contradictory and self-limiting, in that the upstream determinants that influence the creation of OHS risks remain overlooked.

I have illustrated throughout this thesis how historical local and broader societal factors and dynamics influence not only the creation of OHS and work-related risks, but also people's and cooperatives' scope for risk management. Some of the recent OHS literature starts to recognise the importance of accounting for the 'external' or wider social and global issues such as economic pressures like market competition, value chain and globalisation to explain OHS disparities within and between countries (see for instance NIOSH, 2011; Burton, 2010; Quinn et al, 2007; Nuwayhid, 2004; Walters, 2003). However, these works often develop a list of possible 'external factors' without engaging with these factors. Alternatively, they discuss the effects of global economic pressures on shaping workplace arrangements, but fail to explicate the processes by which these external factors affect risk or safety within the workplace. This thesis contributes to this literature by unraveling the complex and overlapping nexus of factors, not only current, but also historical, which affect cooperatives and artisanal mining, and the multifaceted processes through which these influence risk and safety in mines. I show how these external factors influence OHS in the Cerro not only because they give shape to the OHS and work-related risks encountered by miners at work and their particular and changing workplace arrangements. Also because these global dynamics also determine the uncertainties workers experience in their personal lives and their agency to challenge the structures that constrain their choices, and thus, their risk management challenges, opportunities and trade-offs. These external factors influence workplace relations and OHSM in both the short and long run. However, I have also demonstrated that to fully comprehend how these external factors affect OHSM, a focus on how global dynamics eventually impact on the workplace is insufficient. Also needed is an exploration of the effects of these global processes and relationships in both shaping states' capacity to improve living standards, and the workers' life-worlds, their ability to make risk management choices, and their perceptions and thresholds of risk. Further research on how these external factors differently impinge on different contexts, industries, productive sectors, firms and individuals will help understand the existing disparities in OHS and the dissimilar challenges and opportunities that external factors pose for different workplaces' OHS capabilities and for people's ability to make risk management choices.

This is of special relevance in the case of OHS in cooperatives. Together with SMEs, cooperatives are the main employer in economically poorer countries. Cooperatives alone are estimated to employ over 51% of the working population in Latin America and 33% in Bolivia (Mogrovejo and Vanhuynegem, 2012). They account for 71% of fishery production in Korea, 40% of agriculture in Brazil; 24% of the health sector in Colombia (ICA, 2014). From an OHS

perspective, this trend is particularly concerning as evidence shows that small firms suffer more work-related injuries and diseases than larger firms (Bluff et al, 2004; ILO, 2003). If there is a common point in the available literature, it is on the importance of acquiring a better understanding of the risks associated with these smaller firms' activities and on how best to promote their OHS. In this sense, the thesis contributes to this debate by providing a better understanding of how work-related risks are conceptualised, framed and negotiated, and with what practical consequences for OHSM, within the Cerro's cooperatives. In so doing, the thesis has shown how current workplace and knowledge-based OHSMSs proposed by dominant approaches do not make sense in the context of the Cerro, and how these are insufficient and inappropriate for promoting the cooperative miners' safety. I therefore argue for revising OHS and for moving beyond the one-size-fits-all solution to OHS problems used by current OHS approaches and instead advance a broader, multi-level, socio-culturally sensitive, contextually aware, and interdisciplinary approach to OHS that recognises diverse and changing social, political and economic contexts and multiple relationships within these so that, as the miners say, things may go well.

8. References

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Annex 1. Risk Management Rituals

Risk management strategy	Description	Type (individual/collective)	Material/Method	Conducted by	Tutelary deity involved
Akukillu	Chew coca	Individual	Coca leaves	All miners	<i>Tío, Pachamama, Almitas, Tatakachu, Virgins, Saints, etc.</i>
Ch'alla	Alcohol libations	Undertaken by an individual, but often occurs at group celebration	Alcohol, coca, cigarettes	All miners, mainly members, who share with labourers.	<i>Tío, Pachamama, Almitas, Tatakachu</i>
Q'oa	The burning of aromatic herbs and symbols	Collective	Herbs, coca leaves, sugar-made symbols, alcohol.	Mainly members, occasionally second-hands, sometimes accompanied by labourers and relatives.	<i>Pachamama</i>
Q'aracu	Animal sacrifice, usually llama	Collective	Animal to be sacrificed, coca, alcohol, cigarettes.	All miners and their relatives	<i>Pachamama, Tío</i>
faith	-	Individual	Working tools, dreams, being open to perceive the signs send by the gods, conduct rituals with truthfulness and honesty.	All miners	<i>God, Pachamama, Almitas, Tatakachu</i>

Annex 2. Risk management rituals (periodicity)

Periodicity	Day of the week	Tutelary deity involved	Type of ritual
Daily		<i>Tío, Pachamama, Tatakachu</i>	<i>Akulliku</i> before work Crossing themselves before entering the mine <i>Ch'alla</i> interior mine during work breaks <i>Ch'alla</i> outside the mine after work.
Weekly	Monday	<i>Almitas</i>	Church service, visiting deceased in the cemetery and 'sharing' (drinking, smoking and chewing coca) with them.
	Tuesday	<i>Tío</i>	<i>Ch'alla</i> and <i>akulliku</i> with <i>Tío</i> inside the mine during work-break and after work.
	Wednesday	<i>Almitas</i>	<i>Ch'alla</i> and <i>akulliku</i> with spirits of deceased miners inside mine.
	Thursday	<i>Almitas</i>	<i>Ch'alla</i> and <i>akulliku</i> with spirits of deceased miners inside mine.
	Friday	<i>Tío</i> <i>Pachamama</i>	<i>Ch'alla</i> with <i>Tío</i> inside mine and with miners outside the mine (often also with <i>Pachamama</i>) after work. The celebration often continues at the buyers' enterprises, when the miners deliver their ores to buyers at the end of the week.
		<i>Tatakachu</i> (i)	Lighting candles in front of the <i>Tatakachu</i> image in cooperative headquarters, <i>ch'alla</i> , <i>akulliku</i> (members only)
Monthly	1 st Friday of the month	<i>Tío</i>	<i>Ch'alla</i> and <i>akulliku</i> with <i>Tío</i> inside and outside the mine.
	Last Friday of the month	<i>Tío</i>	<i>Ch'alla</i> and <i>akulliku</i> with <i>Tío</i> inside and outside the mine.
Yearly	Carnivals (February, the 'month of the devil')	<i>Pachamama, Tío, Tatakachu</i> (ii)	Q'araku, church service with <i>Tatakachu</i> , <i>Ch'alla</i> outside mine with <i>Pachamama</i> and inside mine with <i>Tío</i> followed by <i>fiesta</i> .
	<i>Ispiritu</i> (the three first Saturdays of May, the 'month of the spirits')	<i>Pachamama</i>	3 Saturdays. Q'araku, <i>akulliku</i> , <i>ch'alla</i> , q'oa, <i>fiesta</i> .
	1 st August (iii)	<i>Pachamama</i>	Q'araku, <i>akulliku</i> , <i>ch'alla</i> , q'oa, <i>fiesta</i> .
	Day of the Virgin	Virgin Mary	Church service, <i>ch'alla</i> , <i>akulliku</i> , <i>fiesta</i> .
	Anniversary of the foundation of the cooperative	Miners affiliated to the cooperative	<i>Ch'alla</i> , <i>akulliku</i> , <i>fiesta</i> .
	Anniversary of mineshaft	Cerro, Virgin Mary <i>Pachamama</i> ,	<i>Ch'alla</i> , q'oa, <i>akulliku</i> , <i>fiesta</i> .
	All saints (1 st November)	Deceased relatives, <i>Almitas</i>	Church service, <i>ch'alla</i> , <i>fiesta</i> .
Sporadic ritual (iv)	When needed	<i>Tío, Pachamama, Tatakachu, Almitas</i>	q'oa, q'araku, and/or simply <i>ch'alla</i> and <i>akulliku</i> .

(i) Some miners prefer worshiping only *Tatakachu*, but this is uncommon.

(ii) February is the devil's month. The *Tío* is believed to run free and be hungry, so more accidents are expected. The sacrifice is made to prevent the *Tío* 'from eating miners'. Each year the cooperative decides whether the carnival celebrations are dedicated to the *Tío* (who can guide miners to the mineral but also harm and/or protect) or to the *Tatakachu* (protector only).

(iii) Beginning of the month of *Pachamama*, the fertile time. Miners believe that this day she is 'open to receive' offerings and also hungry. Will eat workers unless feed with animal sacrifices.

(iv) Sporadic rituals are intended to restore the balance with deities (mainly after a work-related accident, after the miners lose the access to the mineral veins, or when mineral prices are low). They are also commonly held following the election of a new directive board or a new alliance.

Annex 3. Bolivian Governments and Presidents (1825-2014)

	Began/left office	President/ Government	Form of government	End of mandate	Mining Period
1	11/08/1825 29/12/1825	Simón Bolívar	Military nominated	Resigned	Foundation of Bolivia
2	29/12/1825 18/04/1828	Antonio José de Sucre	Military nominated	Resigned	
3	18/04/1828 02/08/1828	José María Pérez de Urdininea	Military nominated	Resigned	
4	2/08/1828 18/12/1828	José Miguel de Velasco Franco	Acting President		
5	18/12/1828 01/01/1829	Pedro Blanco Soto	Military elected	Assassinated	
6	01/01/1829 24/05/1829	José Miguel de Velasco Franco	Military nominated	Transfer of Power	
7	24/05/1829 20/02/1839	Andrés de Santa Cruz	Military elected	Ousted	
8	20/02/1839 10/06/1841	José Miguel de Velasco Franco	Military coup d'état	Ousted	
9	10/06/1841 09/07/1841	Sebastián Ágreda	Military coup d'état	Transfer of Power	
10	09/07/1841 22/09/1841	Mariano Enrique Calvo	Allocated by Agreda	Ousted	
11	22/09/1841 23/12/1847	José Ballivián	Military coup d'état	Resigned	
12	23/12/1847 02/01/1848	Eusebio Guilarte Vera	Military nominated	Ousted	
13	02/01/1848 06/12/1848	José Miguel de Velasco Franco	Military coup d'état	Ousted	
14	06/12/1848 15/08/1855	Manuel Isidoro Belzu	Military coup d'état	Transfer of Power	
15	15/08/1855 21/10/1857	Jorge Córdova	Military nominated	Ousted	
16	21/10/1857 14/01/1861	José María Linares	Civil Coup d'état	Ousted	
17	14/01/1861 04/05/1961	Government Junta	Civil-Military coup d'état	Transfer of Power	
18	04/05/1961 28/12/1864	José María Achá	Military elected	Ousted	
19	28/12/1864 15/01/1871	Mariano Melgarejo	Military coup d'état	Ousted	
20	15/01/1871 27/11/1872	Agustín Morales	Military coup d'état	Assassinated	'Silver patriarchs'
21	27/11/1872 09/05/1873	Tomás Frías Ametller	Civil, named by Congress	Transfer of Power	
22	09/05/1873 14/02/1874	Adolfo Ballivián	Military elected	Natural death	
23	14/02/1874 04/05/1876	Tomás Frías Ametller	Civil, named by Congress	Ousted	
24	04/05/1876 28/12/1879	Hilarión Daza	Military coup d'état	Ousted	
25	19/01/1980 03/09/1884	Narciso Campero	Military, elected by Congress	Transfer of Power	
26	03/09/1884 15/08/1888	Gregorio Pacheco	Civil elected	Transfer of Power	
27	15/08/1888 11/08/1892	Aniceto Arce	Civil Elected	Transfer of Power	
28	11/08/1892 19/08/1896	Mariano Baptista	Civil Elected	Transfer of Power	
29	19/08/1896 12/04/1899	Severo Fernández Alonso	Civil Elected	Ousted	

	Began/left office	President/ Government	Form of government	End of mandate	Mining Period
30	12/04/1899 25/10/1899	Government Junta (José Manuel Pando, Serapio Reyes Ortíz, Macario Pinilla Vargas)	Civil-Militar	Transfer of Power	'Tin Barons'
31	25/10/1899 14/08/1904	José Manuel Pando	Military, elected by Congress	Transfer of Power	
32	14/08/1904 12/10/1909	Ismael Montes	Military Elected	Transfer of Power	
33	12/10/1909 14/10/1913	Eliodoro Villazón	Civil Elected	Transfer of Power	
34	14/10/1913 15/10/1917	Ismael Montes	Military Elected	Transfer of Power	
35	15/10/1917 12/07/1920	José Gutiérrez	Civil Elected	Ousted	
36	13/07/1920 28/01/1921	Government Junta (Bautista Saavedra, José María Escalier, José Manuel Ramírez)	Civil Coup d'état	Transfer of Power	
37	28/01/1921 03/09/1925	Bautista Saavedra	Civil, elected by Congress	Transfer of Power	
38	03/09/1925 10/01/1926	Felipe Segundo Guzmán	Civil, elected by Congress	Transfer of Power	
39	10/01/1926 28/05/1930	Hernando Siles Reyes	Civil Elected	Resigned	
40	28/05/1930 25/06/1930	Council of Ministers (Alberto Díez de Medina, Germán Antelo Arauz, Franklin Mercado, David Toro, José Aguirre Achá, Fidel Vega, Carlos Bánzer, Ezequiel Romecín Calderón)	Civil-Military, non-constitutional succession	Ousted	
41	28/06/1930 05/03/1931	Government Junta (Carlos Blanco Galindo, José Lanza, Filiberto Osorio, Bernardino Bilbao Rioja, Emilio González Quint, José Ayoroa)	Military Coup d'état	Transfer of Power	
42	05/03/1931 27/11/1934	Daniel Salamanca Urey	Civil Elected	Ousted	
43	28/11/1934 17/05/1936	José Luis Tejada Sorzano	Civil Coup d'état	Ousted	
44	20/05/1936 13/07/1937	Government Junta (David Toro)	Civil-Military Coup d'état	Ousted	
45	13/07/1937 23/08/1939	Germán Busch	Military Coup d'état	Natural death	
46	23/08/1939 15/04/1940	Carlos Quintanilla	Military Coup d'état	Transfer of Power	
47	15/04/1940 20/12/1943	Enrique Peñaranda	Military Elected	Ousted	
48	20/12/1943 21/07/1946	Gualberto Villarroel	Military Coup d'état	Assassinated	
49	21/07/1946 15/08/1946	Government Junta (Néstor Guillén)	Civil popular rebellion	Transfer of Power	
50	15/08/1946 10/03/1947	Government Junta (Tomás Monje)	Civil, nominated by Congress	Transfer of Power	
51	10/03/1947 22/10/1949	Enrique Hertzog	Civil Elected	Resigned	
52	22/10/1949 16/05/1951	Mamerto Urriolagoitia	Civil, Elected by Congress	Ousted	
53	16/05/1951 11/04/1952	Government Junta (Hugo Ballivián Rojas, Antoniό Seleme Vargas, Humberto Torres Ortiz)	Military Coup d'état	Ousted	

	Began/left office	President/ Government	Form of government		End of mandate
54	11/04/1952 16/04/1952	Hernán Siles Zuazo	Provisional President		Revolutionary Government
55	16/04/1952 06/08/1956	Víctor Paz Estenssoro	Civil, popular rebellion	Transfer of Power	
56	06/08/1956 06/08/1960	Hernán Siles Zuazo	Civil, Elected	Transfer of Power	
57	06/08/1960 04/11/1964	Víctor Paz Estenssoro	Civil, Elected, re-elected	Ousted	
58	04/11/1964 26/05/1965	Military Junta (René Barrientos Ortuño)	Military coup d'état	Juridical change in government	
59	26/05/1965 02/01/1966	Government Junta (René Barrientos, Alfredo Ovando Candía)	Military non-elected	Juridical change in government	
60	02/01/1966 06/08/1966	Alfredo Ovando Candía	Militar, non-elected	Transfer of Power	
61	06/08/1966 27/04/1969	René Barrientos Ortuño	Military, allocated by Armed forces	Accidental death	Dictatorial period
62	27/04/1969 26/09/1969	Luis Adolfo Siles Salinas	Military, allocated by Armed Forces	Ousted	
63	26/09/1969 06/10/1970	Alfredo Ovando Candía	Military Coup d'état	Ousted	
64	06/10/1970 07/10/1970	Junta of Commanders of the Armed Forces 1970 (Efraín Guachalla Ibáñez, Fernando Sattori Ribera, Alberto Albarracín Crespo)	Armed forces Coup d'état	Ousted	
65	07/10/1970 21/08/1971	Juan José Torres	Military Coup d'état	Ousted	
66	21/08/1971 22/08/1971	Junta of Commanders of the Armed Forces 1971 (Andrés Selich Chop, Hugo Bánzer, Jaime Florentino Mendieta)	Armed forces coup d'état	Juridical change in government	
67	22/08/1971 21/07/1978	Hugo Bánzer Suárez	Military Coup d'état	Ousted	
68	21/07/1978 21/07/1978	Military Junta (Víctor González Fuentes, Juan Pereda, David Padilla, Wálter Guevara, Alberto Natusch, Lydia Gueiler Tejada)	Military Coup d'état	Ousted	
69	21/07/1978 24/11/1978	Juan Pereda	Military Coup d'état	Ousted	
70	24/11/1978 08/08/1979	David Padilla	Military Coup d'état	Transfer of Power	
71	08/08/1979 01/11/1979	Wálter Guevara	Civil, allocated by Congress	Ousted	
72	01/11/1979 16/11/1979	Alberto Natusch Busch	Military Coup d'état	Ousted	
73	16/11/1979 18/07/1980	Lidia Gueiler Tejada	Civil, allocated by Congress	Ousted	
74	18/07/1980 18/07/1980	Junta of Commanders of the Armed Forces 1980 (Luís García Meza Tejada , Waldo Bernal Pereira, Ramiro Terrazas Rodríguez)	Armed forces coup d'état	Juridical change in government	
75	18/07/1980 04/08/1981	Luís García Meza Tejada	Military Coup d'état	Resigned	
76	04/08/1981 04/09/1981	Junta of Commanders of the Armed Forces 1981 (Waldo Bernal Pereira, Celso Torrelio, Óscar Jaime Pammo)	Military allocated by Mesa	Transfer of Power	
77	04/09/1981 19/07/1982	Celso Torrelio	Military, allocated by the Junta	Resigned	
78	19/07/1982 21/07/1982	Junta of Commanders of the Armed Forces 1982 (Natalio Morales Mosquera, Óscar Jaime Pammo, Ángel Mariscal Gómez)	Provisional government		

	Began/left office	President/ Government	Form of government	End of mandate	Began/left office
79	21/07/1982 10/10/1982	Guido Vildoso Calderón	Military, allocated by armed forces	Transfer of Power	Return of Democracy
80	10/10/1982 06/08/1985	Hernán Siles Zuazo	Civil Elected	Resigned & Transfer of Power	
81	06/08/1985 06/08/1989	Víctor Paz Estenssoro	Civil Elected	Transfer of Power	Privatisation of the mining industry and rise of Evo
82	06/08/1989 06/08/1993	Jaime Paz Zamora	Civil Elected	Transfer of Power	
83	06/08/1993 06/08/1997	Gonzalo Sánchez de Lozada	Civil Elected	Transfer of Power	
84	06/08/1997 07/08/2001	Hugo Bánzer Suárez	Military Elected	Resigned	
85	07/08/2001 06/08/2002	Jorge Quiroga Ramírez	Civil, allocated by Bánzer	Transfer of Power	
86	06/08/2002 17/10/2003	Gonzalo Sánchez de Lozada	Civil Elected	Resigned	
87	17/10/2003 09/06/2005	Carlos Mesa Gisbert	Civil, allocated by Congress	Resigned	
88	09/06/2005 22/01/2006	Eduardo Rodríguez Veltzé	Civil, allocated by Congress	Transfer of Power	
89	22/01/2006 present	Evo Morales	Civil Elected	-	

(Data from: Mesa et al, 2008; Ministerio de la Presidencia, 2012)

Annex 4. Main OHS risks, their consequences, causes and management as described by miners.

Risks	Consequences	Causes	Prevention	Response/Management once it occurs
Gas	<ul style="list-style-type: none"> . Death . Faints . Headaches . Nauseas . Unable to work 	<ul style="list-style-type: none"> . Pockets of gas retained inside rocks are released whilst drilling. . Released with explosions . Accumulates in abandoned and wet parts of the mine. . It moves within the mine. . Lack of ventilation. . <i>Tío, Pachamama, almitas, envies</i> 	<ul style="list-style-type: none"> . Avoid entering in areas that have not been worked for years. . Using a lighter or carbide lamp to detect gas and leave area. . Ventilate opening holes between mine passages and galleries. . <i>Akulliku</i> . Keeping a Tupperware with raw meat in work-site. . Having oranges in the <i>paraje</i> . Avoid working alone to ease rescue. . Introduce air in the <i>paraje</i> . Be in good terms with the <i>Tío, Tattakachu, Pachamama</i> and <i>almitas</i>. . Crossing yourself before entering the mine. . Have faith, courage and be open to receive the signs and warnings sent by the deities. . Being in good terms with people to avoid envies and black magic. 	<ul style="list-style-type: none"> . Leave the area when possible. . Assist the fainted . Ventilate the area. . Drink urine . Urinate over fainted person . Breathe through an orange . Open the Tupperware. The meat will absorb the gas, make holes between passages and galleries to ventilate and avoid future gas accumulations. . Make a <i>q'oa, ch'alla</i> to 'change luck'.
Dynamite explosions	<ul style="list-style-type: none"> . Death . Losing limbs, hands, legs. . Contusions due to falling rocks and to the blast. 	<ul style="list-style-type: none"> . Not having enough time to find a safe place in between ignition and explosion. . Short dynamite fuse. . Going to check when a dynamite cartridge does not explode after ignition. . Inexperience . Wet floor or walls (rain) . Wet-drilling . <i>Tío, Pachamama, Almitas, envies</i> 	<ul style="list-style-type: none"> . Only experienced miners to handle dynamite . Never check a cartridge that did not explode right after ignition . Longer fuses to have enough time to run between ignition and blast. . Dry drilling . Make a <i>ch'alla</i> in <i>paraje</i> before blast . Be in good terms with the <i>Tío, Tattakachu, Pachamama</i> and <i>almitas</i>. . Crossing yourself before entering the mine. . Have faith, courage and be open to receive the signs and warnings sent by the deities. . Being in good terms with people and keeping things to oneself. 	n/a
Silicosis	<ul style="list-style-type: none"> . Slow and painful early death . Breathless at times. 	<ul style="list-style-type: none"> . Dust inside the mine . Dry drilling . Alcohol consumption . Not chewing coca while in the mine . Bad diet . <i>Tío, Pachamama, envies, etc.</i> 	<ul style="list-style-type: none"> . Using a mask and filters . Avoiding drilling more than 3 times a day. . Injecting air in <i>paraje</i> while drilling . Chewing coca during work . Smoke only during rituals . Covering nose with scarf or old clothing when dusty . Drink a glass of milk before work and a glass of <i>linseed</i> oil after work . Eat plenty of dry fruits and oranges. . Be in good terms with the <i>Tío, Tattakachu, Pachamama</i> and <i>almitas</i>. . Be in good terms with Saint Bartholomew. . Crossing yourself before entering the mine. . Being in good terms with people to avoid envies and black magic. 	<ul style="list-style-type: none"> . Avoid drilling . Use a mask and regularly change filters . Seek medical advice . Eat well . Smoke only during rituals . Improve your relationships with deities and people. . Make a <i>q'oa, ch'alla</i> to 'change luck' or hire a traditional healer to intercede with the deities.
Roof collapse and falling rocks	<ul style="list-style-type: none"> . Death . Contusions . Concussions . Trapped inside the mine. . Unable to work 	<ul style="list-style-type: none"> . Unsecured rooftop of passages and galleries. . Wet areas (rain) . Wooden beams eaten by acid waters . <i>Tío, Pachamama, almitas, envies</i>. 	<ul style="list-style-type: none"> . Helmet, <i>Akulliku</i> . Secure the rooftop of mine passages and galleries . Blowing loose roofs with dynamite . Be in good terms with the <i>Tío, Tattakachu, Pachamama, almitas</i> and people. . Crossing yourself before entering the mine. . Have faith, courage and be open to receive the signs and warnings sent by the deities. 	<ul style="list-style-type: none"> . Secure the rooftop of mine passages and galleries . Improve your relationships with deities and people. . Make a <i>q'oa, ch'alla</i> to 'change luck' or hire a traditional healer to intercede with the deities.