The Transfer of Environmental Technology as a Tool for Empowering Communities in Conflict; the case of Participatory Water Monitoring in Cajamarca, Peru.

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Abstract

The last decades have seen a growing trend towards integrating “soft” or social technology in the form of participatory practices into the praxis of development as a means to making it more sustainable and empowering. This study attempts to integrate this branch of development theory into the theory of ecological modernisation; the conceptual framework which views technological advancement as the means to generate sustainable development. Critically integrating these two frameworks, this study will examine the introduction of a Participatory Water Monitoring Schemes (PWMS), as a vehicle for community empowerment and conflict resolution in a development context. The case study chosen for the investigation is that of the region of Cajamarca in northern Peru, where a very large mining operation is at the centre of a social-environmental conflict over, among other issues, water quality and quantity.

Four different PWMS that were introduced to the region are surveyed and their history, strengths and weaknesses are discussed. The study then offers three wider reflections on the relationship between PWMS, empowerment and state and private actors. The first is concerned with causal relationships between empowerment and PWMS, suggesting that in many ways PWMS are not the engines of empowerment but the result of it, highlighting the important empowerment effects of conflictual social mobilisation. The second reflection points to the gap between the way public and private institutions reacted to public pressure in Cajamarca and suggests that the private multinational company was not only quicker to respond but did so in a more comprehensive way. Lastly the study points at the gap between the organisational culture of the mine and that of the people living around it as one of the reasons why the conflict is still on-going and the PWMS not delivering on their conflict resolution and empowerment promises.

Declaration

No portion of the work referred to in this dissertation has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning

Copyright

List of abbreviations and acronyms

ADEFOR	Asociación Civil para la Investigación y Desarrollo Forestal (Civil Association for Forest Development Research)
ASPADERUC	Asociación para el Desarrollo Rural de Cajamarca (Association for the Rural Development of Cajamarca)
ATDR	Administración Técnica del Distrito de Riego (Technical administration of the irrigation district)
CAO	Compliance Advisor/Ombudsmen
COMOCA	Comité Técnico y Científico de Monitoreo del Agua (Scientific and Technical Committee for the Monitoring of Water)
CONAM	Consejo Nacional del Ambiente (National Environmental Council)
CORECAMIC	Coordinadora Regional de Cuencas Afectadas por la MinerÌa en Cajamarca (Regional Coordinator of Watersheds Affected by Mining in Cajamarca)
CSR	corporate social and environmental responsibility
DESA	Dirección Ejecutiva de Salud Ambiental (Executive Authority for Environmental Health)
DGAA	Direccion General de Asuntos Ambientales (General Directorate of environmental affairs)
DGM	Direccion General de Mineria (General Directorate of Mining)
DIGESA	Dirección General de Salud Ambiental (General Directorate of Environmental Health)
DREM	Dirección Regional del Ministerio de Energía y Minas (Regional Authority for the Ministry of Energy and Mines)
FDI	foreign direct investment
FEROCAFENOP	Federación de Rondas Campesinas Femeninas del Norte del Perú (Federation of Female Rondas Campesinas of Northern Peru)
GRUFIDES	Grupo de Formación e Intervención para el Desarrollo Sostenible (Group for Training and Intervention for Sustainable Development)

GTZ	Gesellschaft für Technische Zusammenarbeit (Agency for technical development)
IFC	International Financial Corporation
IFIs	international funding institutions
INIA	Instituto Nacional de Investigación y Extensión Agraria (National Institute for Agrarian Research and Extension)
INRENA	Instituto Nacional de Recursos Naturales (National Natural Resources Institute)
IUDER	Instituto Universitario de Desarrollo Regional de la Universidad Nacional de Cajamarca (University Institute for Regional Development of the National University of Cajamarca)
JUR	Junta de Usuarios (Users council)
MYSA	Minera Yanacocha SA.
PWMS	participatory water monitoring schemes
QA/QC	Quality Assurance and Control
SEDACAJ	Empresa Prestadora de Servicios de Saneamiento de Cajamarca (Sanitation System Provider of Cajamarca)

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1 Introduction

This study is concerned with policy measures and perceptions relating to Participatory Water Monitoring Schemes (PWMS) as a vehicle for community empowerment in a conflictual environment. The case study chosen for the investigation is that of the region of Cajamarca in northern Peru, where a very large mining operation is at the centre of a social-environmental conflict over, among other issues, water quality and quantity. One of the means used to try and mitigate the conflict was the establishment of several different PWMS aimed at building trust between the different actors, solving the environmental dispute and preventing further conflict. This study attempts to clarify the social and environmental conditions under which the conflict has erupted, the history, significance and effectiveness of the PWMS, and the interdependence between the conflict and the outcome of the schemes.

The research is based on the hypothesis that PWMS serve both a conflict resolution role and act as agents of community empowerment in rural communities. The purpose of the research was to discover and evaluate the mechanism by which these two roles are fulfilled and the difficulties they face.

The scope of the study is PWMS associated with large scale industrial mining[1] and the very complex, and often fluid, power relationships between social actors, various government agencies and the private sector in a predominantly poor and rural setting. The study concentrates on notions and perceptions of the urban elite, decision makers within the various organisations involved and other researchers rather than those of the rural population.

The study is relevant to different audiences - local Cajamarcan society, participants of political and academic discussions about national mining policies in Peru (for example A. Bebbington, Connarty et al. 2007) and participants in the international debate about the role large industrial mining can play in development of poor nations (for example: Davis & Tilton 2005; Salim 2003; Chrisitian Aid 2005). Because large scale mining, and particularly gold mining, is often associated with water pollution (World Bank 2005), the need to safeguard the quality and quantity of the water available to local communities is a prerequisite to the resolution (or mitigation) of social-environmental conflicts and an

1 Large scale mining is characterised by an integral process from exploration to mineral delivery and is highly technological.

indispensable component of any community empowerment effort.

The introduction of PWMS as a means for conflict resolution and community empowerment is part of the growing trend to integrate participation into the theory and practice of development (World Bank 2000). It is now widely believed that participation of the beneficiaries of the development process is needed to make the process meaningful and sustainable (Hickey & Mohan 2005; CAO 2003). Participation could be seen as a kind of "soft" or social technology partaking in ecological modernisation, an optimistic view that holds that through technological advances development is possible in a sustainable way, meaning economic, social and environmental. Both these views have come under considerable criticism (Fisher & Freudenburg 2001; Hickey & Mohan 2005) and this study will attempt to contribute to this discourse through a detailed analysis of the mechanisms underlying the participatory process and the introduction of social technology.

The work consists of four main chapters: methodology, extended context, water monitoring schemes and reflections. The methodology presents the type of data collected for this study and the constraints it put on the study. The context moves from the general to the more specific, concentrating on the importance of the mine to the Peruvian state and economy in the context of the reforms of the early 1990s and on the environmental and social impacts it has on the region of Cajamarca. The next chapter presents, in some detail, four case studies of PWMS in the region, their history and analysis. The final chapter presents three general reflections that resulted from the study, how they relate to PWMS in Cajamarca and what, if any, are their wider implications.

2 Methodology

At the core of the research leading to the present work is a field study conducted in Peru and supplemented by a literature survey both in Spanish and in English. The field study, which took place in March 2008, was based around a series of in-depth interviews with key players in relevant institutions both in Cajamarca and in Lima. The study employed a qualitative research methodology as this was deemed most suitable for the focus on general institutional trends and perceptions rather then on the perceptions of the general public on the issues at hand.

A number of interviewees were contacted from the UK through e-mail and most of the interviews were arranged from Peru through a snowball strategy by which interviewees were identified as a result of other interviewees' suggestion or comment. The interviews were made up of open ended questions which were rather general in scope and standard throughout the various interviews. This method was chosen to try and balance any bias in the interviewing process, to allow the interviewees as free as possible a vehicle to express their ideas and to prevent a situation in which the interviewees would perceive the interviews as a tool for conveying the prejudice and preconceptions of an outsider (i.e. The interviewer). All interviews were conducted in Spanish, recorded and then transcribed and translated to English, all with the expressed consent of the subjects. Appendix 1 includes a list of the individuals interviewed for this study with their associated institutes and the reference codes for citations in the rest of the text.

Literature survey and archival research were used extensively to understand the context and history of the subject matter as well as to verify the claims made by the interviewees. Most of the material was collected before the field trip but some key documents and data sheets were provided by various interviewees and their respective institutions.

A study trip to the mine was conducted as well as two day trips to rural communities in the vicinity of the mine in which informal interviews were conducted. The first was a field visit with an ITDG (Intermediate Technology Development Group – Practical Action) team to three communities in the vicinity of the mine and the second was independent. Due to the extremely limited nature of such research the results serve an anecdotal purpose as a tool to further the understanding of the concerns in the region.

3 Contextualization

Peru has a long mining history, dating back to pre-Inca times, but in the last two decades the sector has experienced a dramatic increase in size, both geographically and economically, and importance. At the root of this increase stand the policy reforms that the government of president Alberto Fujimori enacted in the early 1990s, reforms that included opening up Peruvian markets and deep economic liberalisation. The scale of this increase is impressive: between 1990 and 1997 the worldwide increase in mineral exploration was 90% while the Latin American increase was in the order of 400%. In Peru, investment in exploration increased 20 fold (World Bank 2005). The area affected by mining grew from 4 million to 16 million ha (A. Bebbington, Connarty et al. 2007) and 55% of Peru's export was accounted for by mining (Dorman 2006). Together with this surge in exploration and economic importance, and in many ways because of it, there has been a marked increase in social mobilisation against it, as evidenced by the 186 cases of mining related social-environmental conflicts in which the Defensoría del Pueblo (Ombudsperson's Office) intervened (Defensoría del Pueblo 2007). This chapter will present the history of mining in Peru, in particular the Fujimori reforms, mining related environmental governance in Peru and then go on to discuss the mine itself and its impacts on the surrounding environment.

3.1 A short history of mining in Peru, the Fujimori reforms

The boom experienced by the mining industry in Peru is only the last of several cycles of economic growth fuelled by mining exports (Cárdenas et al. 2000). The influence of foreign-led mining capital came to an end when a series of military regimes, beginning in 1968, nationalised or expropriated most of the mining operations (Dore 1988).

The period between the 1968 military coup and the early 1990s was characterised by economic and social instability. The military regime of general Velasco implemented a series of far reaching social and economic reforms, including, in addition to the above mentioned nationalisation of natural resource exploitation, a radical land reform. Following him, general Morales Bermúdez led a more liberal economic policy that failed to stabilise the flailing Peruvian economy. This line of hesitant economic reform and market liberalisation combined with a protectionist approach (for some sectors) continued with the transition into democracy in the 1980s but proved, again, to be ineffective in inducing growth and stabilising the economy. The 1985 elections brought what Crabtree (1999,

p.13) called “the last gasp” of traditional Latin American populism with economic nationalism and state interventionism. The results were disastrous – by 1990 the annual inflation was above 7500% and the GDP had decreased by 30% in three years (Poole & Rénique 1992).

The other major factor dominating Peruvian life from the early 1980s until the mid 1990s was the armed struggles waged by the *Sendero Luminoso* (Shining Path) and later by the *Movimiento Revolucionario Tupac Amaru* (MRTA) and the subsequent internal war this brought to the country. This war brought with it incredible human suffering distributed very unevenly between Peruvians, with rural population suffering significantly more then urban population (CVR 2003). The political violence affected the mining industry because *Sendero Luminoso* specifically targeted the sector. They attacked convoys and mining compounds, putting mining executives on 'black lists', all with the expressed purpose of threatening their security and investment in the hope that mining companies, the agents of “*the international capital exploiting the Peruvian people and robbing the country of its riches*” (Vela de Eiden 2005, p.5), would shut down their operations and leave the country. The strategy was a success, as no new investment took place for almost a decade and the sector suffered a severe recession.

The election of Alberto Fujimori for president of Peru brought with it a far reaching shift in direction. Elected in 1990, he received a country in a state of collapse and bankruptcy (Olarte & Center 1996) and some measures were essential. The main objective of his reforms was the restructuring of the economy as a modern, market based system that is integrated into a rapidly globalising economy. For that end Fujimori had to rebuild the economic institutional infrastructure. The reform consisted of top down radical neo-classical measures, as advocated by the international financial institutes, and, after 1992 included authoritarian and dictatorial measures. The economic side of it included market liberalisation, the privatisation of national companies, the loosening up of labour legislation, removing price controls and state subsidies and the freezing of public sector spending. The political reform included a new constitution adopted in 1992 and a brutal, and successful, clamp down on armed groups (and other social activists).

Several steps were taken to attract foreign investors to the country: first the Peruvian economy was opened to Foreign Direct Investment (FDI); restrictions on remittances of profit or any other monetary equivalent were lifted; tax stability packages for ten or fifteen years were offered to foreign investors; far reaching privatisation programs both opened up opportunities for foreign investors and eliminated state competition; in order to offer more

guarantees for foreign investors Peru ratified bilateral and multilateral investment guarantees treaties. There were also specific measures aimed at the mining industry, mainly the creation, in 1996, of a new cadastral law, unifying all mining concessions and claims under one, centralised, geographic reference system, thus streamlining the process and guaranteeing exclusive control over land resource (Bury 2005). These policies were greatly aided by the marked decrease in the armed struggle following the capture of *Sendero Luminoso*'s leader, Abimael Guzman, in 1992.

The strategy was a success, at least in terms of the goals it set itself, as the mining sector enjoyed incredible growth. The accumulated growth of the sector between the years of 1993 to 1997 was 48.6%, compared to an already impressive 41.8% national average (Vela de Eiden 2005). The sector was also the second largest recipient of foreign direct investment (FDI), totalling US$10.7 billion between 1994 and 2001 (Bury 2005). Although the mining sector is an important FDI source for the Peruvian economy (37% of FDI in 2003, according to the (World Bank 2005)) and is responsible for a large part of its export it plays a much smaller part in overall economic activity, 6.6% of GDP in 2003 (World Bank 2005) and 0.4% of employment in 2000 (IMF 2001).

The advantages, and especially the development advantages, that the state and local communities derive from the mining industry are framed in terms of economical opportunities (A. Bebbington, Connarty et al. 2007):

- Mineral exports generate foreign exchange, a much needed resource for a country with a sizeable external debt.
- Direct revenue for the state through Income tax, currently at 30% of profit and 4.1% of dividends. An important part of the system for distributing corporate tax revenues is the Canon Minero, a legal[2] obligation on the government to pay a certain amount of the money to the area where the mine is located. As well as dictating how much of the tax revenue will go to the departmental government, it governs the distribution of the revenue inside the department quite strictly, limiting its use mainly to infrastructure. At the moment the share of the revenue going to the department is 50% of the total Income tax.
- Royalties, of which 100% go to the sub-national government where the area of influence of the mine is, though many companies have negotiated zero royalty agreements.

2 Law No. 2756 from 2001, later modified by law No. 28077 in 2003, which define the percentage according to which the the revenue is distributed. And law No .28322 of 2004, that allows the producing district to be a beneficiary at every stage of the distribution.

Non direct advantages include:

- employment opportunities for the population during the construction and operation stages of the mine.
- Multiplier effects to the local business as they take part in the mine's supply chain.
- Improved infrastructure – roads and electricity networks.

3.2 Mining and the environment in Peru

Although the mine has contributed to the growth and increasing stability of Peru's macro-economy it has other legacies, as well. The environmental liabilities most associated with mining are acid mine drainage, damage to water resources and untreated and unmanaged tailing heaps (World Bank 2005). Even without something going wrong large scale alteration of the natural environment is inherent to large scale mining, and in particular open pit mining, which by its very nature involves the grinding down of whole mountains and saturating them with cyanide (in the case of gold).

Underlying the importance of these environmental legacies is the fact that since 1992 mining claims in Peru have increased in size from 4 million hectares to 22 million hectares, totalling 10% of all the land in the country (CONACAMI 2000). Moreover, these claims are distributed very unevenly. They are concentrated mostly in the highlands, and in some departments more then others, reaching, for example, 49% of the land surface of the Department of Cajamarca (Bury 2005). In light of these statistics the importance of the policy that governs the environmental aspects of mining in Peru becomes apparent.

The environmental policy of Peru towards mining operations falls under the authority of the Ministry of Energy and Mines (MEM) and is governed by several explicit and implicit laws. The MEM, a very important ministry due to its economic power, is charged with the contradictory responsibilities of both promoting mining and regulating and reducing the industry's harmful environmental (and social) effects (Vela de Eiden 2005).

In reality the most significant motivation of the MEM is the economic importance of mining to Peru, even at the cost of undermining environmental objectives (Vela de Eiden 2005). The environmental unit inside the MEM (DGAA) has no enforcement competences, which are unique to the General Direction of Mining (DGM), the body responsible for promoting mining. The weakness of the actual presence of the MEM in areas where the actual mining takes place is best demonstrated by the fact that the regional offices of the MEM for the whole of the department of Cajamarca employ 2 professionals (interview I4,

I5).

The relevant environmental regulations governing mining are concerned with requirements for a monitoring programme and maximum permissible limits for liquid effluent. The former dictates a monitoring programme, approved by the ministry, to detect and evaluate the presence of pollutants in the environment. The results of this monitoring programme, performed by the mine and reported to the MEM, are not known to the public. The liquid effluent regulations control pH, sulphur, suspended solids, lead, copper, zinc, iron, arsenic and cyanide[3] at the source of the installation and not at the receiving bodies.

Apart from the MEM there are three more state agencies involved in the environmental regulation and monitoring of mining: the National Environmental Council (Consejo Nacional del Ambiente – CONAM), Ministry of Health through its water authority, the Executive Authority for Environmental Health (Dirección Ejecutiva de Salud Ambiental – DESA) and the Ministry of Agriculture through its technical administration of the irrigation district (Administración Técnica del Distrito de Riego – ATDR). The CONAM is invested with purely advisory capacities and plays a very limited role in the actual environmental governance of the mining sector. The DESA has probably the most developed environmental monitoring system in the country, monitoring water quality throughout Peru but due to enforcement gaps (the MEM has authority over mines) and an incompatible standard system (MEM favours point-source pollution limits while DESA employs limits on the receiving body) the effect of this monitoring on the mines is limited. ATDR is responsible for irrigation related water issues but has very limited monitoring capabilities. Another peculiar outcome of this fragmented environmental policy is the division of water monitoring in rural zones between the DESA, which monitors water *quality*, and ATDR, responsible for water *quantity*.

Another result of these gaps in environmental governance is that much of it is done by the mining companies themselves and as a result much of the decision making is actually performed abroad, in the headquarters of multinationals. Large scale mining companies, fearing their reputations damaged, and their competitiveness diminished, usually adhere to the law. Big multinationals are subjected to considerable national and international scrutiny and as a result an environmental scandal can damage their reputation, or even worse, lead them to court, either in Peru or in their home country. To prevent such occurrence the big mines implement various environmental management systems and outside consultancies.

3 Resolución Ministerial N° 011-96-EM/VMM (13.ene.1996).

3.3 Minera Yanacocha

The inauguration of the mining complex *Minera Yanacocha S.A.* (MYSA) on 23rd of July 1992 was supposed to usher a new era of mining in Peru. Not only would it be the first FDI in the country after more then two decades of economic and political turmoil, thus finally integrating Peru back into the world economy – it would also bring modern mining into the country. The first large scale gold mine in the country, it was to be implemented, from the outset, with the latest not only in extraction and production techniques but also the highest level of environmental protection. The project carried with it tremendous importance, extending far beyond its, quite substantial, borders. MYSA was to be an economic, political, technological and environmental milestone for Peru and represent all that the Fujimori reforms stood for[4]: open economy, private investment and global integration. The mine was supposed to be a model, leading the way for many other private investors and the involvement of the International Financial Corporation[5] (IFC) in the project only made this statement louder.

The MYSA mining project is a joint venture of Newmont Mining Corporation, of Boulder, Colorado, holding 51.35%, Compania Minera Buenaventura S.A., holding 43,65%, and the IFC holding the remaining 5%. Newmont, the world's largest gold producer, began exploring in Peru in 1982 and identified the first deposit in Yanacocha in 1986 (MYSA 2006). Buenaventura is one of the biggest mining companies in Peru and its biggest shareholders are the Benavides family (one of the richest families in Peru and the founding fathers of modern mining in Peru). The mine is the largest gold producer in south America.

MYSA operations are located in the northern Andes, at an elevation of between 3500m and 4200m, 40km north of the city of Cajamarca and about 600km north of the capital Lima (Illustration 1). The mine consists of six separate open pits: the Carachugo, San Jose, Maqui Maqui, Cerro Negro, Cerro Yanacocha and La Quinua, of which Cerro Negro, Cerro Yanacocha and La Quinua are still active (Illustration 2). The rest are under reclamation and/or backfilling efforts. The mine consists of four leach pads and three gold recovery plants. It operates in a standard heap-leaching cyanide process. Because of the extremely porous nature of the ores in Yanacocha the ores can be placed directly in the leach pads, without crushing, significantly reducing the cost of production.

4 Mr. Fujimori, along with many other high level official, took part in the inauguration ceremony.
5 The IFC is the private sector arm of the World Bank Group.

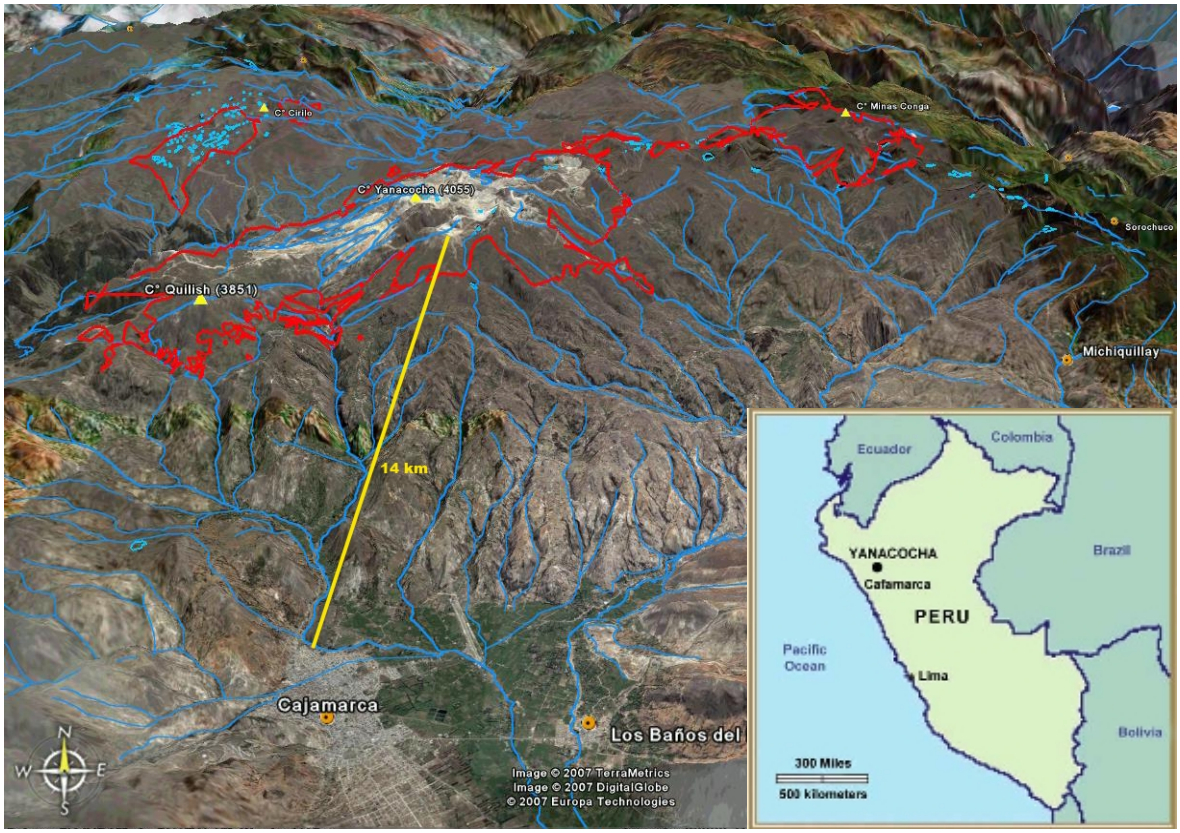

Illustration 1: A Google-Earth view of the Yanacocha area with a wider scale map in the embedded map. Note the size difference between the mine (upper part) and the city of Cajamarca (lower part). The red lines signify the land claims of the mine and the whiter areas are the actual mined area. Cerro Quilish can be seen to the left hand side as well as the major basin system. Source: Google-Earth, 2008.

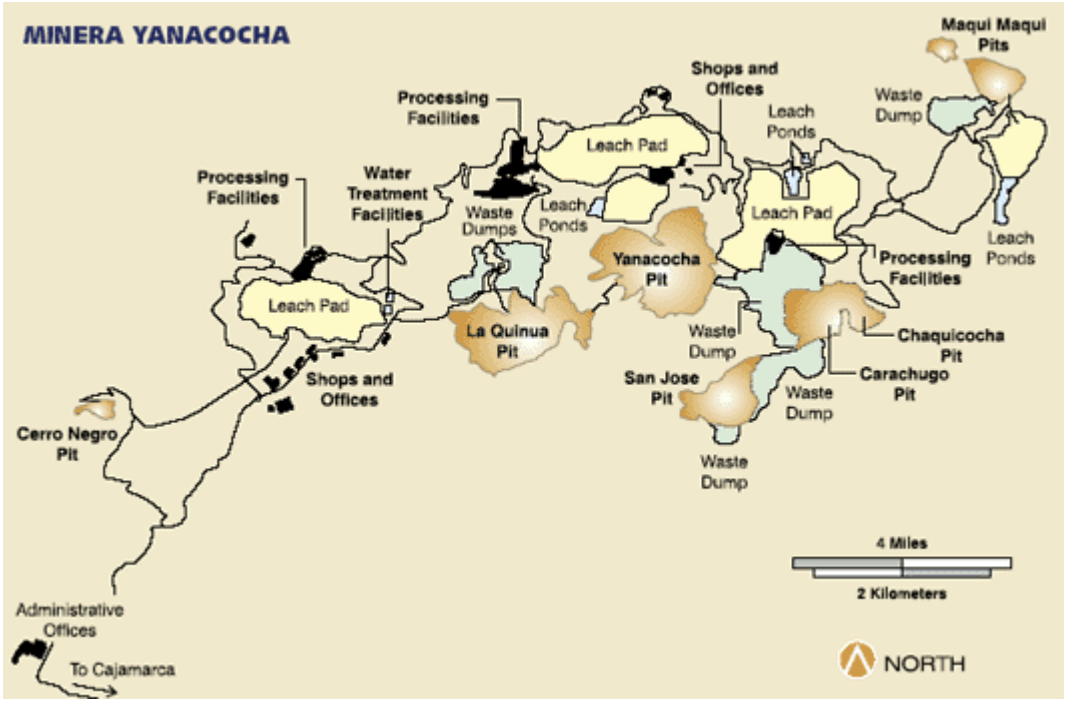

Illustration 2: A map of Yanacocha, showing the major components of the mine. This map shows in greater detail the white sections in Illustration 1. Source: Newmont 2005.

In 2005 MYSA sold 3.3 million consolidated ounces of gold at a cost of 147$ per ounce,

one of the lowest in the world. The proven and probable economically viable reserves of gold in the site stand at 32.6 million ounces of gold (plus 3.2 billion pounds of copper). By 2005 MYSA has removed more then 19 million ounces of gold from the Peruvian highland, worth more then $7 billion (Perlez & Bergman 2005). With mineral, and especially gold, prices at an all times high it is no wonder that Yanacocha is called the "crown jewel" of Newmont's mining operations.

3.4 MYSA and the region: impacts and opportunities

MYSA has a significant impact on the region, both socially and environmentally. The mine is the biggest land owner in the region (Illustration 3) and by far the biggest economic entity, the biggest employer, and biggest donation provider. The total value of all the monies MYSA introduced into the region, from 1992 to 2006, including community investment, environmental investment, acquisition in Cajamarca and the Canon Minero tax money is more then $1.5 billion. 2946 people are directly employed by the mine, out of which about half are from the department and only 13 are from outside Peru. The mine employs about 8000 sub-contractors (MYSA 2007).

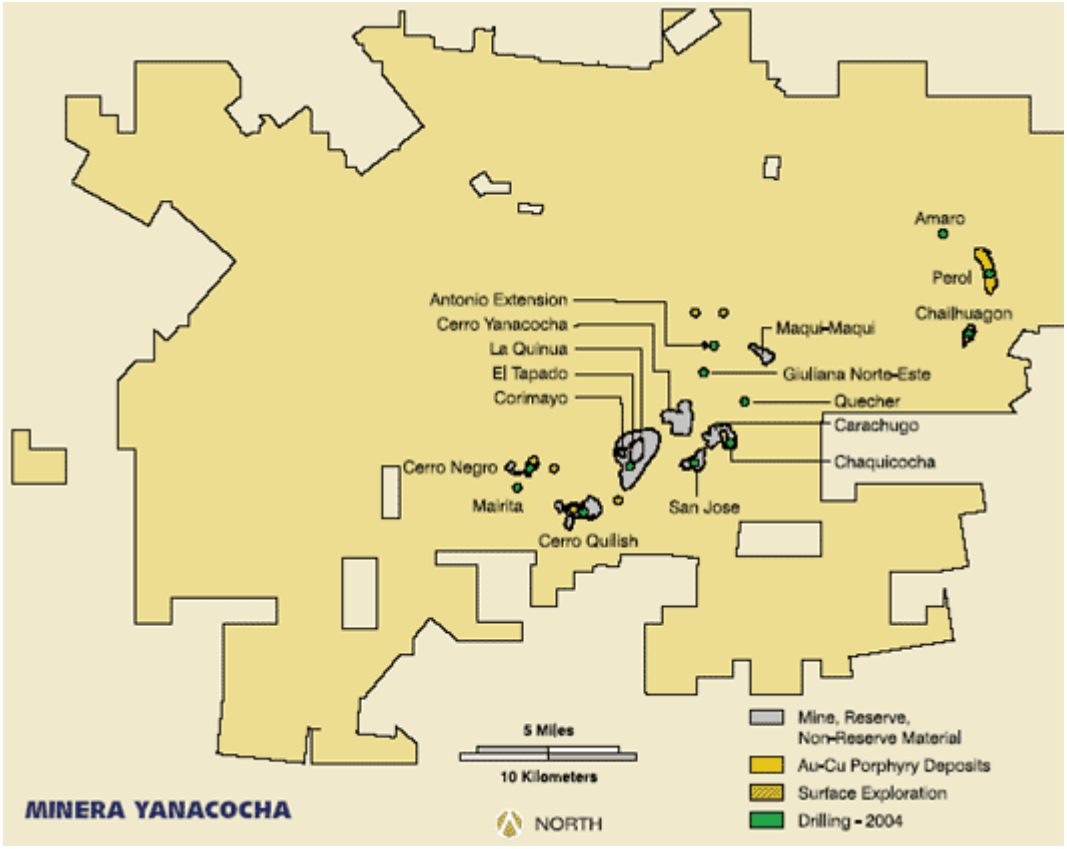

Illustration 3: A map of MYSA land claims in the region of Cajamarca. Note the scale of the claims in comparison to the size of the existing mine. Source: Newmont 2005.

The effect of the mine is different on rural and urban communities. Rural communities are impacted more directly, and Bury (2002) has listed four main themes for such (perceived and actual) influence: 1. water quality and supply, 2. land tenure/grazing areas, 3. social resources, and 4. economic resources.

The livelihoods of the rural communities in the mine's zone of influence are based predominantly on traditional agriculture, animal husbandry and agroforestry. Most landholdings are small and span several ecological production regions with little in the way of advanced irrigation or terracing. Irrigation is used solely in winter. As a result the biggest environmental impact the mine has had, since its inception, has been on water quality and quantity and whether this is an actual or perceived change is one of the main themes of the present work. Either way it is undoubtedly a major influence over the lives of the campesinos[6] who live in the mine's area of influence, as they depend on surface water or aquifer release for their survival.

Land tenure and grazing areas are impacted in three fundamentally different ways (Bury 2005). The first of these concerns the actual spatial, and horizontal, distribution of land use. Traditionally households in the region have a pretty well defined system of land use organised around different ecological zones, based primarily on altitude. The combination of the mine's vast size and its location has forced many of the adjacent communities to change their production zones, resulting in the intensification of agricultural activities at lower zones. The second such impact is the acceleration of the process of moving from either communal or informal land tenure institutions to private ownership. This change was driven largely by a series of of land tenure reforms[7] in the rural sector, facilitating land acquisition by private investors. Because of its need for land MYSA became the agent of land tenure change in the region, using its vast resources to facilitate (not too gently at times, as suggested by, among others, (Bury 2002)) the process. The third impact has been a significant rise in the price of land. MYSA began purchasing land in 1992 for less then $80 per ha and by 2000 the price was more then $1000 in areas around the mine, an increase of over 1200% (GRADE 2000).

Social resources are impacted more indirectly, through a range of social phenomena whose causal links to mining activity are more complex. The communities around the mine were divided into those that have and those that do not, according to who works in the mine and who does not, or who sold land for a good price and who did not. Bury (2002) reports a

6 Campesino is a Spanish word meaning a peasant farmer and usually associated with subsistence or near subsistence farming and may denote also, at least to some extent, indigenous roots.

7 Law 653 from 1991 for the promotion of foreign investment in the agricultural sector and law 26505 from 1995 that allowed collective groups to to parcel and sell their land.

perceived loss of cultural traditions, leading to the unravelling of the social fabric of the agricultural communities. On the other hand there is increased access to formal education, professional training and health services.

The economic impact on rural communities are of a complex nature. On the one hand, many who have sold their land, now have access to less and/or lower quality land and have experienced a negative economic effect, increasing long term migration away from communities surrounding the mine (Bury 2007). The mine generates only limited employment and much of it is for highly skilled personnel; similarly, much of the local supply chain of the mine arrives from the city and not the rural regions. There is a very widely held perception, especially among rural communities, that not only does the mine not pay enough taxes, very little of these actually finds their way to the communities most affected by the mine. There is a strong sentiment that the mine has brought little in the way of economic dividends to local communities.

On the other hand the mine has invested millions of dollars in its social programs, creating seed banks, irrigation extensions, potable water systems and rural credit programs. Many individuals have benefited tremendously, be it through direct or indirect employment. Road construction by the mine has had an important impact on local communities. Between 1994 and 1999 the mine has either opened or improved 133 km of roads (Martinez & Oblitas 2002), thus increasing household access to markets for their agricultural produce. This has, in turn, increased short-term and short-range migration activities in the region (Bury 2007).

The urban community in the region is the town of Cajamarca and it has undergone an economic boom in the years the mine has been operating in its vicinity. The housing and construction market have expanded to accommodate increased demand and the mine's increasing emphasis on local supply chains and acquisition has produced a host of prosperous local businesses. As a result prices have risen significantly in the city, making it among the most expensive towns in Peru and leaving much of the population poorer than they were before. A host of social issues has accompanied this rapid economic boom, namely, crime, violence, prostitution and alcoholism (Bury 2002; World Bank 2005).

By the very nature of its operation MYSA has a tremendous impact on the natural environment. While the total area of the contiguous mineral concession block it holds is 2653 square km (Newmont 2005) the mine itself is about 25000 ha (Leyva & Jahncke 2002), as can seen in Illustration 3. The combination of the mine's sizeable dimensions and the open-pit leach pad technology it uses, create a massive change in land-cover patterns and alterations to various natural processes such as surface water flow and absorption into

aquifer and fauna and flora presence and abundance. The scale of the operation and its effect on the natural environment can be exemplified by noting that between 2003 and 2005 around 200 million tons of rock were moved annually (Newmont 2005).

3.5 Social Environmental conflicts related to MYSA

It took only several years until MYSA, meant to be the "crown jewel" of both Newmont and the Peruvian mining reforms, became the centre of a wide and ongoing social environmental conflict. The causes for this conflict are complex and intertwined and any rigorous attempt at explaining them would have to consider not only the immediate social and environmental issues but also the historical context of entrenched poverty and its causes, land reform and long mistrust and struggle against the state and transnational corporations. The conflict itself is actually not one conflict in any way, rather a myriad of different interconnected conflicts, fusing various tensions: environmental justice and environmental preservation; urban versus rural; centralism versus decentralisation; the complex Andean politics of identity; different models of development and democratisation, to mention some of the main ones. This chapter will provide a partial survey of some of the main themes.

The department of Cajamarca (UNDP 2006) has a population of 1,359,023 and an area of 33,317 sq km. The majority of the population is rural (71.93% in 2003) and about a quarter of all the land is used for agriculture, out of which about 10% has access to any form of irrigation. The Human Development Index (HDI) of the department of Cajamarca is 0.49, which puts it at number 22 out of 25 departments in Peru, with the lowest educational indicators in the country and a 22.2% illiteracy rate. There is no doubt that the presence of the mining industry has contributed to the macro economic development of the department. While the national average of Gross National Product (GNP) increase was 3.5% over the period from 1995 to 2005, in Cajamarca the figure was 9.3%, an increase driven mainly by the mining sector responsible for 38.7% of the departmental GNP for 2004(A. Bebbington, Connarty et al. 2007).

The picture becomes more complex when we increase the resolution and look inside the provinces and districts where the mine is located. MYSA lists 14 districts as containing communities falling in its area of influence (MYSA 2007) but only six of those contain more then two effected communities so we will use these six for the sake of analysis. The six districts (Encañada, Hualgayoc, Bambamarca, Tumbaden, Los Baños Del Inca and Cajamrca) exhibit quite a variance in their human development indexes and national

ranking (Table 1), with the province of Cajamarca, where the city of Cajamarca is located, significantly higher up in the national ranking. We can observe significant differences in all the parameters between the least and most effected district: almost 7 years in the life expectancy at birth, 20 percentage point difference in literacy, 20 percentage point difference in educational attainment and almost 50 new soles in the per capita monthly income (25% more). These numbers show two important facts: 1) after more then 15 years in the region, the human development brought by the presence of MYSA is distributed unequally, with the city gaining much more, and 2) even after all this time the presence of MYSA has done little to alleviate the pattern of extreme rural poverty so present in the rural areas adjacent to the mine. Both these findings support the assertion that the mine has a significant impact on regional economy, only this impact is limited to the urban area.

	Population		HDI		Life expectancy at birth		Literacy		Secondary enrolment		Educational attainment		Per capita family income	
District	Inhabitants	Rank	HDI	Rank	Years	Rank	%	Rank	%	Rank	%	Rank	New Soles/ month	Rank
Encañada	22,397	215	0.4778	1,725	65.3	1,282	69.3	1,702	66.2	1,758	68.2	1,785	198.7	1,332
Hualgayoc	15,803	302	0.4867	1,661	65.6	1,242	68.2	1,722	72.3	1,663	69.6	1,764	216.3	1,142
Bambamarca	74,513	63	0.5041	1,504	69.3	680	68.3	1,719	69.2	1,724	68.6	1,779	216.4	1,141
Tumbaden	3,904	978	0.5162	1,364	66.9	1,048	77.8	1,414	76.0	1,553	77.2	1,527	195.4	1,369
Los Baños Del Inca	31,764	151	0.5399	1,078	69.9	589	78.8	1,365	78.1	1,458	78.6	1,457	212.4	1,181
Cajamarca	156,821	28	0.5867	540	72.1	268	89.2	688	83.8	1,139	87.4	722	243.3	829

Table 1: Human Development parameters in the districts directly effected by MYSA. The ranking is out of 1831 districts in the whole of Peru. Source: UNDP 2006.

The first signs of social unrest relating to the mine appeared not long after it started operating in the region and were related to the manner by which the mine interacted with communities and individuals in the process of purchasing land. Between 1992 and 1996 MYSA purchased 4068.95 ha from 41 families and during that process complaints emerged about the prices that the mine paid for the land, the pressure placed on families to sell their land, less than honest dealings with the campesinos and general arrogance (Bury 2002; Vela de Eiden 2005). The first actor to take up the case of the campesinos was the local church who took the case of the affected communities and was able to voice their plight to various actors. Church groups in Germany, the Vicariate of Solidarity of the Diocese of Cajamarca and the National Coordinator of Human Rights (based in Lima) all took part in a campaign that involved not only MYSA but also the management of its parent company, Newmont, in Denver USA, the World Bank, the German ambassador and the president of Peru, until the company agreed to compensate the families. The church set a pattern that would become typical to the conflicts in Cajamarca, using various national and

international networks to convert what might be thought of as a micro-level, local issue, involving 41 families, into an international, multi-faceted effort to pressure the company to compensate the families. The local priest was able to use, in an effective way, the fact that, by its very nature, this local dispute was not local at all, it involved a transnational corporation, and thus was of interest to individuals and groups far away from the mountains of northern Peru.

The next local actor to gain prominence in relation to the increasingly problematic relationship between the rural communities and the mine was the *rondas campesinas*. These first appeared in the 1970s as self defence groups aimed at fighting rural criminality, mainly cattle rustling, but later became much more than that, playing a role in fighting the Shining Path and becoming a rural judiciary and dispute solving mechanism (Vela de Eiden 2005). When their members felt that they were adversely effected by the mine's expansion they involved the *rondas* as a contact point for contesting these effects and with time the level of organisation moved up, to regional federations. In turn, the regional Federation of Women's Self-Defence Committees in Northern Peru (FEROCAFENOP) became the focal point and adopted similar tactics to that of the local church, contacting a North American[8] mining related NGO and forming a strategic partnership.

The late 1990s and early 2000 were marked by two complementary processes. On the one hand evidence of negative environmental impacts related to the mine was gaining public attention and on the other the role of city based NGOs and Social Movement Organisations (SMO) became much more pronounced. Throughout the 1990s a series of environmental incidents involving the death of fish in the region and water pollution both in the city of Cajamarca and the region were documented (see Appendix 2 for a comprehensive list of documented environmental incidents involving the mine). Locals were able to document at least 4 cases of massive death of fish and data obtained from national institutions suggests wide spread water pollution with various heavy metals, to the point that MYSA was charged 159 times for violating the World Health Organisation (WHO) standard. SEDACAJ, the municipal water authority, claimed that the mine was responsible for elevated levels of cyanide, chromium, iron and manganese in the municipal drinking water and Project Underground obtained an internal MEM document allegedly showing that MYSA had been dumping acid waters and heavy metals since 1993 (A. Bebbington, D. H. Bebbington et al. 2007; Bury 2002; Langdon 2000).

It is important to note that there was no official investigation into any of these incidents

8 Project Underground, now defunct.

and that the quality of much of this data is questionable, not least because of the difficulties in accessing data in the MEM. This accelerated the creation and strengthening of several urban NGO (GRUFIDES, ADEA and ECOVIDA) who worked on issues of development and environment, and were instrumental in collecting, producing and disseminating information about the environmental dangers of the mine.

According to Vela de Eiden (2005) the main reason the environmental incidents up to 1999 went largely unnoticed is that the population put very high hopes in the operations of MYSA and in their positive effects on the region. As a result those initial adverse environmental effects were tolerated and the relevant authorities (DGM, regional offices) either dismissed or ignored complaints and information they received.

Mobilisation against the mine, on a large scale, started already in 1999 when in December of that year a series of protests, involving up to 6000 people, assembled at the gates of the mine demanding an end to the expansion of the mining in the region and charging the mine with extensive social and environmental damage. But the situation really came to a head on the 2nd of June 2000 when 151 kg of elemental Mercury leaked from a truck making its way from MYSA, spreading along a 40 km section of road through three villages, San Juan, Choropampa and Magdalena. As a result, between two to three hundred people of the effected communities suffered mercury poisoning of various degrees. The event sparked wide ranging criticism on the relevant state authorities, MYSA and Newmont for their slow and ineffective emergency response and treatment of the injured.

The next big milestone was the conflict around mineral exploration by MYSA of Cerro Quilish (Illustration 1), a mountain north of the city of Cajamarca in the basin of the river Mashcon. The company has had the exploration of the mountain as part of its long term plan from an early stage, with the current extraction potential estimated at 3.7 million ounces of gold with a possible half a million more (MYSA 2002). A municipal study carried out in 2000 concluded that mining in Cerro Quilish would have detrimental effects on the quality of drinking water in the city and as a result, probably also under the influence of the Choropampa incident, the municipality declared the mountain a municipal protected reserve, thus preventing mineral exploitation of the mountain. A legal battle ensued, at the end of which (in 2003) MYSA won the right to proceed with the exploration of the mountain. Mass social mobilisation culminated in 2004 after the MEM gave MYSA the final go ahead for the exploration. At its peak the protest was a unique show of rural and urban unity and force with more then 40000 people demonstrating, the department under an indefinite strike and the mine under civilian siege. After a short stand-off MYSA

declared that it had asked the MEM to revoke the exploration authorisation in Cerro Quilish and that due to the lack of "social license" from the people of the region it would not explore the mountain.

3.6 Mediation attempts, Mesa CAO and Mesa CTAR.

One of the most important responses to the various conflicts was the formation of various multilateral roundtables for dialogue. Participatory roundtables are a common phenomena in the Peruvian political landscape, created in response to socio-environmental conflicts, as a sort of multi stake holder mediation space. Although they can, potentially, serve a democratic, participatory role in decision making they can also serve as a political tool to vent socio-environmental grievances and demonstrate the divisiveness of civil society. The use of roundtable approachs in Cajamarca stems from a legacy of participatory and consensus-based planning led by the mayor of the city in the early 1990s (A. Bebbington, D. H. Bebbington et al. 2007). There were two major roundtables, one led by the Compliance Advisor/Ombudsmen (CAO) of the IFC and the other by the Transitional Agency for Regional Administration (CTAR in the Spanish).

The CAO roundtable was created as a response to two complaints put before the CAO, in its capacity as the ombudsman of the IFC, a shareholder in MYSA, one relating to the Choropampa spill and the other by FEROCAFENOP about the adverse socio-environmental impact of MYSA. This roundtable started in 2001 and finally dissolved in 2006. During its years of operations it suffered from two main problems which, one can argue, prevented it from serving a long term stated objective of resolving and preventing conflicts between the community of Cajamarca and MYSA. First is the perception, prevalent throughout the community, that the CAO roundtable was not independent of MYSA and was pro mining. Second, and related to this perception, was limited participation, both from civil society actors and from regional and municipal governments, though from different reasons. Civil society actors mostly stayed out because of this perception while the administrative bodies stayed out for political reasons. The most important outcome from the CAO roundtable process was a technical study on the effects of MYSA on the quality and quantity of water in the region by an external company, Stratus Consulting, and another, smaller participatory study on the same issue (CAO 2005). The main findings of the report are[9] (Stratus Consulting 2003):

1. The mine has influenced the quality and quantity of water at some points and some

9 Partial list.

times.

2. The mine has had negligible impact over the water quality and quantity of the city of Cajamarca.
3. There is no imminent water quality risks in the area surrounding the mine.
4. On average there was no decrease in water quantity in the area surrounding the mine.
5. International standards have been exceeded at times and thus may pose a long term risk. Tighter controls and long term monitoring were recommended.
6. The most pertinent risk to humans is that of the presence of bacteria in the water, which is the result of animal and human waste.
7. The change in water quality might be deadly for fish and other aquatic fauna.

The second roundtable was created by the the Ministry of the Presidency, to address the growing social unrest related to water quantity and quality and although this roundtable process enjoyed wider participation from both civil society and national, regional and municipal government representative it finally dissolved with the events of the 2004 Cerro Quilish mobilisation. As with the CAO roundtable the main outcome of the process was an environmental audit of MYSA by the Colombian environmental consulting firm INGETEC.

3.7 Influence of the conflicts on MYSA's corporate social and environmental responsibility program

The social mobilisation and growing resistance to the mine had a significant impact on it. The ongoing socio-environmental conflicts surrounding the mine have made it difficult for the mine to realise new exploitation on its concessions and as a result the mine's production peaked in 2005 and has been declining since. In 2007 its gold production has dropped by 69% compared to 2002, on a month to month basis, mainly due to its inability to exploit new deposits containing about one eighth of the mine's reserves (Emery 2007b; Emery 2007a). This comes on top of the mine's decision to delay, indefinitely, their exploration plans for Cerro Quilish in 2004[10], which, assuming current gold prices of $850 per ounce and production costs of about $150 per ounce, represents lost earnings of more then $2.5 billion[11]. MYSA has equity reserves of about 10.7 million ounces of gold (equivalent to

10 It is clear that the last word in the subject of Quilish was not said yet, as various statements by Compañía de Minas Buenaventura indicate.

11 This calculation is not a very accurate one and is just aimed at giving an order of magnitude estimation of

$7.5 billion of profit according to the same estimate as above), the exploitation of most of which is under threat of further social and environmental contention (Newmont 2005; Herz, La Vina & Sohn 2007).

Looking at these figures it becomes clear why MYSA has had to seriously re-consider its position within the social fabric of Cajamarca. In the period from 2000 to the present MYSA has revised both its corporate social and environmental responsibility (CSR) program and the ways in which it does business in the department (interview I1, I4). From a position in which MYSA saw itself tied to various public and private institutions in a web of bilateral linkages, the model it now tries to follow is that of being one more actor in the development field, a part of a team and not the centre of events. On the environmental side, until 2003 MYSA's stated environmental policy centred around the control and mitigation of mining related environmental impacts; since then it is claiming to be actively trying to generate positive environmental impacts for the surrounding communities (MYSA 2007).

The most significant changes to the social policies of MYSA include transparency in its donation policy, improved management of the social commitments the mine has given and proactive communication policies (interview I1, I4). The first two are an attempt to break a pattern in which MYSA developed dependency relations with various social actors, the local groups depending on donations and the mine depending on them “keeping quiet”. In many ways the best option to receive money from the mine was to attack it, publicly (Rodríguez et al. 2005). The result was a 52% decline in requests for donations for the fear of being associated with the mine.

Financially, the sums the mine spends on corporate social and environmental responsibility have increased dramatically since it started operations, though its profits have increased even more dramatically (Illustration 4). Considering the base tax rate the company pays has stayed constant at least since 1996 (Parsons 1998; Otto 2002) we can view the increase in corporate social and environmental responsibility expenditure in a different light. Illustration 5 shows CSR expenditure as percentage of profits (calculated from a 30% tax on profit) and reveals how environmental expenditure varies greatly, in accordance with infrastructure installations in the mine, but has actually decreased since 2002. Investment in community affairs has hovered around the 3 – 4% mark since 2002. In conclusion, we can see that although MYSA has invested more in CSR policies in recent years, when one considers its increased profits, this investment has remained roughly constant.

the financial impact of the Cerro Quilish events.

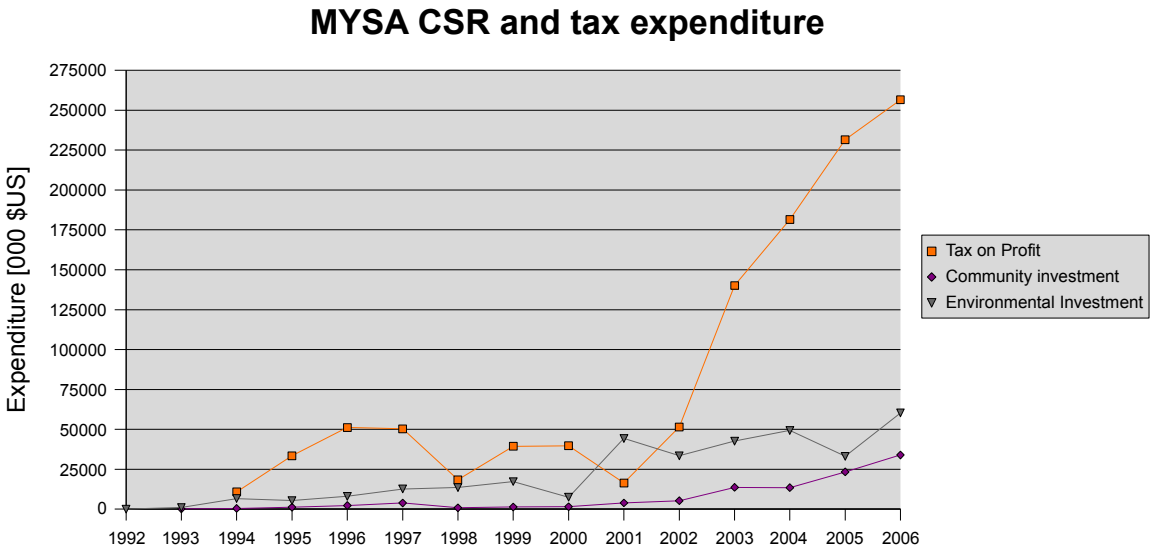

Illustration 4: MYSA expenditure on tax and its social and environmental programs. Note the sharp increase in profits since the early 2000s. Source: MYSA 2007.

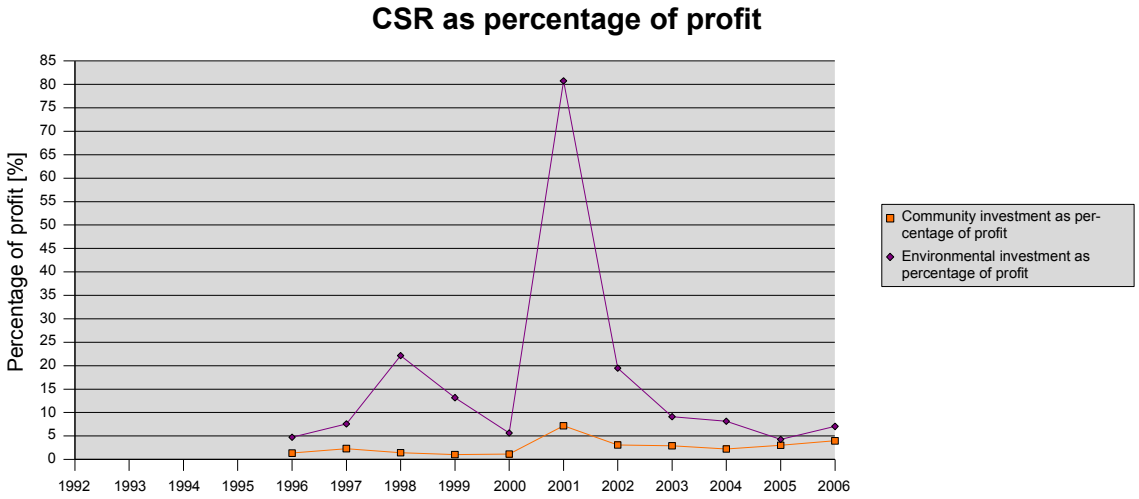

Illustration 5: Social and environmental expenditure as percentage of profit from 1996 till 2006. Environmental expenditure has sharp peaks coinciding with infrastructure work in the mine. Social expenditure since 2002 hovers around the 3 - 4% mark. Adapted from MYSA 2007.

The multiplier effects to local business which partake in the mine's supply chain have increased considerably during MYSA years of operation (Illustration 6). A clear upward trend is visible from 3.2% in 1993 to 25.5% in 2006, which in absolute numbers translates to $75 million, meaning there is a considerable multiplier effect to the Cajamarcan economy from presence of MYSA. Although there is a clear trend of increased share for local employment the data MYSA publishes, the data is not coherent and makes a quantitative assessment difficult.

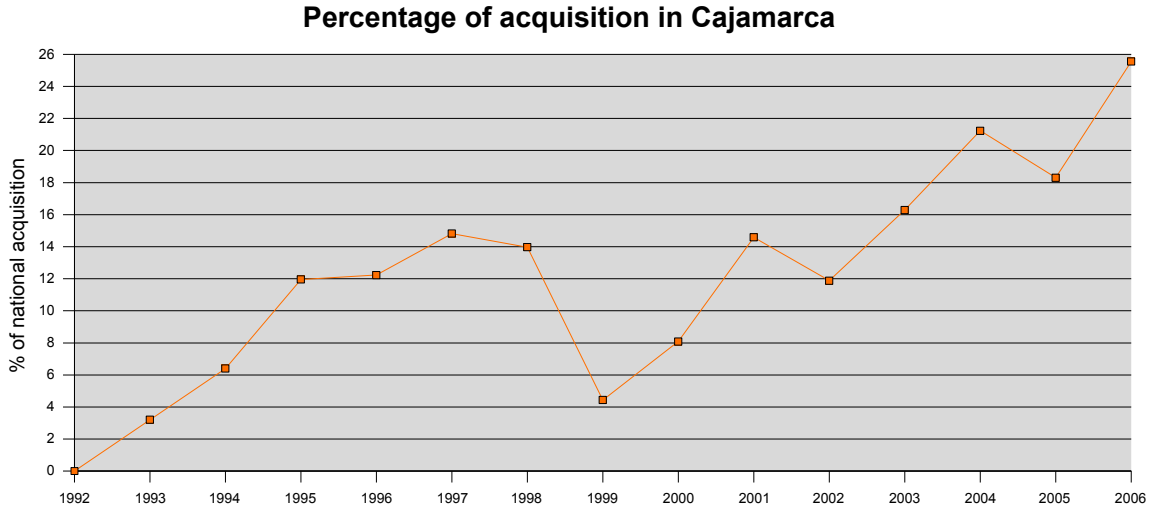

Illustration 6: Percentage of acquisition done in Cajamarca out of total national acquisition. Source: MYSA 2007.

4 Participatory water monitoring schemes

At the root of all the PWMS established in the vicinity of MYSA is the notion that these schemes can serve to either resolve or mitigate the conflict surrounding the environmental impact the mine has on waters. This would happen through a confidence building process with the local population by creating, at least theoretically, a situation in which the communities stop being just consumers of data and actually start to produce some of it. Involvement in the process would convince people that there is actually no environmental problem and thus defuse the tension. It turned out that things were much more complicated.

MYSA is currently involved in 8 different participatory water monitoring schemes and was involved with two more initiatives on behalf of the CAO (interviewes I1, I2, I3, I4 and CAO 2007a; CAO 2007b), as can be seen in Table 2. These schemes vary greatly in their scope, participation and their available documentation.

Program	Frequency of sampling	Starting date	Number of current sampling points	Participants
SEDACAJ	Monthly	1996	20	SEDACAJ, DREM, MYSA
COMOCA Sur	Monthly	2000	26	ATDR-Cajamarca, JUR-Mashcón, SEDACAJ, MYSA, local committees
COMOCA Este	Monthly	2002	10	ATDR-Cajamarca, JUR-Mashcón, SEDACAJ, MYSA, local committees
Granja Porcón	Monthly	2003	5	Granja Porcón, MYSA
ATDRJ	Bi-monthly	2004	6	ATDRJ, MYSA
Llaucan	Monthly	2004	4	Communities of Tambillo, Llaclla, Llaucan and MYSA
Yanacocha	Monthly	2005	4	CP. Ingenio, Yanacocha Baja, MYSA
DESA-Combayo	Monthly	2006	11	DESA, Combayo, DREM, ATDR-Cajamarca, MYSA
Stratus Consulting Inc.	NA	2002 – 2004	NA	FEROCAFENOP, SEDACAJ, COMOCA, The National University of Cajamarca, MEM, MYSA, Municipal Government of Cajamarca, JUR-Mashcón
Independent water monitoring	NA	2004 – 2006	NA	ADEFOR, ASPADERUC, JUR-Mashcón, JUR-Chonta, COMOCAs, CORECAMIC, DREM, INIA, INRENA, IUDER, The Municipality of Cajamarca, SEDACAJ, Solidarity International, National University of Cajamarca, MYSA

Table 2: Participatory water monitoring schemes in Cajamarca involving MYSA. The light grey part of the table are the programs associated with the CAO which are no longer in existence. Source: interviews with I1, I2, I3, I4 and the CAO monographs on its roundtable *(CAO 2007b; CAO 2007a)*

Some of these schemes are participatory only in that several institutions participate in

them, but some include more citizen and community participation and are thus more relevant to the present work. This chapter will present in more detail the history, scope, strengths and weaknesses of four of the schemes that are relevant to the research question.

The four schemes that will be elaborated are: the two CAO sponsored schemes, the Scientific and Technical Committee for the Monitoring of Water (COMOCA) and the DESA-Combayo scheme. Of those schemes only the CAO sponsored ones enjoy a wealth of documentation, indeed, a surprising wealth of documentation, while the information available on the others is limited to indirect references in documentation and interviews with participants.

4.1 COMOCA

Water for irrigation, as well as washing and watering of livestock, is drawn from dedicated water canals which are both common and vital for local rural livelihood. There is some evidence that water from the canals is used for drinking by some. The canals originate from either streams or springs, some of which are in the mine's zone of operations and are thus influenced directly by the mine's operations (though the canals fed on sources outside the mine's operational zone can, and often are effected by it as well). The canals themselves are built for low gradients by contouring along the hillsides (Bury 2004; CAO 2005).

The COMOCA was first established in 2000 by the ATDR, in its capacity as responsible for the rational and efficient use of hydrological resources in the region, to address the concerns of the canal users regarding the influence of the mine on the waters flowing in the canals (MYSA 2001; MYSA 2002; MYSA 2003; MYSA 2004; MYSA 2005; MYSA 2007; CAO 2007b; García Esteves 2008). Their full aims are:

- Organise the water monitoring in the canals.
- Evaluate water behaviour in the canals.
- Detect mining related changes.
- Guard the observance of the relevant regulations in the administration and use of irrigation waters.

The COMOCA is divided into two organisational entities, sur and este, to the south and east of the mine, respectively. The COMOCAs entered, in 2000 and 2002, a bilateral agreement with the mine to perform monitoring of the quality and quantity of waters in their respective canals. The first to start operations was the COMOCA sur, comprising of

representatives of 10 irrigation canals, the technical committee of the irrigation district of Cajamarca, SEDACAJ, DESA, the users councils of the river Mashcón and MYSA. Its findings, which showed that the average concentrations of various substances[12] were all below the relevant legal requirement by the Peruvian law, were published by MYSA and the detailed information was distributed to the member organisations.

The workings of the monitoring commissions is very similar in all the non – CAO cases. The monitoring points are chosen by the commission, though usually this process is heavily biased towards the experts which are from the mine and the relevant state agencies (ATDR or DESA). As Cajamarca has no laboratory capable of performing all the analysis (apart from the one in the mine which is not used in order to make the analysis more credible) an independent credited laboratory is chosen, in Lima, to which the samples are sent. In turn, the results are passed on to the member institutions and to the participating communities in open meetings, and are also available for inspection at MYSA's information centre in Cajamarca. There is limited training of the participating non-professional civilian as part of the scheme which are usually campesinos from the users council. One of the most important aspect of the COMOCA is that it is funded, wholly, by MYSA.

Opinions on the effectiveness and purpose of the COMOCA are greatly polarised. Although there was a consensus among interviewees that the actual results of the monitoring are neither tampered with nor wholly untrue there is great disagreement on what meaning the results carry and even more as to the social and political role the COMOCA fulfils. The interviewees from MYSA, COMOCA and the Defensoria (interview I1-7, I11) said the COMOCA water monitoring scheme was effective in producing well founded, credible and accessible data about water quality and quantity in the region, data that demonstrates that, by and large, water quality in the canals is of adequate standard and there is little reason for concern in this regard. Moreover, they argue, the COMOCA serves its purpose by a) serving as community communication and organisation tool both internally and externally, mainly with MYSA; and b) monitor, on a continuos, long-term basis, water quality in the canals and disseminating this information effectively between canal users. The empowerment role they serve is best understood by the ability of canal users associations to negotiate with MYSA various aspects of social and environmental development projects funded by the mine (interview I5). Although the COMOCA is not part of the negotiation as such the work done through it is the basis of

12 Total Arsenic, total Cadmium, total Chromium, total Copper, total Lead, total Mercury, total Selenium, total Zinc, total Nickel.

these negotiations, by creating a canal users channel of communication with the mine, and informing the campesinos on various water related issues. Maybe the strongest demonstration of both the empowering and monitoring roles it serves is how, in 2005, an exception in water quality was detected not by the mine's own, multi million dollar, internal monitoring system, but by the COMOCA who were quick to point it out and make sure MYSA would fix it (interview I2, I3).

On the other hand interviewees from civil society (interview I10, I12) and the report by GTZ (García Esteves 2008) present some serious concerns regarding the social and political stance of the COMOCA (which impacts the validity of the data it generates). At the root of the problem is the COMOCA close association with the body it is supposed to monitor. The result of this association is large scale mistrust, both on an institutional level and on a community level. On the community level the result is that the presence of the COMOCA strengthens the divide that already exists, due to many other factors, between mine supporters and those who object to it, between those that directly benefit from it and those that do not. Also criticised is the limited training and participation process which leaves the non professional participants in a position of observer, both in the design of the study and the actual sampling process. In many ways, for those interviewees, the COMOCA serve a political purpose for MYSA and are basically a device created to numb the population in the face of the environmental impacts the mine creates. Another angle of criticism levelled at the COMOCA (García Esteves 2008) is the administrative one – why is it necessary to create an entity for monitoring of waters in a body already responsible for doing just that (ATDR)? Why monitor only the canals then and not other water bodies?

The COMOCA is certainly a flawed institution. Even if the data it produces is valid and useful its close association with the mine is at the root of its flaws. It is clear that for a participatory monitoring scheme to be credible and effective it should be run and funded by an actor that is not associated with the potential polluter and is regarded by the population as unbiased. The most natural candidate to fulfil this role is the state, and in the Peruvian case, with the present legal frame work (see chapter 3.2), it must include some form of cooperation between the ministry of health and agriculture. Another important factor which arises is the need, in order to realise the full empowerment potential of PWMS, for a much more comprehensive training element.

4.2 CAO – sponsored schemes

4.2.1 Independent water study

One of the first issues that were discussed in the CAO sponsored roundtable in Cajamarca was the need to conduct an independent water study in the region to understand and allow for prevention and mitigation of any harmful impacts the mine may have on the waters. The CAO contacted the north American environmental research and consultancy firm Stratus Consulting Inc. to perform the study due to its reputation and lack of mining related contacts. The objectives of the study were to study "*if and to what extent the waters outside of the Minera Yanacocha mine property are adversely affected by mine operations*" (Stratus Consulting 2003, pp.1-3). The study dealt with both quality and quantity. Of the utmost importance for the stakeholders in the CAO roundtable was to guarantee that not only are the results of the study scientifically valid and the conclusions and recommendations useful but that the people of Cajamarca believe the study and accept it as an authoritative source. The participatory component in the study is part of the efforts that were made to generate credibility. In the process of designing the study the team conducted a series of interviews and open consultation sessions to make sure it understands the concerns of the local population. The roundtable chose the lab that will conduct the water analysis together, with participation from all its members. The function of "veedores" (observers)[13] was created and introduced into the study. The veedores were oversight volunteers who came from local communities and institutions and accompanied the study team on their many field trips to a) make sure the sampling was fair and accurate and b) to communicate their observations to their respective communities or institutions.

Although the participatory element of the design of the study helped to centre it around issues that are of concern to the local population it was not able to incorporate into the process wide sections of the local population. That was due, on the one hand, to objective difficulties of working in isolated region like rural Cajamarca. Time limitations dictate a limited number of consultations, only at certain locations, and using the most accessible social entry point, namely those already in contact with the mine (interview I10). On the other hand, because of the widespread criticism of the CAO roundtable, relating it to MYSA, many groups, both NGOs and local communities did not take part in the roundtable and thus were outside both the consultation and the veedores circles. The main contact point with local communities was the COMOCA, already highly suspect of being

13 The original concept was suggested by FEROCAFENOP to guarantee the independence of the study (CAO 2007a).

on MYSA's "side". Despite those difficulties the veedores concept was highly beneficial to the study and did generate more credibility within local communities and institutions. Their actual operation was at times difficult because of the voluntary nature of the scheme – they received no compensation for work that was very hard, and at times, when accused of collaboration, not rewarding. As a result, the attendance rate for the veedores was about 20%. Due to communication problems many individuals and some communities did not know that the study was being held, or that it was independent of MYSA, resulting in confrontations with the sampling teams.

The independent water study is generally regarded as a sound and accurate study, no doubt in part due to its participatory component. Its two main shortfalls were the limited credibility the CAO enjoyed, due to doubts about its motivations, and its transitory nature. As a result the participation in the process was limited to those elements in the Cajamarcan society already associated with the mine. Probably the most obvious problem/constraint on the participatory component of the CAO's involvement in Cajamarca is its transitory nature. The CAO was not meant to stay indefinitely in Cajamarca and upon its withdrawal little was left of its efforts apart from the water study. The capacitation process that was part of the roundtable came to naught as most of its graduates could not even be accounted for (CAO 2005). In the words of several of the interviewees – the CAO came and went and not much was left.

4.2.2 Participatory monitoring and quality assurance program

Following the independent water study the CAO roundtable chose to focus on the implementation of the recommendations of the Stratus study. At the same time it became clear that there was no point in creating another water monitoring institute to compete with the various existing ones (see Table 2). As a result the roundtable decided to initiate a framework that would enhance and complement the existing schemes by concentrating on collating information from the other schemes for the purpose of quality assurance and control (QA/QC). The purpose of the scheme was to provide the much needed credibility to other water monitoring schemes by providing a unified platform for the collection of all the data produced, assuring its validity and quality and utilising the skills of the technical committee of the CAO roundtable to provide an interpretation of the results. There were also plans to present, periodically, the data obtained to the relevant communities but this program did not materialise due to institutional weakness of the roundtable and lack of resources.

The actual study took place only for one year, between July 2004 and August 2005, and included data from over 100 sampling points. It includes a participatory element on two levels: 1) the concept, design and all decision making were done by the roundtable itself involving representatives from various communities and institutions, and 2) the sampling process itself involved veedores again, much in the same way as in the Stratus study. The final report (CAO 2005) was presented by the technical team to 14 public institutions with attendance of about 300 individuals and 12 different rural communities and groups of canal users with about 300 community members and canal users hearing the presentations. The main conclusion of the report was that the data collected by the other monitoring schemes was reliable and that water quality in the region is mostly satisfactory, but there were exceptions that require further monitoring and caution. With the withdrawal of the CAO from Cajamarca the roundtable it established dissolved and the scheme terminated.

Many of the issues relating to the Stratus study are relevant here, especially the issues relating to veedores and the position of the CAO roundtable in Cajamarcan society. The technical competency of the study did not address the concerns of most Cajamarcans because these concerns were not technical. Cajamarcans were not concerned about statistical significance or sampling protocols but with deeper sentiments of identity and trust. These issues will be discussed in the next chapter.

4.3 DESA-Combayo

In August and September of 2006 a social-environmental conflict between the mine and the population of Combayo and the surrounding communities erupted. Although cooperation agreements between the mine and those communities were signed only a year before, involving representatives of the MEM and the DESA and including a clause on the formation of a participatory water monitoring scheme (MYSA 2005), confrontation erupted with the approval and beginning of works on a new extension of the mine in the region. A campesino was shot dead and the road leading up to the mine was blocked by angry campesinos for 6 days leading to more confrontations with the police and the mine's private security force. The main demands of the protesters were more jobs on the mine and guarantees for water quality as well as clarification regarding the death of their comrade. The mayor of Combayo, Luciano Llanos, was quoted as saying “This project has not brought us benefits...We have demonstrated how our lagoons, our springs are being destroyed by this project” (Salazar 2006). The response of the mine was to close down the operation in the region and later throughout all its operations, laying off contractor

workers, and costing the state more then half a million $US a day. As a result all of MYSA social projects in the region were put on hold. The pressure on the state to solve the conflict mounted until finally a high level commission was sent and negotiations between the community and the state started. The result was an 11 point agreement, one of which was a participatory water monitoring scheme led, and just as importantly, financed, by the DESA.

The scheme involves, apart from the local authority and the DESA, the DREM, ATDRC and MYSA. The monitoring points are chosen together according to the DESA's criteria and, because the scheme is led by the DESA, the samples are analysed in the DESA's central lab in Lima. The scheme includes the function of veedores from the local community who join the sampling process after a short training process. The DESA works with the head of the local authority and she/he does the co-ordination inside the community (interview I7).

The scheme suffers from a great delay in the distribution of results due to a three, four months lag in the DESA's Lima lab. This delay is not only a source of contention with the local community but also prevents the system from serving as a tool for immediate response. A second issue with the ongoing operation of the scheme is the loss of interest in the participatory nature of the scheme by the local population and the resulting difficulties in working with veedores. The scheme is limited to water *quality* due to DESA's mandate, something that the DESA is trying to resolve by negotiating a comprehensive scheme with the ATDRC that will include both quality and quantity.

The scheme enjoys relative credibility as evidenced by the desire of several other local authorities to duplicate it. Although the veedores and the participatory decision making process and dissemination of results are contributing factors to the scheme's success, one of the main factors is that the program is led and funded by a state organ, independent of the mine.

5 Reflections

This chapter deals with the complex relationship the water monitoring schemes have with community empowerment in Cajamarca. It will present three general reflections pertaining to the research question but relating to wider issues.

5.1 Causal relations in empowerment – are water monitoring schemes the result or the engine of empowerment?

The analysis presented here relies on the discussion of empowerment by the World Bank (Narayan 2002) as it presents a coherent and accessible framework for the understanding of empowerment and poverty reduction. Narayan defines empowerment as: "*the expansion of assets and capabilities of poor people to participate in, negotiate with, influence, control, and hold accountable institutions that affect their lives*" (p.14). Empowerment, according to Narayan, has four components:

- Access to information
- Inclusion and participation
- Accountability
- Local organisational capacity.

This chapter examines the relationship between empowerment, as defined here, and the participatory water monitoring schemes detailed above.

It is clear that all four schemes do (or did) contribute towards the empowerment of the communities that participated in them. All four schemes increase, by their very nature, the access of the respective communities to information. Clearly all the schemes provided the communities with information about water quality and quantity in the region in an ongoing (COMOCA, DESA-Combayo) or a snapshot format (the two CAO sponsored studies). The two ongoing schemes provide the communities with information that is very local in nature and is relevant to their technical concerns. Although this information is contested at times, most would agree that it is accurate and serves, at least to some degree, its purpose. Moreover, the involvement of local campesino institutions and individuals has provided them with access not only to technical information about water quantity and quality but also, and arguably more importantly, to information on how the bureaucratic system works

with regard to water management. Local communities and institutions are able to navigate the state system with greater understanding, both of the technical terminology and of power structure. This newly gained knowledge is exemplified by the move from using utterances like: “There has been a change in the appearance of the water and the ground over time” (CAO 2001, p.9) to using scientific Jargon (heavy metal presence) without loosing local knowledge (interview I11). An example of the much improved understanding of the intricacies of monitoring schemes and the politics that are involved is the insistence of the Combayo protesters that part of the agreement to resolve the dispute will disconnect the scheme from the mine.

The PWMS raise difficult questions when considering the subject of inclusion and accountability, for two reasons. The first issue has to do with *internal* participation and inclusion. Due to the polarised attitudes within Cajamarcan society the schemes involve only a fraction of the community although they are theoretically open to all, thus contributing to individual empowerment but not to community empowerment. In this respect, the schemes, chiefly the CAO and COMOCA schemes, serve to strengthen internal division and thus internal *exclusion*. The second issue has to do with the inclusion of the community, as a group, in decision making and priority setting on the political level. Although, officially, the purpose of all the four schemes is to allow local communities to participate in the monitoring process and thus be able to influence it, that aspect is the most criticised aspect of the monitoring schemes. The claim is made, especially by civil society actors (interview I10, I12), that the inclusion of local communities in the schemes serves mainly the interests of the mine by giving it credibility and co-opting the opposition. Probably the main issue here is that PWMS, if isolated from wider policy making circles are indeed of limited political power. The fact that there is no participatory, independent and comprehensive state run water monitoring scheme that is integrated into the decision making process, does lend weight to the argument that the water monitoring schemes provide the local population with limited opportunities to participate in the decision making and priority setting process.

Narayan (2002) defines three types of accountability: political, administrative and public. There is little doubt that the PWMS have increased the public accountability of the mine for the state of the water in its area of influence. The administrative level is much slower to react to the concerns of the population and conduct its monitoring in an accountable and transparent way, and as a result is seen by some to be representing the interests of the mine and not that of the population. There are of course serious issues of capacity deficiency

inside the administration which no doubt contribute to this state of affairs. Again, without a comprehensive strategy on behalf of the state no serious administrative accountability can exist and the existing are extremely disjoint in their strategy and operation..

Local organisational capacity is probably the most important issue when analysing the relation of PWMS to community empowerment. The three cases differ in this respect. The COMOCA has indeed built some such capacity but the controversy surrounding it meant that it has, overall, contributed to a loss of social cohesion in the participating communities. As a result, this organisational capacity was not translated into an ability to "*negotiate with, influence, control, and hold accountable institutions"* (Narayan 2002, p.14) and has thus served limited empowerment purpose. Although the CAO did intend to generate considerable local organisational capacity, and included an extensive training element in its program, its transitory nature and its limited participation meant that it did not contribute to generating any significant organisational capacity amongst local communities. The DESA-Combayo scheme is really too new to evaluate its ability to generate organisational capacity but its limited training element might hint at a possible negative outcome. In all the cases the lack of a long term, wide ranging training process leaves the patterns of mistrust intact, thus damaging the credibility of the data produced and prevents the development of meaningful and sustainable local organisational capacity.

In many ways it becomes clear that the direction of the causal relationship between the participatory schemes and community empowerment are reversed, meaning that the participatory schemes are the result of community empowerment and not its drivers. The conflict, then, becomes an agent of empowerment. It creates[14], and motivates, social movements, as exemplified by the creation of various defence fronts in the region and social and environmental NGOs, and it connects and creates local, national and international networks (A. Bebbington, D. H. Bebbington et al. 2007). The social-environmental conflict in Cajamarca was, by its very nature, about the public accountability of the mine about the negative impacts of its presence in the region. The roundtables were the result of the conflict, as were both the water monitoring schemes and the two large scale external environmental studies, thus increasing the access to information and the participation and inclusion of local communities in the political process.

14 And sometimes destroys, as in the case of the FEROCAFENOP (A. Bebbington, D. H. Bebbington et al. 2007).

5.2 Accountability and democracy – who is driven by public pressure (and when)?

One of the main criticisms voiced against MYSA is that due to its enormous size and importance for the department of Cajamarca and the absence, or at the very best, the weakness, of the state, particularly in rural zones, the mine replaces, *de facto*, the state. As the mine is privately owned, and with a majority share by a foreign company, it is not accountable nor elected or representative of the local population, which creates a clash of interests.

In the case of the PWMS in Cajamarca the picture is more complex. MYSA, the unaccountable, non elected actor was both more responsive and quicker to respond to the concerns of the population then state actors. Although the elected politicians at the local level in many cases aligned themselves with the concerns of the population, like in the case of Combayo or the municipality of Cajamarca battling the legality of the Quilish exploration, the state administration reacted much more slowly, if it at all. State authorities like the DESA, MEM and Ministry of Agriculture have failed to respond in a coherent and integrated way to popular concerns. Of the four schemes presented in the previous chapter only the DESA-Combayo scheme can be said to have been created by the state.

The mine has changed its policies, both environmental and social, as a result of massive citizen pressure which had resulted in significant revenue loss. Although MYSA is a private company dedicated to generating revenue, it understood, at least to some degree, that its core business would be damaged by a lack of "social license" to mine. It decided to incorporate environmental and social responsibility into decision making and priority setting more comprehensively then it did prior to the conflict. The depth and and breadth of this change are discussed above and should be the subject of a much wider investigation, but that there has been a change, and a rather considerable one, is certain. On the other hand, MYSA is *not* a development agency, a point that one should constantly bear in mind, and that is lost at times in the references all the actors make to the mine's role in the region. As a result the PWMS that MYSA was instrumental in setting up suffers from shortfalls that could otherwise been avoided, such as depth and scale of training and the lack of a comprehensive region wide monitoring scheme. Because the mine is not a development agency, the important question of whether the PWMS the mine was instrumental in establishing was meant as a type of pressure release mechanism or whether the scheme face objective difficulties[15] loses some of its practical importance. Precisely because

15 There is evidence to support both views. Limited capacitation, and the limited extent of inclusion and

MYSA is not a development agency but a private company responsible for much of the conflict, its extensive involvement in the construction of a PWMS would lead, inherently, to a deficient outcome.

The state, on the other hand, has changed much less, and much more slowly. The question of water quality and the credibility of the available data regarding it, have been one of the foci of the conflict surrounding MYSA since the late 1990s, but only in 2006 has the state assumed responsibility for a local PWMS (and even then only as the result of violent conflict). The state is caught up between its dependency on tax money from the mine and its commitments to its citizens. The combination of this internal conflict and severe deficiency in local capacity, incoherent policy framework and deeply entrenched non-transparent and non-accountable practices has resulted in this very limited and slow reaction to public concerns. Because of the state's close relationship with the mine, particularly in the case of the very powerful MEM, but other agencies as well, it is seen by many as a collaborator with the mine and thus the environmental data it produces lacks credibility. The three relevant ministries, MEM, health and agriculture have done little that is not reactive to dispel this perception.

5.3 Worlds apart – language and cultural gaps in the Andean highland

Illustration 7: A sign hanging in MYSA dining hall warning the workers from electric storms. It reads: "Do not go out! Electric storm". Photo: Frederic Horta.

participation all support the pressure release hypothesis while crucial local governance deficiencies and difficult geographic condition are all objective difficulties the schemes had to face.

Of very little scientific value, but very telling nonetheless, was an encounter, during the field study, with a campesina who was narrating the disastrous influence the mine has had on her life and the health of her family. She was telling of poverty and water pollution and the way the mine just takes all the riches from this land leaving the people who actually live there worse off. There was a very clear logic to what she was saying, expressing what is in many ways the most basic sentiment governing the conflict surrounding MYSA. However, what was telling about this encounter was the fact that the land and the river she was referring to, the land under her feet, was outside the mine's area of influence and thus was not polluted by the mine[16]. There is a deep mistrust of any outside agent, state and private alike (Vela de Eiden 2005), and a deep sentiment of social injustice inflicted upon them, an injustice that has received an address in MYSA (interview I1, I4).

Visiting the mine, on the other hand, gives the visitor a very different experience. The sheer scale of the operation is what strikes the visitor first – the ability to, quite literally, move mountains, and how all the numbers associated with the mine, are all of a gigantic scale. But upon further inspection a second, deeper, impression takes hold that has to do with the institutional culture of the mine. There is a strong sense of control over both nature and humans that is very much absent from the surrounding region. The control over nature is clearer – an engineering enterprise of this scale is all about controlling nature. The human side of it is more subtle and has to do with notions such as efficiency, urgency and uniformity which are all present in the ideological fabric of the mine and are tangible throughout its operations in ways that are simply absent from the region around the mine. A dining hall that serves standardised and sanitised Peruvian food[17], incredible adherence to health and safety regulations (see Illustration 7) and a corporate language that is saturated with the word community and sustainability, are all manifestations of a globalised, western, late capitalist culture.

Through the lenses of this cultural gap the problems associated with PWMS assume a wider meaning. The magnitude of the changes brought about by the mine has altered livelihoods in the region tremendously (Bury 2002; Bury 2004), and the rate at which the local population reacts to the change is much slower. There is no doubt that many of the problems associated with water in the region are solvable with technological progress and improved water management[18]. It is solving these problems while maintaining the Andean world view, and at a pace that local people can cope with, that is very difficult, and water

16 This, of course does not exclude other sources of pollution, most probably Coliforms.
17 Prepared by Aramark, another US based multinational.
18 One of the things I found most difficult to understand, coming from a semi-arid region like Israel, was the often heard complaint about water shortage, in a region with an annual rain fall of more then 1000mm.

monitoring is a good example of this difficulty. The Cajamarcan experience demonstrates the limitations of introducing environmental technology, such as PWMS, as a technocratic solution for a social-environmental conflict or for serving as engines for community empowerment. Without engaging meaningfully with both power relations and cultural gaps in the region the introduction of PWMS will not address the fundamental issues of access to information, inclusion, accountability and organisational capacity, and will, thus, serve only very limited empowerment and conflict resolution roles.

6 Conclusion

Rather then re-state what has been said above, this closing discussion attempts to draw some broad-reaching implications of the Cajamarcan experience. Probably the most direct lesson to be learnt is the importance of having an integrative, long-term and coherent outlook on the problem of mining-related environmental conflicts. Although the PWMS surveyed here do play a role in conflict resolution and community empowerment, it is also clear that this role is limited by their restricted nature. All the PWMS discussed are limited not only geographically and temporally but also in the extent of their inclusion and participation, and, perhaps most importantly, in their political viability. For a PWMS to serve its purpose it cannot be sponsored by the actor who is suspected as the polluter. The most obvious and natural actor to assume responsibility for PWMS is the state[19], as an addition to its regular water monitoring program or as a special initiative aimed at addressing a specific issue. There are also PWMS that rely on local knowledge and/or very simple (i.e. Not involving laboratory techniques) methodologies for monitoring water quality and quantity (Deutsch et al. 2001; Gasteyer & Flora 2000) and those can be very useful as well for much the same purposes as state sponsored schemes.

The notion of the state being a slower and less responsive social and environmental actor than the private, foreign multinational presents a difficult dilemma for social movements and NGOs – what is the role they should play once the multinational is already established in the region[20]? Would it not be wiser, in terms of the benefits for the effected communities, to turn the energy and understanding of the movement or NGO from opposing the very presence of this multinational towards influencing the policies of the enterprise in a way that the NGOs and social movements, with their grassroots know-how and understanding, deem to be the best? On the other hand there is the very serious prospect of being co-opted by the multinational and losing the independence and moral authority that is at the heart of any social movement or NGO. Although some form of middle ground might be found, such as maintaining the independence of the NGO (through cautious funding, for example) combined with critical evaluation of joint (with the multinational) projects, this difficult dilemma must stay sharp at the minds of social and environmental leaders and activists.

19 For a well thought out recommendation as to how such a scheme could look like for the department of Cajamarca see a forthcoming report by GTZ Peru (García Esteves 2008) and another by the NGO GRUFIDES (GRUFIDES 2007).

20 Meaning that a struggle against the very existence of the enterprise might be futile.

Going back to the theoretical frame-work of participation as part of ecological modernisation, the critique writers such as Hickey and Mohan (2005) have towards a limited notion of participation becomes particularly relevant. A limited notion of participation that does not engage with issues of power and politics remains a technocratic fix that achieves only limited empowerment and sustainability, as demonstrated by the CAO's involvement in Cajamarca. The transfer of environmental technology, if viewed as part of only a very limited and naïve version of ecological modernisation, especially in developing countries, can not be viewed as a silver bullet (Fisher & Freudenburg 2001). The case of PWMS in Cajamarca highlights some of the main issues that can contribute to making the introduction of environmental technology in the context of development an engine for community empowerment. Participation should be integrated into a wider political context, particularly in conflictual circumstances, in a way that should aim to increase the citizenship rights of marginalised groups.

It seems suitable to finish this work with a reflection on the symbolic meaning of the connection, geographic and geological but also deeply metaphorical, between gold and water. Emerging from the same mountains, they could not be more different – one is the symbol of riches and specifically in Cajamarca of betrayal and greed[21] while the other is the symbol of life. While the water comes from the sky and provides for the needs of the people, the gold is taken away from the ground and serves their excesses. It should be of no wonder that the encounter leads to conflict.

21 Cajamaraca is where the Spanish conquerer Pizarro, in 1532, kidnapped the last Inca emperor Atahualpa and after he received the ransom, a room filled with gold and silver, killed the emperor.

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Appendix 1: List of interviewees

Name of interviewee	Name of institution	Reference code
Ricardo Morel	MYSA - manager for external Affairs and communications	I1
Luis Chang	MYSA - Environmental specialist, participative monitoring	I2
Roger Alfonso	MYSA – Supervisor, environmental laboratory	I3
Carlos Scerpella	MYSA – Institutional relations and communication	I4
Alicia Abanto	Defensoría del Pueblo, Lima - Associate for public services and environment	I5
Pastor Cardenas	Defensoría del Pueblo, Cajamarca	I6
Alfonso Morales	DESA, Cajamarca - Manager	I7
Marco Naro Centurion	SEDACAJ – Quality control engineer	I8
Mirella Gellardo	GTZ – Technical advisor on natural resource conservation	I9
Nilton Desa	Ecovida – Manager	I10
Wilson Chalan	COMOCA - Manager	I11
Patricia Rojas	GRUFIDES	I12

Appendix 2: Aquatic environmental incidents involving MYSA

Date	Event	Place
September 1998	Death of trout	River Llauacano in the province of Hualgayoc.
December 1998	Ammonia spill resulting in death of fish	River Jequetepeque
January 2000	Arsenic spill resulting in the death of more then 12000 fish.	Jequetepeque basin and Granja Porcón.
January 2001	Death of 10000 fish.	River Llauacano
January – March 2001	Emergency halting of fishing activity and petrol spill.	River Jequetepeque
March 2001	Death of trout in aquaculture. pH variation was detected as well as mercury in fish tissue.	4 km from Cajamarca. Close to the municipal water treatment facility.
August 2001	Death of trout. Water highly acidic.	Aquaculture farm, Granja Porcón
September 2001	Mercury detected in drinking water	Cajamarca
November 2001	Mercury detected in drinking water	Cajamarca
May 2002	8000 trout dead. Sediment overload.	Aquaculture farm, Granja Porcón
August 2002	2200 trout dead. Sediment overload.	Aquaculture farm, Granja Porcón
October – November 2002	More then 26000 trout dead. Sediment overload.	Aquaculture farm, Granja Porcón
2003	Mercury detected in drinking water	Cajamarca
March 2007	1000 trout dead. SEDACAJ accuses MYSA and MYSA accuses SEDACAJ.	Aquaculture Lluscapampa, river Llaucano.
April 2007	Mercury detected in drinking water	Cajamarca

Table 3: The table list all the reported water related environmental incidents involving MYSA. Note that most of the incidents in the table are highly contested and that there has not been an official, comprehensive investigation into any of them. Source: *(GRUFIDES 2007).*