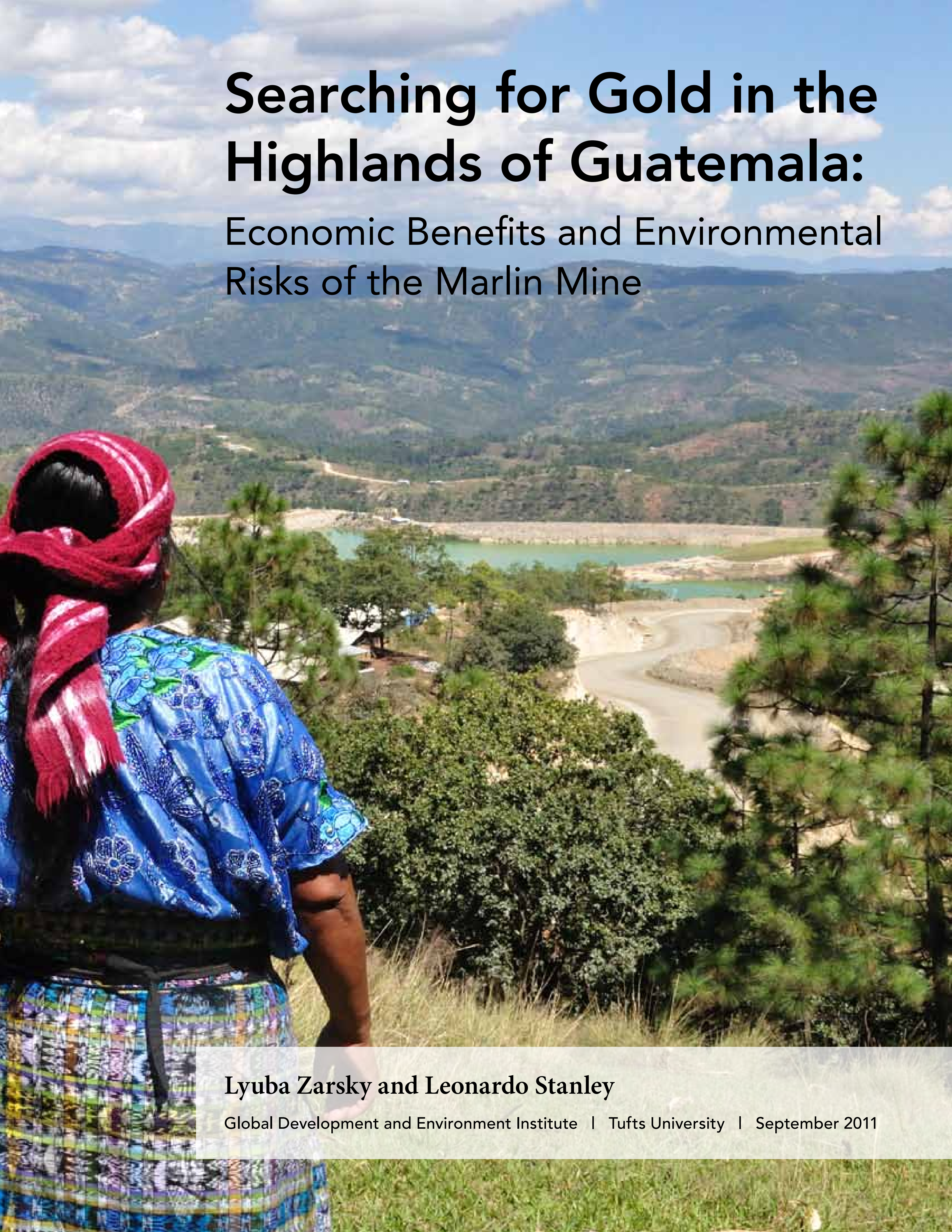

Searching for Gold in the Highlands of Guatemala:

Economic Benefits and Environmental Risks of the Marlin Mine

Lyuba Zarsky and Leonardo Stanley

Global Development and Environment Institute | Tufts University | September 2011

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Cover Photo by Chris Hufstader/Oxfam America
Indigenous women from San Miguel Ixtahuacan overlook the tailings dam of the Marlin mine.

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The Global Development and Environment Institute (GDAE) is a research institute at Tufts University founded in 1993 and dedicated to promoting a better understanding of how societies can pursue their economic and community goals in an environmentally and socially sustainable manner. GDAE's Globalization and Sustainable Development Program examines the economic, social and environmental impacts of economic integration in developing countries, with the goal of identifying policies and international agreements that foster sustainable development. In 2003, GDAE initiated the Working Group on Development and Environment in the Americas, which has carried out a series of research projects on foreign investment, agricultural trade liberalization, and the impacts of economic integration on the environment. This study is a Working Group project. Publication design by Neutra Design (www.neutra-design.com).

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Executive Summary

The Marlin mine in Guatemala has been the object of local conflict and international scrutiny for nearly a decade. In mid-2010, in order to protect the health, environment and human rights of local indigenous communities, the Inter-American Commission on Human Rights of the Organization of American States issued precautionary measures, calling on the Guatemalan government to suspend operations at the Marlin mine.

Owned and operated by the Canadian company Goldcorp, Marlin is highly successful commercially, generating substantial returns to shareholders based on global prices of gold and silver and low local costs of production. Near the mid-point of the mine's operating life, the mine's contributions to local communities are more ambiguous and have received little study.

This report examines the economic benefits and environmental risks of the Marlin mine and assesses its contribution to sustainable development in Guatemala. Based on non-renewable resources, extractive industries are inherently unsustainable. Utilizing the concept of "weak sustainability", however, mining can be considered broadly to contribute to sustainable development if economic benefits outweigh social and environmental costs, and if mining revenues are invested in building sustainable industries, enterprises and productive capacities.

The report explores six lines of inquiry:

- How much total revenue is being generated by the gold and silver produced at the Marlin mine?
- What share is going to Guatemala in the form of direct benefits, that is royalties, taxes, wages, procurement, and company social investment?
- What share of direct benefits is going to communities surrounding the mine?
- What are the indirect benefits in the form of jobs generated by company procurement in Guatemala and the economic impact of wage spending?
- Are the revenues received by Guatemala being invested in promoting sustainable development?
- What is the risk that the mine will impose long-term environmental costs that undermine health and livelihoods in communities surrounding the mine?

While it is evidence-based, the report does not attempt to assign monetary values to direct or indirect environmental, social, cultural and health risks or costs. Given the uncertainty and wide range of potential long-term environmental risks, a quantitative assessment of environmental costs would have little meaning.

The report has three central findings. First, due to a weak royalty and tax regime, the Guatemalan government's share of Marlin's bonanza is small. Royalties and taxes to the Guatemalan treasury are only about six percent of total Marlin mine revenues and about 15 percent of mine earnings. While company procurement is apparently substantial, social investment is low. The total direct economic benefits to Guatemala are about 41.5 percent of mine revenues, and to local communities about 5.1 percent of mine revenues.

Second, the balance of Marlin's benefits and risks is highly skewed in terms of both place and time. At the mine site, Marlin is generating significant economic benefits in the operating phase in the form of wages in highly impoverished, subsistence-based local communities. However, local benefits are a tiny fraction of total mine revenues and earnings, the bulk of which flow overseas to the company and its shareholders. The mine may also be generating substantial indirect benefits outside of the local communities. But both direct and indirect economic benefits will cease abruptly when the mine closes because jobs, taxes and royalties will evaporate and because there is little evidence that mine revenues have been invested in building sustainable industries. Local communities, on the other hand, bear 100 percent of environmental risk.

Environmental risk at Marlin is exceptionally high and likely to increase over the remaining life of the mine and into the post-closure phase. Gold mining poses generic hazards related to cyanide and heavy metals contamination of water from acid mine drainage (AMD). In addition to proximity to local communities, environmental risk at Marlin is exacerbated and likely to rise over time due to the lack of adequate environmental regulation and oversight; the absence of an adequate management plan for mine closure; the lack of financial assurance for post-closure remediation and monitoring, and the failure to take projected climate change impacts into account in mine design and post-closure planning. Risk is also heightened by local poverty and dependence on agriculture and the lack of legislative or judicial protection of the rights of indigenous people. Besides the risk to human health, the greatest long-term environmental risk of the mine is that its lasting and widespread water contamination will undermine agricultural livelihoods, impoverishing local communities.

"... when juxtaposed against the long-term and uncertain environmental risk, the economic benefits of the mine to Guatemala and especially to local communities under a business-as-usual scenario are meager and short-lived."

The third finding of the report is that the Marlin mine is contributing little to sustainable development in Guatemala. While it is the largest single taxpayer in Guatemala, Marlin's fiscal contribution will terminate when the mine closes. A lack of transparency and accountability suggests that little of the royalty and tax revenue has been invested in public goods such as education, health, and infrastructure that build sustainable productive capacities. A substantial portion of the mine's procurement of supplies and equipment is sourced within Guatemala, mostly for energy, though very little is sourced locally. However, lack of data precludes an evaluation of the potential development spillovers from local procurement. Finally, company social investment is low and stagnant and there is little evidence that is promoting sustainable enterprise.

Adding all economic benefits together—royalties, taxes, wages, procurement and social investment—Guatemala receives about 42 percent of total mine revenues, substantially below best practice in global mining operations. Local communities receive only about 5 percent of total mine revenues.

Overall, the report concludes that, when juxtaposed against the long-term and uncertain environmental risk, the economic benefits of the mine to Guatemala and especially to local communities under a business-as-usual scenario are meager and short-lived.

The report makes three recommendations. First, Goldcorp and the Guatemalan government should agree to suspend Marlin operations, as ordered by the Inter-American Commission on Human Rights, until environmental and human rights safeguards are put in place and further information is gathered. The company and the government should collaborate with local stakeholders to: 1) undertake a comprehensive and rigorous environmental and health assessment in the entire watershed surrounding the Marlin mine; 2) undertake an assessment of projected climate change impacts; 3) produce a comprehensive and robust design and implementation plan for mine closure and post-closure monitoring and remediation; and 4) undertake a detailed socio-economic assessment, including indirect jobs, the economic impacts of wage spending, and an account of expenditure of mine royalties and taxes. The assessment should include options for the development of sustainable enterprise and industry in the region, including in agriculture. The government should also suspend operations at Cerro Blanco, Goldcorp's mine now in development, pending the results of similar investigations.

Second, Guatemala's Mining Law should be reformed to enable the capture for the public purse of a higher share of mining revenue. A reformed Mining Law should also give a substantially larger proportion of royalties to local municipalities.

Third, the capture of greater economic benefits and reduced environmental risk require significant development of Guatemala's governance capacity in three dimensions: 1) environmental and health regulation and oversight; 2) legislative definition and judicial protection of the rights of indigenous people; and 3) fiscal accountability. Also needed is a sustainable development plan that allocates mine revenues into targeted investments in building sustainable productive capacities, especially in indigenous communities. Without good governance and productive investment, the local legacy of the Marlin mine could well be ecological devastation and impoverishment.

I. Introduction

I.1 WHY THIS REPORT?

Since it was first proposed, the Marlin gold mine in the western highlands of Guatemala has generated intense local conflict and international scrutiny on human rights and environmental grounds. People have been killed and arrested protesting the mine and in locally-run referenda, indigenous communities have rejected mining as a development strategy in general and the Marlin mine in particular. The Inter-American Commission on Human Rights of the Organization of American States (IACHR) issued precautionary measures, ordering the Guatemalan government to suspend mine operations and to "implement effective measures to prevent environmental contamination" until the Commission decides on the merits of a petition brought by Guatemalan groups (IACHR, 2010, p. 680).

Buoyed by a boom in global commodity prices, the Marlin mine is part of a global expansion of investment in extractive industries. For the government of Guatemala, as for other developing countries with mineral resources, the mine represents a source of fiscal revenue, export earnings and high-paying jobs, as well as the opportunity for industrial transformation and economic development. With over half its population living in poverty, Guatemala is among the poorest countries in Latin America.

Owned and operated by the Canadian company Goldcorp, the Marlin mine began extractive operations in December 2005 and has an expected life of 10-15 years. Due to the soaring global price of gold and low local costs of production, it has generated substantial returns to shareholders. The mine's economic contributions to local communities and to sustainable development in Guatemala, however, are ambiguous and have received little study.

This report evaluates the economic benefits of the Marlin mine to local communities and to Guatemala's sustainable development and assesses its environmental risks. It explores six lines of inquiry:

- How much total revenue is being generated by the gold and silver produced at the Marlin mine?
- What share is going to Guatemala in the form of direct benefits, that is royalties, taxes, wages, procurement, and company social investment?
- What share of direct benefits is going to communities surrounding the mine?
- What are the indirect benefits in the form of jobs generated by company procurement in Guatemala and the economic impact of wage spending?
- Are the revenues received by Guatemala being invested in promoting sustainable development?
- What is the risk that the mine will impose long-term environmental costs that undermine health and livelihoods in communities surrounding the mine?

A growing body of studies investigates the socio-economic impacts of the Marlin mine and more broadly, of mining as a development strategy in Guatemala (ASIES, 2010; On Common Ground, 2010; CIEN, 2009; Christian Aid, 2009; Vandanbroucke, 2008; Power, 2008). In a cost-benefit study of the Marlin mine, the Guatemalan research group ASIES (Asociación de Investigación y Estudios Sociales) quantified a range of environmental and social costs, including deforestation, medical care, and purchased water, as well as lost output due to mine protests and the value of "lost royalties", calculated on a baseline royalty rate of 12 percent. The report found that costs were 3.5 times greater than benefits, even without accounting for long-term environmental liabilities in the post-closure phase (ASIES, 2010). However, the report did not account for indirect jobs generated through procurement at Marlin.

Concerned about potential human rights abuses, Goldcorp shareholders asked the company in 2009 to sponsor an independent, comprehensive, third-party Human Rights Assessment of the Marlin mine (HRA). Undertaken by On Common Ground and published in 2010, the HRA surveyed a full range of human rights impacts, including environment, labor, security, and economic and social investment. The economic and social assessment focused on the "risk of boom/bust economic development" and concluded that "from a human rights perspective the temporal nature of the economic stimulus presents *a risk that the end result will be more negative than positive*" (On Common Ground, 2010, p. 155 emphasis added). In response to the HRA, Goldcorp is now undertaking its own socio-economic assessment and is working with the Guatemalan government to produce a mine closure plan (Goldcorp, 2011a).

Scrutiny by international organizations, including the International Finance Corporation, which provided partial project funding for Marlin, as well as by Goldcorp, has made publicly available an exceptionally rich body of data (IFC, 2004; CAO, 2005; AMR, multiple years; Goldcorp Annual Report, 2010; On Common Ground, 2010). As a condition of its project loan, the IFC required Goldcorp to produce and make public an Environmental and Social Performance Annual Monitoring Report (AMR). Goldcorp continued to publish an AMR even after the project loan to the IFC was repaid and it was no longer involved. Much of the local financial data in this report were drawn from the AMRs, as well as Goldcorp annual reports.

This report builds on past studies by considering the broader development impacts of Marlin and by juxtaposing environmental risk against economic benefits. The report is organized as follows. Part II outlines the controversy surrounding the Marlin mine and the role of mining as a development strategy in Guatemala. Part III evaluates the economic benefits of the Marlin mine to Goldcorp in the form of shareholder returns; to the Guatemalan national treasury and to local communities in the form of royalties, taxes, wages, local procurement and company social investment; and to Guatemala via indirect jobs and induced wage spending. Part IV presents evidence about the environmental and health risks of the Marlin mine. Part V presents findings and makes recommendations.

I.2 MINING AND SUSTAINABILITY

Based on non-renewable resources, mining is an inherently unsustainable economic activity. A "strong sustainability" principle, which requires that current human activities do not eliminate future options, would rule out mining as a sustainable development strategy. The "weak sustainability" principle, however, posits that different forms of capital (natural, human, physical) are substitutable: activities can be considered "sustainable" if the overall stock of capital is at least not diminished and preferably augmented. This broader definition suggests that mining can contribute to sustainable development if "it gives rise to long-term benefits (environmental and/or social and/or economic) that equal or exceed the values that existed prior to exploitation" (Amezaga et al, 2011, p. 21).

Whether mining contributes to sustainable development depends on whether it generates "net benefits": a positive sum of total economic, environmental, and social benefits minus costs. While simple in theory, a quantitative assessment of net benefits raises three difficult issues.

The first is the time frame. The operating phase of a mine ends at a given point in time but its post-closure phase is essentially infinite. On the benefits side, future economic returns can be captured if 1) mine operations create technology and knowledge spillovers to other industries; and 2) mine revenues are invested in building productive capacities, such as knowledge, skills, health, infrastructure, etc. that increase productivity and support sustainable industries.

On the cost side, mining can generate environmental problems such as heavy metals contamination that persist for hundreds, maybe thousands of years and even worsen with changing climactic conditions. Many cost-benefit analyses of mining examine costs only in the operating phase (ASIES, 2010; Curtis, 2009; NACE, 2009). As an international team of sustainability researchers advises, "the post-extractive phase of the mine life cycle is, if anything, even more important [than the extractive phase] when it comes to evaluating environmental sustainability" (Amezaga et al, 2011, p. 21).

A second problem in assessing "net benefits" is the distribution of costs and benefits. While the economic benefits of mining are split between companies, host country governments and local communities, environmental and social costs fall almost wholly on local communities. An ethically-grounded assessment rules out the creation of "sacrifice areas" and requires that the mine generates net benefits specifically to local communities.[1] Given the complex cost-benefit trade-offs that they imply, only local communities themselves can determine whether a mine generates "net benefits".

A third obstacle to a quantitative assessment of "net benefits" is the valuation methodology for social and environmental costs. Since the environmental and social impacts of mining affect livelihoods and assets, they are ultimately measureable economic costs. For several reasons, however, a quantitative assessment is problematic.

First, baseline and trend data for key indicators such as human health, water quality, agricultural productivity, bio-diversity and even annual income, assets, employment and gross local product are typically scarce or non-existent, especially in developing countries. Methodologies exist, for example, to evaluate the benefits of eco-system services and thus to assess damage costs. But they require baseline bio-diversity and eco-system service data which, to a large extent, are not available.

Second, mines are usually located in poor areas making the use of standard life and health evaluation methodologies employed in cost-benefit analysis ethically problematic. For example, a proxy measure of the cost of human exposure to a toxic substance is the lifetime stream of income lost due to disability or premature death. In the two indigenous communities surrounding the Marlin mine, wages are very low and there is a high level of unemployment. The "income lost" proxy measure of a "value of a life" would thus yield a very small dollar (or quetzal) amount even if the dead or disabled person was a fully-employed able-bodied young man or woman.

Other proxy measures are the decline in property sale value and the opportunity costs of damage to productive assets such as agricultural land. In the local communities surrounding Marlin, property values and market prices for locally-grown agricultural products are low. Estimates of even widespread and long-lasting contamination that lowered property values and damaged or permanently destroyed agricultural productivity would yield very small dollar values.

Only one quantitative cost-benefit analysis of the Marlin mine has been attempted to date (ASIES, 2010). Published in October, 2010, the report estimated environmental costs in terms of the costs of purchased drinking water due to contamination of local river-based drinking sources; and the costs of health services and lost output due to human exposure to contaminants. Over the entire period of 2005 to June 2009, these costs amounted to less than $1 million, even though the study assumed that one of the rivers near the mine was 100 percent contaminated and another 15 percent contaminated.

The "ethical evaluation" problem becomes stark when compared to the very large revenue streams generated by mining operations during the commodity boom and captured, in the main, by foreign shareholders. Added to the fact that many local costs would be excluded due to lack of data, standard cost-benefit techniques would find that the mine yields large net benefits even if many local people became sick, died, or lost their immediate or long-term livelihood options. It is doubtful that the people who suffered such losses would concur with the evaluation methodology.

A third problem with standard cost-benefit techniques is that not all values are understood to be measurable in economic terms. Most indigenous cultures, including Mayan, place an infinite value on nature as Mother Earth. Moreover, agriculture is considered essential to cultural identity. An evaluative tool that conceives of damage to natural integrity or cultural identity only in economic terms captures little in the way of real information about cultural costs either to individuals or society as a whole.

Given these drawbacks, we emphasize in this report that mining poses long-term and uncertain risk and use the term "environmental and social cost" primarily in a qualitative and indicative, rather quantitative and definitive sense. Moreover, we do not attempt to survey the full range of the mine's environmental and social impacts but focus primarily on risk to water quality and human health.

II. Marlin, Mining and Development

II.1 MARLIN MINE: LOCATION AND CONTEXT

The Marlin mine is an open pit and underground gold and silver mine that currently spans about five square kilometers (Figure II.1). The primary product is gold, with silver as a by-product, though estimated silver deposits are high. The mine facilities include two open pits, one underground tunnel mine, an ore processing facility using cyanide vat-leaching techniques, a smelter, a tailings storage facility including a dam and pond, and a waste rock facility. As in all modern industrial mines, minerals are separated from ores using toxic chemicals—in this case, cyanide—and waste rock poses risk of dislodging heavy metals, such as lead, arsenic, and mercury.

Located in Guatemala's mountainous "altiplano" (highlands) in the Department of San Marcos (Figure II.2), the mine is owned and operated by the Canadian company Goldcorp through its wholly owned subsidiary, Montana Exploradora. The original project owner, Glamis Gold, received a 25-year exploitation license from the government of Guatemala in 2003 (CAO, 2005). The International Finance Corporation (IFC) provided a project loan of US$45 million. The mine began extractive operations in December 2005 with a projected life of ten years. However, recent exploration activities suggest potential for a longer mine life (Goldcorp, 2010). Goldcorp acquired Glamis and all its assets, including the Marlin mine, in 2006.

The region surrounding the Marlin mine is populated by indigenous Mayan groups. The mine is located within the two municipalities of San Miguel Ixtahuacan (SMI) and Sipacapa, the former made up of Mayan-Mams and the latter of Mayan-Sipacapense. SMI consists of a municipal capital, seventeen villages and forty-three communities for a total population of about 37,000; Sipacapa has about 14,000 residents in twelve villages and nineteen communities (2003 census).

Figure II.1 Marlin Mine, Aerial Photos

About 87 percent of the area of the Marlin mine is located within the borders of three communities in the SMI municipality; the remainder is within the borders of one community in Sipacapa. The people in the bordering communities live literally on or near the edge of the mine. A primary school overlooks the mine's tailings pond.

Poverty rates in SMI and Sipacapa are very high: 97.5 percent of the population lives in poverty and 80 percent in absolute poverty (Van de Sandt, 2009). The major industry is subsistence farming: inhabitants grow corn and beans and keep livestock on land held by individual families but which form part of the collective property of the community as a whole. Due to poor soil quality and little irrigation infrastructure, agricultural income is very low and is supplemented by seasonal labor in coastal sugar cane and coffee plantations. The major source of income, however, is remittances from family members who have migrated to the United States (ibid).

II.2 CONFLICT AND CONTROVERSY

From the outset of the project planning phase, the Marlin mine has generated intense conflict and controversy. The controversy has two prongs, local and national. Local concerns, examined below, stem from perceived violations of indigenous rights, including the potential for water contamination from the mine that could undermine health, agriculture-based livelihoods and traditional lifestyles. At the national level, considered in the next section, the debate focuses on the benefits and costs of mining as a development strategy.

From 1960 to 1996, Guatemala was swept up in intense social conflict and civil war in which more than 250,000 indigenous people were killed, mostly by military or para-military troops. The United Nations-sponsored Truth Commission found that agents of the State of Guatemala committed acts of genocide. The eight Departments in the Altiplano, including San Marcos, experienced some of the worst of the violence.

As part of the 1996 Peace Accords, the government of Guatemala signed and ratified the International Labor Organization's Convention 169 on the rights of indigenous and tribal people. ILO 169 grants Guatemala's indigenous peoples rights to decide their own development priorities and specifically safeguards their rights to "use, management and conservation" of natural resources pertaining to their lands. When sub-surface resources are owned by the state, as in Guatemala, ILO 169 calls for the government to consult indigenous people ahead of any exploration or exploitation activities.

As a condition of its loan, the IFC required Montana/Glamis to hold consultations with local communities in SMI and Sipacapa. Some 3,000 people participated in a series of informational workshops, which the company interpreted as signaling a high level of popular endorsement. Many residents, however, had deep objections to the mine and perceived the workshops as informing them about a "done deal" rather than seeking consultation or providing an assessment of potential environmental and social impacts. Tensions erupted in January 2005 when a group of mine protestors made up of indigenous, environmental, religious and farmer groups confronted trucks carrying equipment to the mine. One protestor was killed and sixteen wounded (Stevenson, 2005).

In March 2005, communities in Sipacapa filed a complaint with the Compliance Advisor Ombudsman of the IFC raising concerns that the Marlin mine would reduce access to and contaminate local water supplies. The complaint also alleged that the project was being developed without adequate consultation and that it exacerbated social tensions (CAO, 2005).

In June, 2005, Sipacapa held a *consulta*—a traditional, community-level referendum—on the Marlin mine. In the presence of 75 national and international observers, 11 communities rejected mining, almost unanimously, while one supported it and one abstained. In total, 98.5 percent of some 2,400 people participating in the referendum voted no to mining activities in their territory (BIC, 2005) (Figure II.3).

Figure II.2 Location of the Marlin Mine

Source: Basu and Howard (2010)

While judged to be legal but not binding, the referendum ignited local opposition and international attention. The Catholic Church in San Marcos widened its information campaign and began monitoring waters near the mine. Allied with NGOs in Guatemala City, Canada and the United States, indigenous groups reached out to Goldcorp shareholders and to international organizations. Pressed by "socially responsible" shareholders, Goldcorp agreed to commission an independent Human Rights Assessment which identified seven areas of concern, including social conflict, consultation, environment, land acquisition, economic and social investment, security, and access to remedy (On Common Ground, 2010).[ii]

Virtually all relevant international human rights organizations weighed in on the Marlin controversy. In March 2010, the ILO requested that the government of Guatemala suspend operations due to the lack of adequate consultation (ILO, p. 680; Schertow, 2010); and in June the UN Special Rapporteur on the Human Rights of Indigenous Peoples called on the Guatemalan government to adopt a law defining and assuring indigenous rights to consultation over mining and other resource development projects (TodaNoticia, 2010). The strongest measure, however, was the IACHR order to temporarily suspend operations as a "precautionary measure" pending an assessment of the mine's impact on the health and rights of eighteen neighboring indigenous communities.

The government responded to the binding suspension order by initiating an administrative process and an inter-Ministerial investigation of impacts. In concert with Goldcorp, the government asserts that its studies show that the mine poses no threat to community water supplies or human health (Goldcorp, 2010).

Figure II.3 Residents of Sipacapa Vote No to Mining, June 18, 2005

Source: Mines and Communities (2005)

Guatemala may be constrained by its obligations to foreign investors under the Central American Free Trade Agreement (CAFTA) (Anderson et al, 2010). In response to an order to suspend operations, Goldcorp would likely sue for compensation, arguing that the measure was "equivalent to expropriation". Even though CAFTA allows such measures if undertaken "for a public purpose" and "in accordance with due process of the law" (Edsall, 2007), mining companies are successfully pressing challenges. Most notably, the International Center for the Settlement of Investment Disputes agreed to hear a suit brought by the Canadian company Pacific Rim against El Salvador for blocking a gold mining permit on grounds of environmental protection and public safety. Pacific Rim is asking for $77 million in compensation (Center for International Environmental Law, 2011).

Internal community conflict over the mine, especially within SMI, has grown more violent over the life of the mine.[2] Mine opponents charge the company with fostering conditions for conflict by refusing to hear and address grievances and they want the government to close the mine as per the IACHR order. Supporters include mine workers and their families, as well as shop owners and other suppliers who are providing goods and services to the mine.

To date, no government environmental and health studies have been made public and mine operations have continued unabated. A shareholder resolution calling for suspension of Marlin operations presented at the Goldcorp annual meeting in March, 2011 received six percent of the vote (Mining Watch, 2011).

II.3 MINING AND DEVELOPMENT IN GUATEMALA

The second prong of the opposition to the Marlin mine stems from concerns about the development impacts of mining in Guatemala, including the Marlin mine. Guatemala is a very poor country with a high degree of economic and racial inequality. In 2010, Guatemala ranked 116th out of 169 countries on the UNDP's Human Development Index (UNDP, 2010). More than half of Guatemala's population lives in poverty and the incidence of poverty is rising due to the recent economic crisis (Guatemala Times, 2011).

Indigenous people, who comprise about 40 percent of the population, are even poorer, with about three-quarters living in poverty (Van de Sandt, 2009). Indigenous people are generally highly segregated in Guatemala, with the majority living in rural areas with little access to education or health. With an average 2.5 years of schooling, indigenous Guatemalans fall considerably below the national average of 5.7 years and rank the lowest for indigenous education in Latin America (Hall and Patrinos, 2005).

Guatemala's economy, workforce and exports have traditionally been centered on agriculture. It is not a "mineral-rich" country: mining contributes less than 1 percent to GDP and only about 4 percent of exports (CIEN, 2009; World Development Indicators). At 52 percent, services constitute the lion's share of GDP, while manufacturing contributes 19 percent. While it contributes only about 14 percent of GDP, agriculture absorbs about half the labor force and accounts for three-quarters of export earnings. However, the productivity of agriculture is low. The returns to agriculture dropped precipitously in the last decade, with value-added as a percentage of GDP falling from around 23 percent in 1998 to 12 percent in 2009 (Figure II.4).

Figure II.4 Guatemala Agriculture—Value Added (% of GDP)

Source: Trading Economics

For Guatemalan political and economic elites, who are the primary owners of commercial agricultural lands, the decline in returns from agriculture poses a financial crisis. The expansion of mining offers a potential solution and presents a number of advantages as a development strategy. First, it provides a source of direct fiscal revenue to the state. More than 85 percent of the Guatemalan economy is based in the private sector, with government contributing only about 13 percent. Along with other Central American states, Guatemala's tax revenues as a percentage of GDP are among the lowest in the world and significantly below the Latin American average of 11.7 percent (OECD, 2009).

Second, mining companies source a number of goods and services in host countries, including machinery and equipment, energy and water, and construction, transport and food services. Provision of supplies represents a potential source of business income, as well as indirect jobs. According to the Guatemalan think tank CIEN, for every 100 quetzales worth of production, mining companies source an average 27 quetzales from local sectors. It also found the number of indirect jobs generated by procurements in the mining sector was six times greater than the number of direct jobs (CIEN, 2009).

Mining offers other macro-economic benefits such as export earnings, high-paying jobs, and, potentially, technology and knowledge spillovers. For thirty years, Guatemala's annual current account balance has been negative, ranging from 1-8 percent of GDP. The World Bank projects that deficits of 3-4 percent of GDP will continue through 2016 (Trading Economics, 2010). Moreover, the primary source of foreign earnings is remittances from the United States. In the mining sector, the balance of trade is strongly positive, with exports outweighing imports by a factor of 2:1 (CIEN, 2009).

Mining is highly capital-intensive, offering fewer jobs per dollar invested than services, manufacturing or agriculture. However, the average wage in the mining sector is more than double than in manufacturing and triple the wages in agriculture (Table II.1).

The potential for spillovers from mining include knowledge and skills transferable to other industries, as well as infrastructure such as roads and ports built to support mining operations. If significant, spillovers offer the potential for mining operations to sustain jobs and income after mine closure and even to drive a wider process of economic development.

Evidence that mining generates spillovers, however, is thin. Indeed, the preponderance of evidence suggests that economic growth is slower in mineral-rich than mineral-poor countries, a phenomenon known as the "resource curse" (Frankel, 2010). One reason is that elites appropriate mine royalties and other revenues for personal consumption rather than invest them in building productive capacities that could capture and absorb potential spillovers. In 2010, Guatemala ranked in the bottom third of 178 countries on Transparency International's Corruption Perception Index (Transparency International, 2010).

To attract foreign investment, the government of Guatemala amended its Mining Law in 1997, lowering the royalty rate from six to one percent of gross production revenue. The Law decrees that royalties be split equally between the national government and the municipal governments in whose jurisdiction a mine operates.

The Marlin mine is Guatemala's first major mining investment in twenty years. In addition to Marlin, Goldcorp is developing two other gold and silver mines in Guatemala: La Hamaca, about 3 kilometres north of Marlin, which was part of the original exploitation license for Marlin; and Cerro Blanco in southwestern Guatemala about 80 kilometres from Guatemala City. Many more mining sites are being explored: as of March 2009, the government had granted 395 mining licenses and 383 more were pending. However, the Guatemalan advocacy group CALAS (Center for Legal, Environmental and Social Action) successfully challenged the legality of the Mining Law in 2006 on the grounds that it did not sufficiently protect indigenous communities living near mining operations. CALAS argued that, in granting mining licenses without the full and free consultation of affected communities, the government failed to comply with ILO Convention 169. No new licenses have been granted since June 2008 and none will be granted until the Mining Law is revised (CSR Centre).

Objections to mining as a development strategy in Guatemala stem from three broad concerns: that the absolute flow of economic benefits to Guatemala is small, that benefits are appropriated by the elite, and that "collateral damage"—environmental and social costs, especially to indigenous communities—are high. Social costs include the re-ignition of social conflict, problematic both in human and economic terms: Guatemala's long civil war wreaked havoc on the prospects for economic development. Moreover, mining development is part of a larger "mega-project" strategy which includes the expansion of hydro-dams to expand the country's electricity supply, including to power mining operations. Like mining, the hydro-electric dams are located in rural areas occupied by indigenous people.

While all mining projects pose environmental risk, the risk is especially high in Guatemala due to government failure to regulate and monitor the mining sector. In its assessment of the complaint filed by Sipacapa communities, the CAO found that improvement was needed in "the capacity of Guatemalan government agencies to effectively regulate the Marlin project and other projects in the mining sector" (CAO, 2005, p.39).

Tragically, the CAO found significant gaps and weaknesses in the IFC's own Social and Environmental Impact Assessment (ESIA): the rationale for approving the ESIA was not clear; it provided no clear definitions for what constituted "meaningful and culturally appropriate" disclosure and consultation activities; and it did not require a security policy that protects human rights. The most telling gap was the failure of the IFC to undertake "a thorough consideration of the governance and country context and *the balance of risks and benefits* accruing as a result of this investment" (ibid, p. 39, emphasis added).

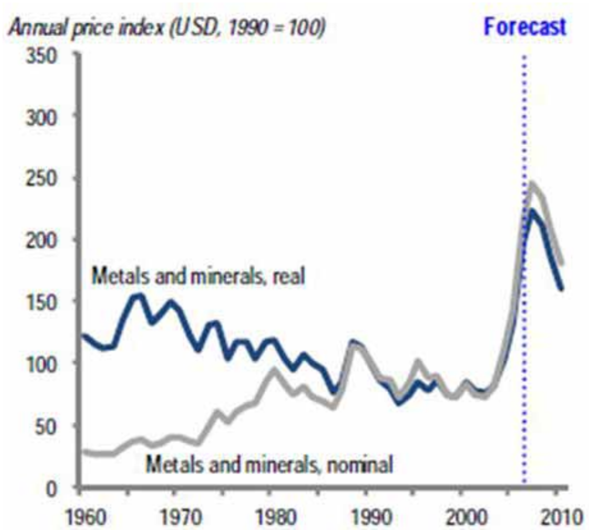
III. Evaluating the Economic Benefits of the Marlin Mine

III.1 GOLD AND GOLDCORP

Industrial mining is a risky affair, entailing large investments and long lead times in exploration and construction for a commodity that will sell in the future under potentially very different market conditions. While all large-scale industrial ventures face market risk, extractive industries face industry-specific risk due to the finite nature of their business (the "life of the mine") and the political risk that stems from immobile assets and sunk costs: companies cannot move mine assets elsewhere in the face of regime change.

As in all extractive industries, capital investment in gold mining operations is highly sensitive to the global market price of gold, as well as in other ores that are co-located with the gold such as silver. Over the past 60 years, prices of minerals, ores, and metals have swung in response to shifts in the global economy. After a period of high volatility from the end of the Second World War to the mid-1970s, global mineral prices fell in the 1980s into a long period of price depression. Around 2002, fuelled by rapid demand in emerging markets, especially China and India, mineral prices have risen dramatically (Figure III.1).

Figure III.1 Metals and Minerals Price Index, 1960-2010



Source: OECD (2008)

The price of gold has seen an exceptionally dramatic rise. Between 2006 and mid-2011, the market price of gold rose by more than 150 percent, from an average of US$833 to about US$1225 per ounce, and it hit a high of about US1557 (GoldPrice; Figure III.2). Silver prices also surged in recent years, rising from $10 per ounce in mid-2006 to a high of over US$48 per ounce in early 2011 (Figure III.3).

Figure III.2 Gold price 1971-2011

Source: Goldprice.org

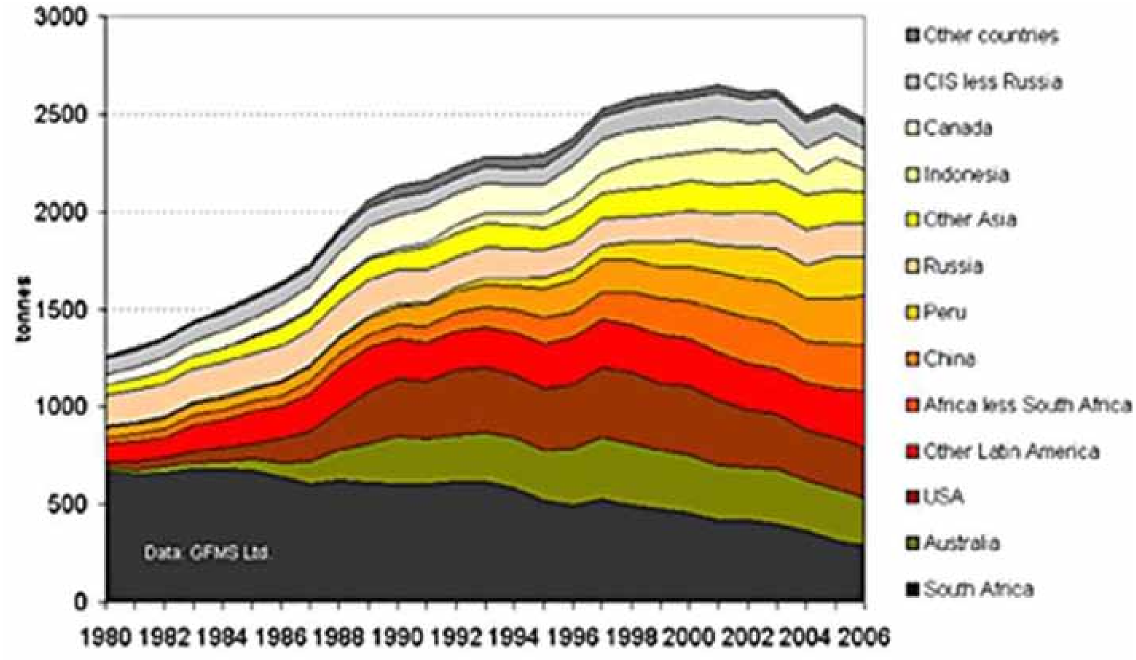
Figure III.3 Silver price 2006-2011 (USD)

Source: eBullionguide.com

The ballooning price of gold is driven by surging global demand. In 2010, world demand for gold increased by 9 percent over the previous year, its highest level—in both tonnage and value--in ten years (www.commodityonline.com/news/, February 17, 2011). The growing global demand is fuelled by a confluence of two major economic trends: rapid growth in incomes as a result of fast-growing emerging market economies, especially China and India; and global economic recession and financial instability. Both trends promote growing expenditure on gold jewelry and investment in gold bars and coins as a store of value, including by Central Banks.[3] In 2010, jewelry accounted for 54 percent of global gold demand and investment for 35 percent. Electronics and other industrial uses accounted for around 10 percent and dentistry for 1 percent (World Gold Council).

The rising gold price has been a stimulus to gold producers, including Goldcorp. World gold production rose strongly from the 1980s to 2002. Since then, it has been difficult for global supply to keep up with demand (Figure III.4). The exhaustion of ore bodies in South Africa, historically the largest source of global gold supply, has pushed gold producers to search for new sites. Latin America's share of global production has risen, as has that of China and Russia. The high global price pushes producers to explore and exploit sites considered non-economic or marginal in a low-price regime. It has also pushed gold mines closer to where people live.

Figure III.4 World Gold Mine Production, 1980–2005



Source: goldnews.billionvault.com

The high gold (and silver) price has produced a bonanza for shareholders in gold companies, including Goldcorp. Between 2000-2010, the value of Goldcorp stock increased by over 1,400 percent, more than doubling the performance of other senior gold producers and tripling the increase in the price of gold and silver (Goldcorp 2010 Annual Report, p. 1). By the spring of 2011, Goldcorp was the world's second biggest gold producer by market capitalization, with only Barrick Gold trading at a higher valuation (www.goldstocksdaily.com).

Goldcorp's business strategy is based on positioning itself in North America and owes its strong financial performance to its low costs of production. The company describes itself as "North America's fastest growing senior gold producer with low-cost operations and development projects located in safe jurisdictions throughout the Americas" (Goldcorp, 2009). As of early 2010, Goldcorp had nineteen mines in operation and development, including Marlin and Cerro Blanco, in Guatemala, Alumbrera in Argentina, Pueblo Viejo in the Dominican Republic, and Los Filos, El Suazal, Penasquito, Noche Buena and Camino Rojo in Mexico. Its largest and most lucrative operation is Red Lake in northern Ontario (Goldcorp, 2011b).

According to 2010 data, average industry costs of production were about $500 per ounce. At about $274 per ounce, Goldcorp's average cash costs were more than 40 percent below the industry average and more than 30 percent below Barrick's, the world's largest mining company (Stanley, 2011).

The Marlin mine is Goldcorp's cheapest operations site. At a cash cost of $192 per ounce, cash costs of production at the Marlin mine in 2009 were 35 percent below Goldcorp's 2009 average of $295 per ounce (Table III.1). In 2010, due to the escalating market price of silver as a residual product, production costs at Marlin were a negative $19 per ounce.

Table III.1 Cash costs of production in Goldcorp operations 2008-2010 ($US per ounce)

Operation	2008	2009	2010
Red Lake	302	288	297
Alumbrera	588	447	(619)
Marlin	191	192	(19)
El Sauzal	149	201	301
Los Filos	407	469	423
Musselwhite	611	585	625
Porcupine	558	447	595
Marigold	608	596	678
Wharf	481	686	645
Total	**305**	**295**	**274**

Source: Goldcorp Annual Reports

Marlin was not only the lowest cost producer of all Goldcorp's operations in 2009; it was also the company's third top performer in terms of earnings every year between 2006 and 2009 and second in 2010 (Table III.2).

Table III.2 Earnings in Goldcorp operations, 2006-2010 ($US million)

Mine	2006	2007	2008	2009	2010	TT Period	Share in total
Red Lake	186.1	213.1	231.5	329.2	527.7	1487.6	35.4%
Alumbrera	—	238.7	135.3	158.9	220.5	753.4	17.9%
Marlin	16.0	72.8	100.0	136.9	268.6	594.3	14.2%
El Sauzal	14.3	73.6	96.1	66.1	72.1	322.2	7.7%
Los Filos	—	7.8	58.3	72.9	188.3	327.3	7.8%
Musselwhite	3.7	10.8	21.2	52.1	111.3	199.1	4.7%
Porcupine	16.9	4.3	34.2	88.7	76.3	220.4	5.2%
Wharf	12.3	14.2	19.7	12.2	34.6	93.0	2.2%
Marigold	6.3	1.2	12.1	22.0	29.0	70.6	1.7%
Others	191.2	33.2	194.0	(117.8)	(168.4)	132.2	3.2%
Total	**446.8**	**669.7**	**902.4**	**821.2**	**1360.0**	**4200.1**	**100.0%**

Source: Own calculations based on Goldcorp data

III.2 GUATEMALA: SHARING IN THE BONANZA?

Marlin is Goldcorp's lowest cost producer and third best generator of earnings from operations. It is a strong contributor to the overall high dividends enjoyed by Goldcorp shareholders. To what extent are Guatemalan governments, citizens and communities sharing in the gold (and silver) bonanza?

Guatemalan citizens can benefit, obviously, if they hold shares in Goldcorp. We were not able to obtain a full listing of shareholders for this report. However, our investigation suggests that the large majority of Goldcorp shares are held by Canadian and European pension funds. While it is likely that some Guatemalan citizens hold shares in Goldcorp, especially the managers of Montana Exploradora, the company's wholly-owned subsidiary which operates the mine, Guatemala's high rate of poverty keeps financial assets far out of reach for the majority.

The direct economic benefits to Guatemala from the Marlin mine are derived from:

- Direct payments to the government via mine royalties and corporate tax payments;
- Wages paid to mine workers;
- Purchases by Goldcorp/Montana in Guatemala of supplies and equipment;
- Social investment by Goldcorp/Montana.

Indirect economic benefits derive from the multiplier effects of company and worker spending. Such benefits are difficult to assess, particularly in the absence of detailed data about company procurement spending. We focus first and primarily on direct economic benefits, followed by an estimate of indirect benefits.

This section presents available data for each type of economic benefit. To the extent possible, it differentiates benefits captured nationally from those accruing locally, that is, to the two communities that abut the Marlin mine, SMI and Sipacapa.

III.2.1 ROYALTIES AND TAXES

Royalties are payments made to governments to compensate for the loss of a non-renewable resource. They also compensate for the legacy of contamination left by mining activity that must be managed indefinitely (Kuyek, 2008).

Royalties are assessed by various formulas. The two main approaches are unit-based--a fee levied at the mine mouth per unit volume of non-processed minerals; and value-based--a percentage of the total gross sale value of processed ore. Most resource-rich countries use a value-based formula for royalties. The percentage of value could be uniform or variable (sliding scale) but is payable whether the mine is profitable or not. An emerging third type calculates royalties as a percentage of mine earnings (profits), defined as sales minus allowable costs. A fourth hybrid approach sets a fixed value-based rate on production plus a variable share of profit.

Both developed and developing mineral-producing countries are looking for new ways to increase the government share of mining revenues and profits in today's high commodity price environment. Australia became a leading example of the trend toward "resource nationalism" when it proposed a "resource super profit tax" followed by Canada, Norway, and the United States (Financial Times, 2011; Economist, 2010a). In Canada, local communities, especially in the indigenous north, are pressing for an increased share of the commodity boom (Irlbacher-Fox and Mills, 2007).

The trend towards resource nationalism is strong in Africa. Countries like Niger, with important endowments of uranium, are becoming aware of the strategic importance of their resources (Le Monde, 2010). A number of African countries, including Zambia, Tanzania, South Africa and the Democratic Republic of Congo initiated a process of contract renegotiation with mining companies based on amended mineral legislation that raised royalties and/or taxes, an effort that has garnered the support of the IMF (China Mining, 2010; BIC, 2007). In 2010, the parliament in Ghana raised royalties from 3 to 6 percent (Mining Weekly, 2010). The OECD has called for radical tax reform in Africa, including taxing extractive industries more fairly and transparently (OECD et al, 2011).

Latin American countries have generally taken a more cautious approach. However, political pressure to increase the government take of mining revenues is mounting, including in Mexico, Peru, Chile and Brazil, as well as Central America. In October, 2010, Chile's Congress approved a government proposal to raise royalties paid by mining companies from the current rate of 4-5 percent to as much as 14 percent (Economist, 2010b). In 2010, Panama increased its royalties from 2 to 4 percent, along with introducing changes in the Mining Resource Code (www.CentralAmericaDATA.com, July 7, 2010).

To date, Guatemala has been an outlier in the trend towards resource nationalism. In 1997, a new Mining Law reduced the royalty rate from 6 to 1 percent in an effort to attract foreign investment in the mining sector. The Law also established a system of concessions and licenses while retaining sub-surface mineral rights in the state. The setting of royalties follows a simple value-based formula based on a percentage of the gross sales value of processed ore. The Mining Law also splits royalties received evenly between the national treasury and municipal governments in whose jurisdiction mining operations take place.

Pressure is mounting within Guatemala to change the Mining Law. A number of proposals to raise the royalty rate have been presented to the National Congress, including those introduced by Deputy Rosa Maria de Frade to set royalties in the range of 5 to 8 percent (Prensa Libre, 2010a).[4] The Guatemalan government has acknowledged the need to reconsider the royalty rate and even Goldcorp has recognized the possibility of change in the royalty rate (Prensa Libre, 2010b).[5]

In addition to royalties, mining companies pay host governments a wide array of taxes, including corporate, remittance and specific mining taxes. These payments are much larger than royalty payments. In Canada, for example, mining companies pay a federal corporate income tax rate of 15 percent plus provincial tax rates between 10 and 16 percent (PWC, 2010.). In the Dominican Republic, mining firms pay a 25 percent income tax as well as an annual asset tax of 1 percent of the value of the concession (Rizik and Garcia, 2010).

The Marlin mine is the largest single taxpayer in Guatemala (On Common Ground, 2010). Goldcorp Marlin-related payments to the Guatemalan treasury include corporate income and value-added tax. Municipal governments do not get a direct share of these taxes but can benefit to the extent that the taxes are spent on the provision of public goods in the mining areas. Goldcorp's initial tax rate on earnings was 9.3 percent in 2006 but increased to an average of 12.8 percent between 2007 and 2009. . The company has paid a total of $42.9 million over the four year period between 2006 and 2009 (Table III.3).

The value added tax is set at 12 percent of gross income. However, companies receive a refund based on the proportion of production that is exported. Since 100 percent of the gold (and silver) produced at the Marlin mine is exported, there is no net VAT payment.

Together, royalties and taxes from the Marlin mine between 2006 and 2009 amounted to $51.93 million—15 percent of total mine earnings. Local communities received just under $5 million, one half of one percent (Table III.9). Municipal data on the receipt and expenditure of royalties are not publicly available. SMI staff indicated verbally to the HRA investigation that 70 to 80 percent of royalty payments are designated for infrastructure projects (HRA, 2010).

Table III.3 Revenues to Guatemalan Treasury from the Marlin Mine, 2006-2009

	2006	2007	2008	2009	Total	Local
Total mine revenues ($USm)	109.9	203.7	258.1	331.8	903.5	
Total mine earnings ($USm)	36.4	72.8	100.0	136.9	346.1	
Royalties ($USm)	1.3	1.9	2.48	3.35	9.03	**4.5**
Corporate income taxes ($USm)	3.4	9.5	12.5	17.5	42.9	
Corporate tax rate (tax as % of earnings)	9.3%	13.1%	12.5%	12.8%	--	
Total royalties and taxes ($USm)	4.7	11.4	14.98	20.85	51.93	**4.5**
Total royalties and taxes a per cent of mine revenues ($USm)	4.3%	5.3%	5.8%	6.3%	5.8%	**0.5%**
Total royalties and taxes as % of mine earnings ($USm)	12.9%	15.7%	15.0%	15.2%	15.0%	**1.3%**

Source: Own calculations based on Goldcorp Annual Reports: Guatemala Ministry of Energy and Mines data

III.2.2 WAGES

An important potential source of income generated by mining operations, especially for local communities, is employment. Given high rates of poverty and unemployment and the relatively high wages in the mining sector, competition for mining jobs can be intense.

As a condition of its loan, the IFC required Montana Exploradora to produce and make public an Environmental and Social Performance Annual Monitoring Report (AMR). Goldcorp continued to publish an AMR even after the IFC was no longer involved. However, there was no requirement for third-party verification of reported data. According to the AMR, 1,905 workers were employed by Montana Exploradora at the Marlin mine as of December 2009, up from 1,609 in 2008 and 1,149 in 2007. The total includes contractors, who in 2008 accounted for about 3 percent of the total, as well as a small number of teachers whose salaries are paid by Montana via its social investment program (see below). The majority of the workers—58 percent in 2009 and 61 percent in 2008—were residents of the local communities of SMI and Sipacapa, with about three quarters of local workers coming from SMI (Table III.4).

Table III.4 Marlin: Local Employment and Payroll, 2005-2009

	2005	2006	2007	2008	2009
Total workers*	556**	1132	1149	1609	1905
SMI (percent of total)	250 (45%)	657 (56%)	643 (56%)	756 (47%)	838 (44%)
Sipacapa (percent of total)	61 (11%)	147 (13%)	138 (12%)	225 (14%)	267 (14%)
Rotational workers	265	215	n/a	n/a	n/a
Local payroll ($US millions)	$3.6	$3.8	$4.8	$6.9	$10.4

Source: Own calculations based on AMR, multiple years

*Includes workers employed directly by Montana and by mine contractors; and teachers whose salaries are paid by Montana.
**Operations employment as of December 2005. Construction and operations employment peaked in April at 2339 workers.

According to the authors' field investigations in July 2010, the number of workers reported by Montana inflates the number of jobs because the company hires "rotational" workers who work shifts of one week on-one week off. In 2005 and 2006, Montana reported that rotational workers accounted for about one-half and one-third respectively of the work force (AMR, 2006 and 2007). However, the company provided no data for subsequent years.

The total local payroll in 2009 came to $10.4 million, a jump from $6.9 million in 2008. Neither the government nor the company publishes information about job descriptions, wage scales, or job ladders. Interviewees told us that workers hired as gardeners on a 15-day contract basis are paid at a rate of 1,500 quetzales (US$192) per month; permanent gardeners at 2,200 quetzales (US$282) per month; and mine workers involved in tunneling and processing, who tend to not live in SMI or Sipacapa, at 3,500 quetzales (US$449) per month.

By comparison, the nationally legislated minimum wage in agriculture in 2010 was 57 quetzales per day plus a 250 quetzales bonus per month. Assuming that employers comply with the legislation and a five day work week, a monthly wage in agriculture would total about 1874 quetzales ($240) per month. Wages for gardeners at the Marlin mine are about 16 percent higher; wages for heavy machinery workers (tunnelers and processers) are about 87 percent higher (wageindicator.org).

III.2.3 PROCUREMENT

National and local procurement by mining companies of materials, equipment and supplies can be a potent way to inject income into local businesses and households, in effect sharing the revenues from mining operations. Procurement also generates indirect jobs, that is, jobs created by businesses supplying the companies, which generate further income through "demand linkages" or wage multiplier effects. Most important, local procurement builds linkages to and strengthens local economic sectors, promoting sustainable development. Without local linkages, foreign direct investment, including in extractive industries, creates enclave economies (Gallagher and Zarsky, 2007).

According to the AMRs, Montana Exploradora purchases a substantial share of its requisite materials, equipment and supplies for the Marlin mine within Guatemala: about 70 percent in 2009. In total spending, procurement dwarfs the royalty and tax contributions of the mine to the national treasury (Table III.5). The proportion is in line with other Latin American countries: in Chile, in-country procurement is about 80 percent and in Peru, about 65 percent (UNCTAD and World Bank, 2007).

Montana provides no detailed information about specific procurement expenditures. The principal inputs to mining generally are diesel fuel, electricity, explosives and machine parts, as well as water. In some countries—though not in Guatemala—mining companies pay water charges. A significant cost for open-pit gold mines is the energy it takes to haul massive amounts of rock by truck from the mine site. The cost of diesel may comprise up to a quarter of total costs of procurement of supplies and equipment. In underground mines, electricity can substitute for diesel. Another significant input cost in gold (and silver) mining is cyanide.

The dollar value of procurement in Guatemala may be inflated if it includes purchases from domestic importers for inputs such as diesel, cyanide, explosives and machine parts. A detailed case study in Chile found that "a portion of the domestic procurement is likely to consist of imported goods bought from local agents" (UNCTAD, 2007, p.33). Further research is needed to determine whether and how procurement at the Marlin mine is promoting linkage with other industry sectors in Guatemala.

While the national share is substantial, the local share of procurement for the Marlin mine is very small: 5 percent in 2009, up from 1 percent in 2008. The absolute value is also small--$6.3 million in 2009 and $1.7 million in 2008—relative to an estimated regional GDP of $1.2 billion in 2008 (Table III.5). Again, data is missing but the most likely purchases in SMI and Sipacapa are for food-related goods and services. In contrast, local procurement at the Escondido mine in Chile accounted for 48 percent of total procurement in 2004. As a result of targeted government and company policies, including human capital development, Escondido has strong linkages with the business services, retail, and utilities sectors. At the Marlin mine, there has been no effort by the government and little by the company to create local linkages. Chile is considered to be a "best practice" performer in terms of mining contributions to local sustainable development (UNCTAD and World Bank, 2007).

Table III.5 Marlin: Procurement Sources of Materials, Equipment and Supplies, 2005-2009 (US$ millions)

	2005	2006	2007	2008	2009
Local*	$2.2	$2.2	$1.1	$1.7	$6.3
Elsewhere in Guatemala	$6.9	$31.3	$54.2	$79.3	$80.2
Total Guatemala	$9.3	$33.5	$55.5	$81.0	$86.5
Outside Guatemala	$2.2	$19.6	$29.1	$73.3	$36.6
Total	$11.5	$53.1	$84.6	$154.3	$123.1
Local/Total	19.5%	4.1%	1.2%	1.1%	5.1%
Guatemala/Total **Sipacapa and SMI*	71.7%	64%	65.4%	52.5%	70.3%

Source: Own calculations based on AMR, multiple years

III.2.4 SOCIAL INVESTMENT

Social investments are voluntary company contributions to community welfare and development. Goldcorp prides itself on its commitment to corporate social responsibility. According to its website, the company's objective is to "make meaningful contributions to the host communities where we operate" and be "proactive in program development in order for the communities not to be reliant on the mines for their future."

As part of its application for project finance to the International Finance Corporation, Glamis prepared an Indigenous Peoples Development Plan (IPDP). The Plan aimed to share the economic benefits of the mine though local hiring; local capacity building and infrastructure improvements; projects to promote local sustainable development; and reforestation and sustainable forestry (IFC, 2004). The IPDP is implemented through funding provided by Goldcorp to the Fundación Sierra Madre, an NGO created by Goldcorp.

In addition to funding the Fundación Sierra Madre, Goldcorp provides funding for 20-36 primary school teacher salaries (depending on the year) and for activities undertaken by its Sustainable Development Department. In its Annual Monitoring Reports, Montana describes a variety of social investment projects undertaken, focused mostly on health, education, women's business, and micro-lending. The company has built a health clinic in the town of SMI.

The company, however, provides little data about the myriad of small projects that it supports. According to the Human Rights Impact Assessment of Goldcorp's Marlin Mine, which was commissioned by Goldcorp and carried out by On Common Ground, Montana does not maintain sufficiently rigorous accounting for its social investment projects to enable an external evaluation of its level or development impact (On Common Ground, 2010). Moreover, while other revenue sources from the mine increased between 2006 and 2009, the total level of Goldcorp's social investment has remained stagnant at around $1 million per year (Table III.6).

Montana also voluntarily sets aside an additional 0.01 percent of royalties for Sipacapa, which the town did not accept until 2010. At that time, the mayor directed that the *cocodes* (community development councils) that are part of the municipality of Sipacapa could accept funds from the set-aside for development projects.

Table III.6 Goldcorp Social Investments in Marlin Mine

	2005	2006	2007	2008	2009
Sustainable Development Department	n/a	$500,000	$500,000	$500,000	$651,000
Teacher salaries	$68,700	$117,400	$119,900	$98,600	$62,600
Sierra Madre Foundation	0	$400,000	$400,000	$400,000	n/a
Total	**$68,700**	**$1.17m**	**$1.2m**	**$1.0m**	**n/a**

Source: On Common Ground (2010); AMR (2009)

III.2.5 INDIRECT AND INDUCED BENEFITS

An assessment of the economic benefits of the Marlin mine to Guatemala must include not only direct payments in the form of royalties, taxes, payroll of mine workers and company social investment but also of "indirect benefits" stemming from company procurement and "induced benefits" stemming from the spending of wage income on goods and services. Company procurement of goods and services produced in-country stimulates business demand, creating indirect jobs in the businesses that supply the mine. Spending of wages by workers, both direct and indirect, creates further jobs and income through "demand linkages."

Above, we provided Goldcorp data on company spending on procurement. Here, we estimate 1) the number of indirect jobs and the total wage bill created via Goldcorp's reported in-country procurement in 2009; and 2) the addition to national income generated by worker spending via a wage multiplier.

Goldcorp provides no data about the indirect jobs created by the Marlin mine. CIEN (2010) estimates that the mining sector in general generates six indirect jobs for every (presumably full-time) direct job. Under this assumption, the Marlin mine would have generated 11,430 indirect jobs in 2009. With a monthly average manufacturing wage of 2737 quetzales (US$360.63), each indirect job would have generated an annual income of US$4327.60 and a total wage injection into the Guatemalan economy of some US$49.5 million (Table III.6). This is a very substantial amount and would raise the total economic benefits to Guatemala in 2009 to US$182.5. These estimates are preliminary and need further verification.

Worker spending of wage income induces additional income in regional and national communities through multiplier effects. Workers buy goods and services from local businesses. If the businesses buy locally produced inputs, then local income rises some more. The precise value of the wage multiplier on induced income depends on a range of variables, including how much of wage income is saved versus spent and whether purchased goods are produced domestically or are imported. The latter depends crucially on industry structure within the mining region. The overarching principle is that the size of a multiplier on a particular region "depends fundamentally on what portion of the money injected into a region by mining is spent within the region. Any money spent within a region stimulates additional economic activity within the region, while money spent outside the region does not" (Eggert, 2001, p. 22).

No studies have estimated an induced income multiplier for either the highlands or the urban areas of Guatemala. Studies in other mining regions such as Region II in Chile (the country's largest copper-mining area) and Western Australia have found great variability in income multipliers. In Western Australia, reflecting a highly diversified local industrial structure, Clements and Ye found an income multiplier of 3.0 in 1995. In Chile's Region II, the country's largest copper mining area, Aroca (2000) estimated "open" and "closed" system output multipliers of 1.28 and 1.80 respectively in 1999. The "open" system multiplier does not include induced household spending, effectively assuming that wage income is spent outside the region, while the "closed" system multiplier does include it and assumes that all income is spent on goods and services produced within the region.

As a crude estimate, we took the average of the two Chilean Region II output multipliers (1.54) and applied it to direct and indirect wage income from the Marlin mine. In 2009, total wage income totaled $71.9 million. An induced wage income multiplier of 1.54 would mean that Marlin mine direct and indirect wages induced additional economic activity in Guatemala worth about $141.7 million (Table III.6). We followed the same methodology for 2006-2008.

These estimates suggest that the indirect benefits of the Marlin mine, in the form of indirect jobs and induced wage spending, outweighed the direct benefits by nearly 20 percent between 2006 and 2009. However, a few caveats are in order.

First, the employment multiplier of 6:1 (six indirect jobs for every direct job) needs to be verified and checked against the details of Goldcorp's procurement spending. Imported goods and services purchased from local retail agents will not generate as many indirect jobs in Guatemala.

Second, the induced spending output multiplier in Chile is likely higher than in Guatemala due to Chile's more developed domestic industry structure, proactive industry policies, and more accountable government. More research is needed to determine the actual value of a wage income multiplier in Guatemala's mining sector, as well as other sectors such as agriculture.

Third, the long-term impact of greater output and spending induced by mining depends on how income is spent. If there is no investment in building the skills, infrastructure and technological capacities needed for sustainable, competitive industries, the "income bubble" will burst when the mine closes and the economy will shrink.

Finally, it is important to properly interpret the value of a multiplier. As Porter (1984, p. 14) notes, "multipliers are not good indicators of social desirability." A small sector with a high multiplier will have less economic impact than a large sector with a small multiplier. Moreover, as Eggert concluded in a study for the Metals, Minerals and Sustainable Development project, "a full consideration of all the social benefits and costs of a project or activity is needed to assess social desirability" (Eggert, 2001, p. 25).

Table III.7 Marlin mine: estimates of indirect wages and induced income, 2006-2009 (in millions of current US dollars)

	2006	2007	2008	2009	Total
1. Estimated number of indirect jobs	6,792	6,894	9,654	11,430	
2. Estimated wage income from indirect jobs*	$29.4	$29.8	$41.8	$49.5	$150.5
3. Total direct and indirect wages	$33.2	$34.6	$48.7	$59.9	$176.4
4. Induced income *	$51.1	$53.3	$75.0	$92.2	$271.6
5. Total estimated indirect wages and induced benefits (2) + (4)	$80.5	$83.1	$136.8	$141.7	$442.1

*Total indirect and direct wages multiplied by 1.54

All wage estimates based on 2008 monthly average manufacturing wage of 2737 (US$360.63). See ILO Labor Statistics online.

III.2.6 TOTAL ECONOMIC CONTRIBUTIONS

The total economic contributions of the Marlin mine to Guatemala as a whole and to the local communities surrounding the mine between 2006-2009 are summarized in Tables III.8 and III.9 respectively. Three conclusions stand out from the available data:

- Almost 90 percent of economic benefits generated by the Marlin mine flow to the national government and to workers and businesses outside of the two local communities. SMI and Sipacapa received only 5.1 percent of the total revenue generated by the mine.
- The businesses and contractors who supply equipment, materials and supplies received nearly two-thirds of the total economic benefits of the mine. Procurement dwarfed royalties, taxes and wage income.
- At 41.5 percent, Guatemala's share of mine revenues is small relative to the total revenues the mine generates.
- Wages from indirect jobs and flow-on income is likely significant, if difficult to estimate in this case.

Table III.8 Marlin: Total revenue flows to Guatemala 2006-2009 ($US million)

	2006	2007	2008	2009	Total
Payroll*	$8.5	$10.8	$16.2	$22.4	$57.9
Payroll soc sec tax	$0.8	$1.0	$1.1	$2.0*	$4.9
Royalties	$1.3	$1.9	$2.5	$3.4	$9.1
Sipacapa reserve	0	0	$0.19	$0.25	$0.44
Corporate tax	$3.4	$9.5	$12.5	$17.5**	$42.9
Guatemala purchases	$33.5	$55.3	$81.0	$86.5	$256.3
Social Investment	$	$0.9	$0.9	$0.9**	$3.6
Total Contributions to Guatemala	$48.4	$79.4	$114.4	$132.95	$375.14
Total mine revenues ($US million)	$109.9	$203.7	$258.1	$331.8	$903.5
Guatemala share of total mine revenues	44%	39%	44.3%	40.1%	41.5%

*Includes all workers resident in Guatemala. **Estimate based on prior years.

Source: Own calculations based on Goldcorp Annual Reports; On Common Ground (2010); AMR, multiple years.

Table III.9 Marlin: Total revenue flows to local communities, 2006-2009 ($US millions)

	2006	2007	2008	2009	Total
Payroll	3.8	4.8	6.9	10.4	25.9
Royalties	0.61	1.09	1.41	1.74	4.85
Sipacapa reserve	0	0	0.19	0.25	0.44
Local purchases	2.2	1.1	1.7	6.3	11.3
Social Investment	0.9	0.9	0.9	0.9**	3.6
Total local contributions	7.51	7.89	11.1	19.59	46.09
Total Mine revenues					
($US million)	109.9	203.7	258.1	331.8	903.5
Local revenues as percent of total mine revenues	6.8%	3.9%	4.3%	5.9%	5.1%

Source: Own calculations based on Goldcorp Annual Reports; On Common Ground (2010); AMR, multiple years

III.3 SUSTAINABLE DEVELOPMENT?

The potential benefits of mining for sustainable development stem from knowledge and technology spillovers to other enterprises and industries from mining operations; and the investment of mine-generated revenues in building long-term productive capacities.

There is little information about potential local or national spillovers created by the Marlin mine. There is no public information about job descriptions or requisite skills at the mine, though jobs are evident in operating heavy machinery that may be applicable to other industries. Montana provides training for employees; however, the skills targeted are mostly specific to mining and even more narrowly to gold mining (Table III.10). Information about how mine wage income is spent is also lacking. Wages can pump demand for locally produced goods and services, stimulating enterprise growth. At the national level, further study is needed to determine whether spillovers have been captured through procurement of mine supplies.

Table III.10 Employee Training at the Marlin Mine, 2009

	Number Trained			
Job Classification	Male	Female	Indigenous	Training Description
Managers & Superintendants	10	2	0	Safety Leadership Training
	28	2	0	Management Skills Training
	2	0	0	Incident Investigation Training
	2	0	0	Delta Train the Trainer
Supervisors	100	0	80	Effective Security Leadership Training
	120	0	100	First Aid
OP Operators, UG Operators, Process Plant Operators, Civil Workers, Warehouse Workers	400	0	370	Cyanide Code
	75	5	55	First Responder/Industrial Firefighting Trainings
	140	8	120	Industrial Fire Suppression
	80	6	65	Pre natal birth training
	58	2	40	Sodium Cyanide Incident Training
UG Personnel	56	0	45	Underground First Aid & Rescue
	120	0	80	Incident Command System Training
	60		25	Hazardous Materials First Responder Training

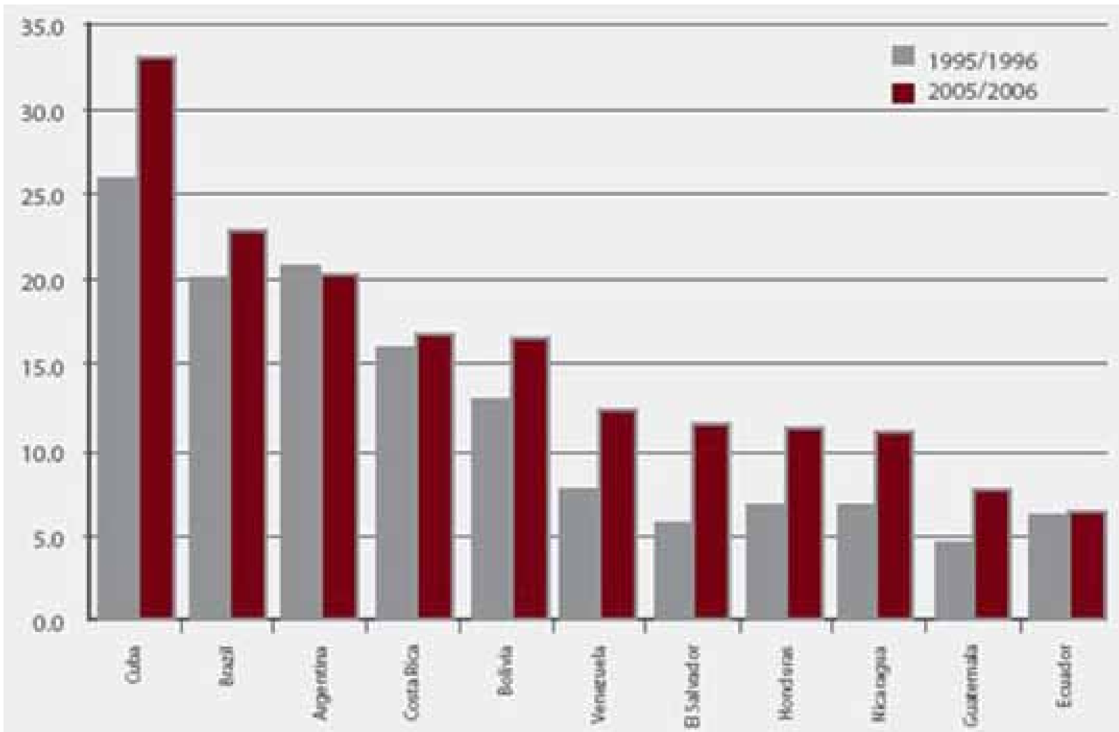
Source: AMR (2009)

There is little evidence that national and local governments have allocated royalties and taxes to productive investment. Accountability and transparency is lacking more generally: national and municipal governments either do not keep or do not make public accounts of total mine-related royalties and taxes received or how the revenues are spent. According to World Bank data, total government expenditure on goods and services fell over the period of Marlin operations, from about 13 percent to below 12 percent of GDP between 2007 and 2009 (Trading Economics). Spending on research and development remained fixed at .05 percent of GDP.

Our field research found that an unknown portion of the royalties received by the municipality of SMI had been spent on paving mountain roads. While welcomed as an improvement over muddy roads, especially in wet weather, local community members pointed out that the roads primarily serve the trucks coming and going from the Marlin mine. Moreover, they suspect that some of the royalties are used to support housing construction and other consumption by local officials, or perhaps are channeled into election campaigns.

Guatemala has a poor record of investment in social and economic development. According to a recent study by the Central American Institute for Fiscal Studies, Guatemala's social spending as a percentage of GDP is the second lowest in Latin America after Ecuador (Figure III.5). The problem is not lack of resources. Despite the fact that it is the largest economy in Central America, Guatemala's social indicators are generally much lower than those of the much poorer countries of Honduras and Nicaragua (ICEFI and CESR, 2010). About 50 percent of children under the age of five, for example, are stunted in their growth, an indicator of malnutrition (ibid).

Figure III.5 Social Spending in Selected Countries in Latin America and the Caribbean as a % of GDP (1995/1996 and 2005/2006)



Source: ICEFI and CESR (2009)

To improve transparency and reduce conflict over mining, Guatemala applied to the Extractive Industries Transparency Initiative (EITI) and, in April, 2011, was accepted as a candidate. To be accepted, Guatemala submitted a plan to work with companies and civil society to create and publish consensus reports of financial flows for the mining and oil industries (Portillo, 2011).

The lack of accountability for mine revenues, coupled with available macro-economic data and field observations, suggests that little if any of the economic benefits of the Marlin mine have been applied towards productive investment in building sustainable industries that could generate income after mine closure. Such investment would augment the returns to Guatemala shown in Table III.7 with a "sustainable development" benefit. We turn next to an assessment of environmental costs.

IV. Environmental Risks of the Marlin Mine

IV.1 ENVIRONMENTAL RISKS OF GOLD MINING

Like all metals extraction operations, gold mining is inherently destructive of the local environment. Strict environmental standards and monitoring are required to mitigate the most egregious environmental and health risks not only in the operating but also the post-closure phase of the mine. Even with the best oversight, however, environmental risk remains.

Rich veins of ore in which gold can be extracted in solid chunks have been exhausted. Today, gold is found primarily in low concentrations of less than ten grams per ton. To get the gold requires clearing vegetation and topsoil from large swaths of land; blasting large open-pit mines and underground tunnels and hauling the waste rock into large nearby mounds or valleys; excavating large amounts of ore and pulverizing it into a fine powder; treating the ore with a mix of water, lime and sodium cyanide; leaching the pregnant solution to separate the gold and sending it to a refining smelter, on or off site; and channeling the leftover tailings slurry to storage in a pond or "impoundment".

Environmental problems emerge at almost every stage of this process (Helwege, 2010):

- The initial clearing destroys productive topsoil and forests;
- Waste rock is dumped in nearby areas, destroying additional habitat;
- The use of explosives damages buildings and stresses wildlife and farm animals; dust from these operations causes respiratory problems;
- The leaching process uses vast amounts of water, often in very dry environments;
- Cyanide leachate poses the threat of pollution if tailings pond walls are weakened by rain or earthquakes; cyanide spills have also resulted from transportation to and from mine. Even diluted, cyanide kills fish, causes skin rashes in humans, and sickens livestock;
- Tailings — vast quantities of finely crushed and processed ore rock — must be disposed of safely once they have been exposed to cyanide;
- Smelting causes severe air pollution, particularly if new pollution control devices are not in place;
- Acid mine drainage (AMD) results from the exposure of sulfide-rich crushed rock (tailings and waste rock) to rainfall. AMD can contaminate local waters with heavy metals such as aluminum, arsenic, cadmium, lead, nickel and zinc that would otherwise remain buried in intact rock.

These problems are widely recognized (Hudson et al, 1999; Perlaz and Johnson, 2005; ENS, 2010). Many, if not all, have been reported by people living close to the Marlin mine, including skin rashes, sick cattle, respiratory ailments and damaged buildings (The Esperanza Project, 2010).[6]

The central question in assessing the environmental and health risk of a particular mine is whether company management and governmental oversight is sufficiently rigorous and robust to minimize risk to mine workers and local communities. The most acute source of risk stems from cyanide. The most long-lived and potentially injurious to human livelihoods and the environment stems from heavy metals contamination from AMD.

IV.1.1 CYANIDE

Gold mining involves sprinkling cyanide solution on pulverized ore on heap leach pads or, as in the Marlin mine, in tanks. The gold-bearing solution is then processed in a refinery on site and smelted to produce gold bars. The remaining water solution is drained into a tailings pond and stored on site.

Cyanide is acutely toxic to humans and wildlife. Inhalation of gaseous hydrogen cyanide of 100-300 parts per million (ppm) can lead to death within an hour, while exposures of 20-40 ppm can lead to symptoms such as headache, weak and rapid pulse, nausea and vomiting. Skin exposure to a hydrogen cyanide concentration of 100 milligrams per kilogram of body weight can be fatal. Lower concentrations can cause severe pain, burns, and deep ulcers that heal slowly (MSDS, 2009).

Unlike heavy metals, cyanide is not bio-accumulative. Small concentrations occur naturally in the human body and are removed by the liver. In the environment, cyanide degrades easily into non-toxic substances and is quickly dispersed. Mine workers are the most vulnerable to cyanide inhalation and skin contact during the heap leaching or tank extraction process. Risks to surrounding communities stem from the transport of cyanide to the mine, and the potential for leaching of sodium cyanide-rich pond tailings into ground and surface waters, either incrementally or in a catastrophic spill.

Due to its high risks, the production, use, transport and disposal of cyanide is regulated in most countries. In addition, the UN Environment Program and the International Council on Metals and Mining, an industry-based body, have developed a voluntary code of good practice. The International Cyanide Management Code for the Manufacture, Transport and Use of Cyanide in the Production of Gold (Cyanide Code) provides third-party certification that a company has adopted nine standards, including disclosure of risks to workers and training of workers in handling accidents (Table IV.1). As of April, 2011, twenty-nine companies, including Goldcorp, had signed the Code.

Table IV.1 Principles and Standards of Practice: International Cyanide Management Code

1. Production:	Encourage responsible cyanide management manufacturing by purchasing from manufacturers who operate in a safe and environmentally protective manner.
2. Transportation:	Protect communities and the environment during cyanide transport.
3. Storage:	Protect workers and the environment during cyanide handling and storage.
4. Operations:	Manage cyanide process solutions and waste streams to protect human health and the environment.
5. Decommissioning:	Protect communities and the environment from cyanide through development and implementation of decommissioning plans for cyanide facilities.
6. Worker safety:	Protect workers' health and safety from exposure to cyanide.
7. Emergency response:	Protect communities and the environment through the development of emergency response strategies and capabilities.
8. Training:	Train workers and emergency response personnel to manage cyanide in a safe and environmentally responsive manner.
9. Dialogue:	Engage in public consultation and disclosure.

Source: International Cyanide Management Code

IV.1.2 ACID MINE DRAINAGE

Since it is short-lived, cyanide poses environmental and health risks primarily in the operating phase of the mine. Acid mine drainage, on the other hand, can persist and even worsen in the post-closure phase. Among the "highly toxic" metals found in rock near the Marlin mine are arsenic, cadmium and lead (Table IV.2).

Table IV.2 Naturally occurring hazardous chemical elements in Marlin Mine ore

Arsenic	High toxic potential – elevated exposures have been associated with cancers and is an acute poison affecting the central nervous system.
Cadmium	High toxic potential – moderate exposures associated with lung cancer and adverse effects on kidneys, bone metabolism, and lung function
Chromium	Occurs in several valences with markedly different toxic potentials. Cr[VI] exposure is associated with increased cancers. Most natural sources contain Cr[VIII) which has low toxic potency.
Lead	High toxic potential – low levels of exposure are associated with adverse effects on the development of the central nervous system and brain in children, and higher exposure affect the nervous system and kidney in adults.
Manganese	Medium toxic potential – high exposures can result in adverse neurological effects and medium exposures as part of a mixture of other metallic elements have been associated with some cancers. Essential nutrient for normal cell function.
Mercury	High toxic potential - low exposure to organic mercury associated with adverse effects in the central nervous system, including brain dysfunction. Mercury in ore would be inorganic.
Nickel	Medium toxic potential – excess inhalation exposure during high temperature smelting associated with sino-nasal cancers. Allergic reactions and skins rashes reported by hypersensitive individuals.
Selenium	Medium toxic potential – essential nutrient; extreme exposures associated with cancers. Organic is more toxic than inorganic forms. Selenium in ore would be inorganic.
Thallium	High toxic potential – elevated exposures result in general system toxicity, particularly effects on nervous system and muscle (e.g. heart) function.
Zinc	Medium toxic potential – essential mineral; extreme levels associated with urogenital system disorders; in fine particulate materials associated with lung cancers.

Source: Intrinsik (2010)

The process of toxic releases from acid mine drainage is extremely long-lived, perhaps irreversible from a practical point of view. In southern Spain, AMD is believed to be coming from ancient mines operated by the Romans or even Phoenicians (Earthworks and Oxfam, 2004). In northern California, AMD from mines dating back to the Gold Rush era continues to pose a major health and environmental hazard. In the United States, toxic releases associated with AMD make the mining industry as a whole the nation's top industrial polluter (Earthworks and Oxfam, 2004).

Water contamination due to AMD is the greatest source of long-term risk from mining operations. "Air and soil pollution are often readily resolved by re-vegetation and landscaping," concludes a recent study of sustainability in mining. "Even mine sites which have otherwise been restored to high standards can subsequently develop pervasive and persistent problems in relation to water quality and quantity.…" (Amezaga et al, 2011, p. 21). At the site of Goldcorp's now-closed San Martin mine in the Siria Valley, Honduras, world-renowned researchers from the University of Newcastle have discovered evidence of AMD (Jarvis and Amezaga, 2010).

Environmental regulators, mining companies and scientists are researching ways to treat acid mine drainage (INAP). However, the cost and feasibility of implementation remain major obstacles to treatment, even in developed countries. In the state of Washington, for example, the clean-up of the Holden gold and silver mine is estimated to cost some $200 million (Woods, 2010).

Contamination of surface and ground water with heavy metals is especially risky in poor areas, like Marlin, where water-supply infrastructure is lacking. Drinking water for families is drawn directly from wells, and cattle and other livestock are watered from streams. In a 2010 study, Belgian researchers at the University of Ghent hypothesized that the depletion of surface waters have caused arsenic-rich groundwaters to be pulled to the surface and may be causing the increased levels of arsenic in the blood and urine found in people living closest to the Marlin mine (Van de Wauw et al, 2010).

Climate change will exacerbate existing risks and create new risks to mining operations, including of AMD. Among the projected impacts of climate change are greater intensity and/or frequency of storms, with associated flooding; and changes in water hydrology. The greatest risk posed by climate change to local communities is AMD contamination stemming from the overtopping of tailings ponds and/or changes in interaction of ground and surface water with waste rock (Box IV.1).

Box IV.1 Climate risk and Mining

A. What is climate risk?

B. Climate risk refers to the extent to which an organisation's infrastructure, operations and markets are affected by variability and long term shifts in the averages and extremes of climate. In mining operations, climate risk may be manifested in areas as diverse as:

- Threats to mine water supply security.
- Damage to mines and associated transport infrastructure from flooding, cyclones and bushfires.
- Threats to port operations and infrastructure from sea level rise and storm surges.
- Overtopping of tailings dams, leading to failure and environmental contamination.
- Delays in construction of mine infrastructure or in production and shipping of product.
- Human health threats for mine staff from changes in working conditions or disease prevalence.
- Climate-related social dislocation and security concerns in communities around mining operations.
- Changes in surface water and groundwater interactions, with implications for acid mine drainage or movement of contaminants.
- Threats to vulnerable ecosystems in areas within mining operations from direct climate impacts or via climate sensitive agents, such as fire, pests, weeds or diseases.

Source: Locke et al (2011)

IV. 2 GOVERNMENT OVERSIGHT OF MARLIN

The Marlin mine is a large-scale operation. At the time that the IFC approved a project loan of $45 million to Glamis Gold, the mine was estimated to produce 2.5 million ounces of gold and 36 million ounces of silver over a lifetime of ten years. It was also estimated to generate some 38 million tons of waste rock and 23 to 27 million tons of tailings over 10-13 years (CAO, 2005; Moran, 2004). The processing mill is designed to treat a minimum of 1.82 million metric tons of ore per year (Christophersen and Howell, 2009).

The government of Guatemala holds primary responsibility for the regulation and oversight of the Marlin mine. In practice, environmental assessment, standards and monitoring have been inadequate or non-existent. Labor standards generally suffer from lack of enforcement in Guatemala, leaving mine workers virtually unprotected from occupational hazards, including cyanide.

At the outset, the Marlin mine project was approved by both the Guatemalan government and the IFC despite the lack of adequate environmental oversight. In its 2005 response to the complaint by residents of Sipacapa, the IFC's Compliance Advisor Ombudsman found that "to date, the government has not established a clear and comprehensive system for regulating the Marlin site that includes water quality standards and government monitoring of adherence to regulations and standards" (CAO, 2005).

Figure IV.1 Marlin Mine

Source: Anna Fawcus / Oxfam America

The CAO found that the Environmental and Social Impact Assessment (ESIA) prepared by Glamis and judged adequate by the IFC failed to:

- Identify all water users downstream from the mine
- Fully assess the potential for acid mine drainage
- Fully assess the potential for other water contaminants
- Establish water quality standards for beneficial uses.

Despite the information gaps, the CAO found that the Marlin mine was unlikely to have negative environmental impacts in Sipacapa, which, unlike SMI, is upstream from the Marlin mine. Responding to the CAO report, the IFC emphasized that a technical annex to the report stated "the fact" that Marlin was unlikely to have a significant environmental impact or pose risks that could not be mitigated in either of the two local communities (World Bank/IFC, 2005).

In 2010, the U.S.-based consulting firm E-Tech International produced a comprehensive evaluation of predicted and actual water quality around the mine. The report found that the ESIA "provided limited information on the baseline environmental setting in and around the Marlin Mine" and should have included more information about "water quality, water quantity and levels, and the abundance and health of aquatic biota" (E-Tech, 2010, p. 5). The review also found that the ESIA provided no evidence to support its claim that the "acid generation and contaminant leaching potential of the rocks are low" and suggested that "more extensive geochemical testing should have been conducted before mining began" (ibid. p. 6).

The lack of adequate baseline data continues to impede environmental and health oversight. Without baseline data, it is difficult to determine, for example, the extent to which AMD has already elevated the level of heavy metals in surrounding waters, or whether mining operations have depleted or rerouted water resources, reducing community access to water. According to Goldcorp's Human Rights Assessment (HRA):

Full information about water users and water sources in all nearby and downstream communities has not been compiled, although five years has passed since this issue was identified as a gap in the baseline studies. Claims that springs in the area have been affected by the mine cannot be fully addressed without a more complete hydro-census and groundwater monitoring program (On Common Ground, 2010, p. 14).

In addition to failing to adequately assess environmental impact at the outset, the government failed to provide adequate avenues for meaningful public disclosure and consultation. The highly technical ESIA was produced in Spanish only, even though local communities speak Mayan languages, and was available for comment for only one week. "Public disclosures," concluded the CAO, "did not at the time have sufficient information to allow for an informed view of the likely adverse impacts of the project" (CAO, 2005, p. ii).

Guatemala's environmental oversight has improved since the Marlin mine was approved. The Ministry of Environment and Natural Resources (MARN) has set standards for water quality, though enforcement is still lagging since it does not regularly undertake water quality monitoring. In response to the Inter-American Commission on Human Rights' order to suspend mine operations, the government claims to be undertaking a "thorough investigation" of water quality and health risks to indigenous peoples. However, no studies have been made public to date. Moreover, MARN is politically marginalized relative to the Ministry of Energy and Mines (MEM), which is eager to promote mining investment.

IV.3 COMPANY ENVIRONMENTAL MANAGEMENT

Goldcorp has positioned itself as a socially responsible mining company (Goldcorp, 2011c). The company's website has a portal for "corporate responsibility" where can be found the company's Corporate Social Responsibility, Human Rights, Environmental and Sustainability, and Health and Safety Policies, as well as annual Sustainability Reports and the Annual Monitoring Report prepared specifically for the Marlin mine (Goldcorp, 2011d). Goldcorp is a member of the International Council of Metals and Mining, a CEO-led organization that seeks to catalyze better social and environmental performance and promote sustainable development (Table IV.3; ICMM website). It also supports the Extractive Industries Transparency Initiative.

Goldcorp enjoys a reputation for having environmental management systems and technologies that are "above average for its peer group" (Sustainanalytics, 2008). Goldcorp's Marigold mine in Nevada was the first gold mine in the world to be fully certified to the Cyanide Code (Goldcorp, 2009). Goldcorp also installed equipment at the Marigold mine that dramatically reduced mercury air emissions, while another company's large nearby gold mine was shut down (Associated Press, 2008).

Goldcorp's record of environmental compliance, monitoring and disclosure, however, has been found to be below par. In 2008, an advisor to the Jantzi Social Index recommended that Goldcorp be ineligible for "socially responsible investment" portfolios. The analyst cited three concerns: 1) growing opposition by indigenous peoples to the Marlin mine based inter alia on the mine's environmental impacts; 2) the company's failure to adequately address health concerns associated with its Honduras operations; and 3) the fact that Goldcorp had the highest level of environmental fines among mining companies listed on the Toronto Stock Exchange (ibid. 2008).

The company's social responsibility strengths and weaknesses are evident in its environmental management of the Marlin mine. According to the environmental review undertaken for the HRA, "the Marlin mine operates to a good standard of practice within the mining industry worldwide with a few exceptions" (KP Consulting, 2010, p 1). Goldcorp's "good standards of practice" are outlined in the company's Environmental and Sustainability Policy, albeit without specific standards and performance measures.

Goldcorp has undertaken a number of measures to reduce the risk of cyanide and heavy metals contamination of surrounding waters and land. The tailings and water coming out of the mill "are treated with an SO2 air cyanide removal technology prior to discharge to the mine's tailings impoundment" (Howell and Christophersen, 2009). Waste rock is stored so that water leakages can be diverted into the tailings pond (KP Consulting, 2010).

Nonetheless, there is cause for concern that there is seepage from the tailings pond, which is lined with compacted clay rather than a synthetic liner. Moreover, there is no collection of leachate downgradient of the pond. In a comprehensive study, E-Tech International concluded that "Although water in the pond is continually pumped back to the tailings impoundment, it is unlikely that the pond captures all the seepage from the impoundment" (E-Tech International, 2010, p. 59).

A major concern that has not been addressed by Goldcorp is the capacity and stability of the tailings dam and pond. A November 2009 technical review by a geo-consultant retained by Montana Exploradora found that "the Marlin tailings dam is approaching the end of its design life" and that "maximum capacity for [the mine's] crest height will be achieved by about mid 2011" (Robertson, 2009, p. 8). Pond waters that breach the dam will spill into surrounding waters. Robertson listed three options as being "under consideration": 1) raising the dam to add storage; 2) developing a second tailings impoundment east of the current dam; and 3) dewatering the existing tailings pond (ibid).

Figure IV.2 Marlin Mine: Tailings Pond

Source: Anna Fawcus / Oxfam America

In the short term, the company has apparently taken the option of dewatering by discharging water from the pond through the surrounding environment. In September, 2010, the Minister of Environment accused Goldcorp of a secret night time discharge from the pond swollen due to heavy rains (IKN, 2010). Goldcorp claimed that it had notified MARN of the discharge. Goldcorp has since announced other discharges.

Another risk is that the tailings dam will be breached due to geologic instability, that is, earthquakes. According to the environmental review contained in the HRA, "the final dam height of 82 meters is a concern since it is an active seismic area" (KP Consulting, 2010, p. 11). Earthquakes pose a risk not only in the operating but also in the postclosure phases of the mine. According to geo-consultant Andrew Robertson, "Post closure the Marlin tailings dam will continue to contain tailings that would liquefy under seismic loadings or a dam breach. It will therefore remain classified as a high hazard dam" (Robertson, 2009, p. 10).

In addition, it is not clear whether and how Goldcorp is managing the potential for overtopping the tailings impoundment due to extreme weather events such as floods and cyclones, especially in the context of climate change. The water treatment plant is designed to contain and control water in a "one in hundred year" rainfall event over 24 hours (KP Consulting, 2010). According to the UN, Guatemala is one of ten countries most vulnerable to the effects of climate change and will become both drier—precipitation is projected to fall by 11-28 percent—and more vulnerable to extreme weather events such as "one hundred year storms" (ECLAC, 2010).

The number of extreme weather events in Guatemala increased dramatically between 1970-1989 and 1990-2008: there were twice as many floods and the number of tropical storms and hurricanes rose from zero to seven (Figure IV.3) In 2010, Guatemala had the wettest rainy season of the last sixty years, including tropical storm Agatha (IDB, 2010). An April, 2011 assessment by the World Bank's Climate Change Team and the Global Facility for Disaster Reduction and Recovery concluded that "overall, the trend over the last 40 years suggests a strengthening of the hydrological and climate cycles, with more intense rain occurring across shorter periods of time that produces greater average precipitation per episode. This trend may continue in the future due to climate change, possibly resulting in a greater frequency or intensity of both floods and droughts" (Climate Change Team, 2011, p. 4).

In addition to concerns about the stability and adequacy of the tailings impoundment, Goldcorp's environmental management has been criticized in two other areas: water quality and quantity monitoring, and mine closure and post-closure planning and monitoring.

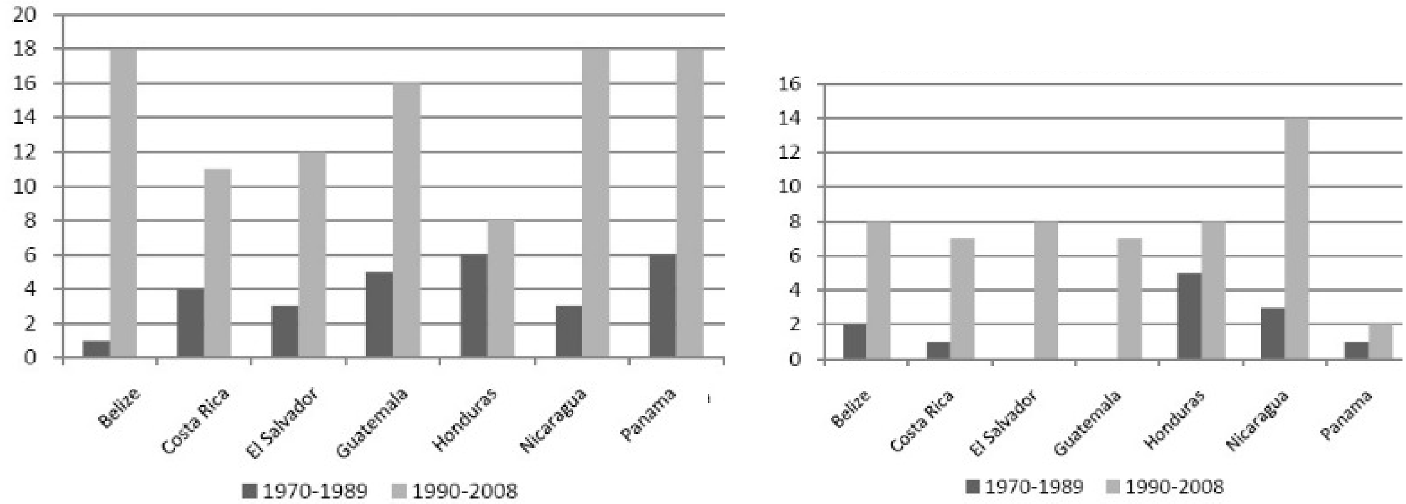
In 2005, Goldcorp established the Community Environmental Monitoring Association (AMAC) to undertake and audit water monitoring. Praised as an example of "industry good practice," the credibility of AMAC suffers from its dependence on Goldcorp for funding. The 2010 HRA found that "external auditing of the water monitoring program has not been implemented in accordance with international standards" (On Common Ground, 2010, p. 15). In its April 2011 response to the Human Rights Assessment (HRA), Goldcorp asserted a commitment to "aggressively support AMAC to become an independent and widely accepted independent community-based monitoring committee". However, Goldcorp remains the funder (Goldcorp, 2011a).

The HRA found plans for mine closure to be "the weakest aspect" of Goldcorp's management of the Marlin mine and "has the potential to leave the community vulnerable to long-term impacts on human rights" (On Common Ground, 2010, p. 82). According to the HRA environmental review (KP Consulting, 2010), the major defects of Goldcorp's closure plan are:

- *Short closure period:* The closure period is 18 months, when a period of 2-3 years is standard practice.
- ***No long-term monitoring and maintenance:*** The time period for post-closure monitoring and management is very short when there should be "a provision for continued care and maintenance of the facilities for a very long time, often defined as 100+ years" (p.13). Such activities include annual dam inspections, monitoring and treatment of impacted waters until they meet discharge criteria, monitoring and maintenance of tailings pond and waste rock piles, etc.
- ***Low cost estimate:*** The full estimated closure cost of $13.6 million is very low. Besides the absence of long-term monitoring and maintenance costs, the costs of re-vegetation are low compared to norms.
- ***No financial assurance:*** The only resources available to close the mine in the event of failure for any reason is a $1 million fund voluntarily established by Goldcorp. Financial assurance vehicles such as secure bonds or letters of credit are the standard of good practice for international companies.

Climate change will likely make the post-closure phase of the mine riskier than the operating phase for the local communities surrounding Marlin. The combination of increasing aridity and extreme weather events is likely to change local water hydrology in unanticipated ways, increasing the potential for more severe and widespread contamination from AMD. The western highlands of Guatemala are already at the highest level of risk in terms of three hazards: cyclone mortality, flood mortality and economic loss from drought (Climate Change Team, 2011). Climate risk is exacerbated by Guatemala's poor capacities for risk reduction and disaster management. In recent years, Guatemala has reduced the number of weather monitoring stations due to fiscal constraints and as of early 2011, only five remained (ibid). To date, there are no studies of the projected impacts of climate change on the Marlin mine.

Figure IV.3 Central America: main extreme weather events, 1970-2008 (number of events recorded)

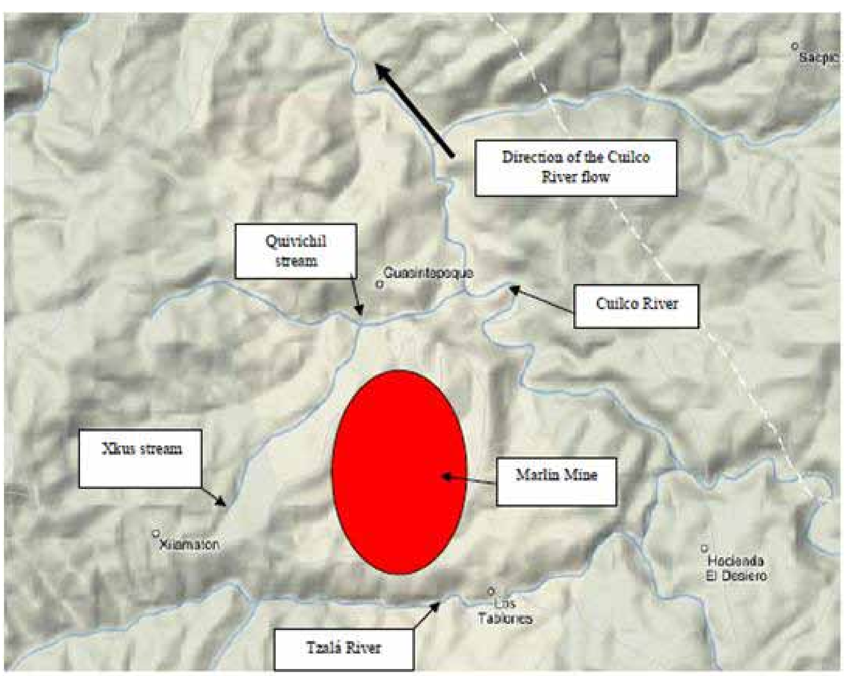


Source: Economics Commission for Latin America and the Caribbean (ECLAC), on the basis of Regional Disaster Information Center (CRID), 2010, Emergency Events Database (EM-DATA) [online] http://www.emdat.be/Database/terms.html

IV.4 INDEPENDENT WATER QUALITY AND HEALTH STUDIES

The Marlin mine lies within two watersheds, the Tzala and the Quivichil, which form part of the larger Cuilco river watershed which covers an approximate land area of 540 square kilometers (Figure IV.4). The rainy season goes from May to November. Regular, standardized and extensive monitoring of water quality and human health throughout the watershed is essential to mitigating the environmental and health costs of the Marlin mine.

Figure IV.4 Waters surrounding the Marlin Mine



Source: COPAE (2009)

Water quality monitoring is undertaken by three groups: AMAC, Goldcorp (Montana Exploradora) itself; and COPAE, the San Marcos-based Pastoral Commission on Peace and Ecology of the Catholic Church. Goldcorp presents results in its Annual Monitoring Report, produced initially as a condition of the IFC loan. COPAE provides the only assessment that is independent of the company.

Table IV.3 summarizes the results of water quality monitoring as of 2010. COPAE data is significantly different from the other two studies for 5 of the 6 elements. For aluminum and iron, COPAE values are much lower, while for copper, arsenic and zinc, the values are much higher. Interpreting these data is not straightforward since there is no standard methodology in terms of where and when the samples are taken. Moreover, the data is for only two years.

Table IV.3 Water quality study results and standards

	Baseline 2004-06*	Baseline 2004-06*	Goldcorp Annual Monitoring Report	COPAE	IFC effluent guidelines	Guatemala MARN	US Safe Drinking Water Act
Element	*Max value*	*Average*	*Highest value*	*Average*			
Aluminum	64.3	24.02	35.9	0.4			0.05-0.2
Arsenic	0.006	0.00323	0.00409	0.027	0.1	0.1	0.01
Copper	0.027	0.0089	0.14	0.55	0.3	3.0	1.3
Iron	34.5	12.38	17.8	4.58	2.0		0.3
Manganese	0.585	0.257	0.318	0.39			0.05
Zinc	0.176	0.0845	0.051	0.29	0.5	10	5

*Data provided by Water Management Consultants for Goldcorp.
Source: Based on KP Consulting (2010) and E-Tech (2010)

Nonetheless, the studies indicate the urgency of further comprehensive testing. The high value of arsenic found by COPAE—2.7 times in excess of U.S. drinking water standards—is cause for particular concern. Evidence of arsenic in groundwater has been confirmed by other studies. Belgian researchers from the University of Ghent found evidence to indicate that the Marlin mine is deleting surface waters and drawing arsenic-rich groundwater to the surface. The study found "sharply rising" arsenic concentrations far above IFC and Canadian drinking water standards (Van de Wauw et al, 2010).

Another study by a team from the University of Michigan found evidence of local exposure to arsenic and other toxic metals. Published by Physicians for Human Rights, the study found that people living closer to the mine had higher blood levels of arsenic, copper, and zinc and urinary mercury compared to people living farther away (Basu and Howard, 2010). While none of the levels exceeded U.S. reference levels, the authors emphasized that "the negative impacts of the mine on human health and ecosystem quality in the region have the potential to increase in the coming years and last for decades…" The study emphasized the need for a "rigorous human epidemiological study" focused especially on children's exposure and health (ibid, p. 3)

Toxic metals in water pose special risks given the absence of water infrastructure. About 47 percent of households near the mine have no access to piped water and depend on ground and river water for drinking, as well as crop irrigation and watering livestock. The report concluded (ibid, p. 1):

The alarming concentrations, combined with the elevated arsenic concentration found in urine of people living close to the mine and the scattered reports of arsenic related diseases [e.g. serious skin problems] 1) *prove that this aspect was neglected during the Social and Environmental Impact Assessment; 2) show that a broader independent research is necessary prior to further groundwater extraction; and 3) the causes and extent of arsenic in groundwater should be further investigated in the region.*

In its comprehensive study, E-Tech International found evidence that tailings seepage may be migrating cyanide and heavy metals downstream of the tailings dam; and that water in the tailings pond exceeds IFC effluent guidelines for cyanide, copper and mercury. Goldcorp plans to treat tailings water before discharging it to the environment. However, treatment will not address leakage of cyanide and heavy metals to groundwater (E-Tech, 2010).

IV.5 INCREASING RISK?

Four independent studies to date have found evidence that cyanide and/or heavy metals may be seeping into the ground and surface waters surrounding the Marlin mine (Table IV.4). Goldcorp has dismissed these studies, claiming that its own studies, as well as studies by the Guatemalan government, show that there is no cause for environmental concern (Goldcorp, 2011e). The Guatemalan government has also refused to consider these independent studies as a part of its administrative process to determine whether to implement the IACHR's precautionary measures.

Table IV. 4 Studies indicating possible contamination from Marlin mine

	Arsenic	Copper	Zinc	Mercury	Cyanide
COPAE (2009)	Surface water 2.7x US drinking water standards	Surface water	Surface water		
Univ of Michigan (Basu and Hu, 2010)	Human blood Elevated levels in people living close to mine	Human blood Elevated levels in people living close to mine	Human blood Elevated levels in people living close to mine	Human urine Elevated levels in people living close to mine	
Univ of Ghent (Van de Wauw et al 2010)	Ground water 100% increase between 2006-2009; below Canadian drinking water standards				
E-Tech International (2010)		Tailings pond 10x above IFC guidelines		Tailings pond 20x above IFC guidelines	Tailings pond 3x IFC guidelines

There is a significant risk that heavy metals contamination will increase in the future. E-Tech found that "nearly half of the waste rock is potentially acid generating, and an additional 25-35 percent has uncertain acid-generation potential. Wastes with higher acid generation potential will release higher concentrations of metals and pose a greater risk to water resources" (E-Tech, 2010, p.7). The routes by which heavy metals may leach, leek or seep from the waste rock have not been thoroughly studied. Furthermore, as noted above, these routes are subject to change with hydrological impacts of projected global climate change.

The Marlin mine was approved on the basis of predictions in the ESIA that the mine would have no moderately negative impacts on water resources or aquatic life. Six years later, E-Tech International's detailed technical report concluded that "adverse effects to the environment may have already begun as a result of mining operations at the Marlin Mine" (E-Tech, 2010, p. 6). The lack of strong environmental regulation and monitoring, coupled with uncertain climate change impacts in the post closure phase, suggest that the risk will increase in the future.

V. Benefits and risks: conclusions and recommendations

This report has attempted to assess the economic benefits and environmental risks of the Marlin mine, first, to the local communities surrounding the mine, and second, to sustainable development in Guatemala. Economic benefits were conceptualized and evaluated as direct flows of income in the form of royalties, taxes, wages, procurement spending, and company social investment; and as indirect flows of income to workers employed in businesses providing goods and services to the mine and to the Guatemalan economy as induced spending from worker consumption spending. Environmental risks were conceptualized as long-term risks to livelihood and to human and ecological health stemming from evidence of poor governance and mine management; water contamination in the operating phase; and poor planning for the post-closure phase of the mine, especially in the context of projected climate change.

The report has two central conclusions. First, over the entire life-cycle of the mine, environmental risks significantly outweigh economic benefits. At the mine's approximate mid-point, local economic benefits, especially wages, are significant though low relative to total mine revenues and earnings. However, the environmental risks are high and, under a business-as-usual scenario, will greatly increase over the remaining life of the mine and in the post-closure phase. Economic benefits, on the other hand, will drop off sharply when the mine closes because jobs will end and because there has been little investment in building sustainable industry and enterprise. Moreover, water contamination could undermine opportunities for subsistence and commercial agriculture, the mainstay of the local economy.

The long-term economic contribution of the mine to local communities is low for four reasons:
1) Guatemala has a weak royalty and tax regime, setting a maximum of 1 percent royalty on mine revenues;
2) local municipalities receive a very small share—only 0.5 percent—of total mine revenues;
3) local poverty is high and wages are low; and
4) there is little local procurement of supplies and materials.
In addition, there is little accountability for royalties and company social investment is low and stagnant.

Environmental risk, on the other hand, is exceptionally high. Gold mining poses generic hazards related to cyanide and acid mine drainage. In addition to proximity to where people live, environmental risk at Marlin is exacerbated and likely to rise over time for the following reasons:

- Lack of adequate government environmental regulation and oversight;
- Lack of an adequate plan for mine closure and remediation;
- Lack of financial assurance for post-closure monitoring and remediation;
- A projected increase in the frequency and severity of extreme weather events such as floods and cyclones due to climate change;
- Lack of government capacity for risk reduction and disaster management;
- Lack of legislative protection for the human rights of indigenous people;
- The poverty of the local community, especially the fact that nearly half the population draws drinking and irrigation water from surface and ground rather than piped water;
- The dependence of local communities on agriculture for livelihoods.

While environmental costs will likely rise, perhaps exponentially, in the post-closure phase, economic benefits will end abruptly with the closure of the mine. There is little evidence that local mine revenues have been invested in building productive capacities and no evidence that mine revenues have been set aside to provide for future jobs or public goods. If these conditions persist, the long-term impact of Marlin will be to impoverish and to impose high health risks on the local communities surrounding the mine—even without taking into account a range of other cultural and social costs, including the destructive impacts of intense conflict on the social fabric.

The conclusion that environmental costs are likely to swamp economic benefits in the long-term reinforces the importance of gaining free, prior and informed consent ahead of undertaking large-scale mining projects. If environmental impacts are adequately and independently assessed, and if information about benefits and risks is fully transparent and available, local communities are best suited to weighing the complex benefits and costs likely to result from mining operations. They should be the final arbiters of a decision to undertake a mining project.

The second conclusion of the report is that the Marlin mine, and mining in general, are contributing little to sustainable development in Guatemala. On the one hand, due to Guatemala's relatively weak royalty and tax regime, revenue flows to the Treasury are low, only about 6 percent of mine revenues and 15 percent of mine earnings. On the other hand, a lack of transparency and accountability suggests that little of the revenue received has been invested in public goods such as education, health, and infrastructure that build long-term productive capacities. Further research is needed, however, to better understand and evaluate the development impacts of the revenues spent by Goldcorp in procuring local supplies, materials and equipment.

Given these conclusions, the report makes four recommendations. First, Goldcorp and the Guatemalan government should agree to suspend Marlin operations, as ordered in the precautionary measures issued by the Inter-American Commission on Human Rights of the OAS. The government should collaborate with Goldcorp, scientists and academics, and civil society to: 1) undertake a comprehensive and rigorous environmental and health assessment in the entire watershed surrounding the Marlin mine; 2) undertake an assessment of projected climate change impacts; 3) produce a comprehensive and robust design and implementation plan for mine closure and post-closure monitoring and remediation, including financial assurance; and 4) undertake a detailed socio-economic assessment, including indirect jobs, induced spending, and an account of expenditure of mine royalties and taxes. Goldcorp itself is currently undertaking a socio-economic assessment but the government's study should go farther and include options for the development of non-mining sustainable enterprise and industry in the region, including in agriculture. The government should also suspend operations at Cerro Blanco pending the results of similar investigations.

Second, Guatemala's Mining Law should be revised to enable Guatemala to capture a higher share of mining revenue and earnings. A revised Mining Law should also give a substantially larger proportion of royalties to local communities. Some of the revenues should be put aside in a Compensation and Stabilization Fund as insurance against environmental hazards as well as sudden changes in global commodity prices.

Third, the capture of greater economic benefits and the reduction of environmental risk require significant development of Guatemala's governance capacity in three dimensions: 1) environmental and health regulation and oversight; 2) legislative definition and judicial protection of the rights of indigenous people; and 3) fiscal accountability.

Also needed is a sustainable development plan that allocates mine revenues into targeted investments in building sustainable productive capacities, especially in indigenous communities. Without good governance and productive investment—and the consultation and consent of local communities—the local legacy of the Marlin mine could well be ecological devastation and impoverishment.

References

Amezaga, Jaime.M, Tobias S. Rotting, Paul L. Younger, Robert. W. Nairn, Anthony-Jo Noles, Ricardo Oyarzun, Jorge Quintanilla (2011). *A rich vein? Mining and the pursuit of sustainability,* Environmental Science and Technology, 45: 21-26.

Amnesty International (2011). *Guatemala: Mine activists beaten and threatened,* www.amesty.org, March 3.

AMR (Multiple years 2006-2009). *Environmental and social performance annual monitoring report,* Montana Exploradora for Goldcorp, available on line at www.goldcorp.com

Anderson, Sarah, Manuel Perez-Rocha and Rebecca Dreyfuss (2010). *Mining for profits in international tribunals,* Institute for Policy Studies, April 29, www.ips-dc.org/

Aroca, Patricio, 2000. *Diversification and development in local economies based on the mining sector: the case of Chilean II Region,* paper presented at the UNCTAD regional workshop for mineral economies in Africa, Cape Town, South Africa, 7-9 November 2000; http://www.natural-resources.org/society/.

ASIES (Asociacion de Investigacion y Estudios Sociales) (2010). *Estudio Costo Beneficio de la Mina Marlin en San Marcos, Guatemala,* May 7.

Associated Press (2008). *Gold mine closed due to mercury emissions,* March 13.

Basu, Niladri and Howard Hu (2010). (2010). *Toxic Metals and Indigenous Peoples Near the Marlin Mine in Western Guatemala,* Physicians for Human Rights, May.

BIC (Bank Information Center) (2007). *IMF predicts DR Congo to reap the benefit of its mineral wealth,* June 15.

BIC (Bank Information Center) (2005). *Guatemala: Sipacapa community says no to mining!* July 1, http://www.bicusa.org/en/Article.2191.aspx.

CAO (Compliance Advisor Ombudsman) (2005). *Assessment of a complaint submitted to CAO in relation to the Marlin Mining Project in Guatemala,* International Finance Corporation, September 7.

China Mining (2010). *Zambia: IMF urges Zambia to up mine taxes to fight poverty,* May 3, Chinamining.org.

Christian Aid (2009). *Undermining the poor: mineral taxation reforms in Latin America,* September.

CIEN (Centro de Investigaciones Economicas Nacionales) (2009). *La Mineria en Guatemala: una Opportunidad para el Desarrollo,* Guatemala City, September 24.

Climate Change Team (Environment Department, World Bank) and Global Facility for Disaster Reduction and Recovery (2011). *Guatemala: Vulnerability, risk reduction, and adaptation to climate change,* April.

COPAE (Comision Pastoral Paz y Ecologia) (2009). *Second annual report on the monitoring and analysis of the water quality,* San Marcos, July.

Council of Canadians (2010). *Pacific Rim CAFTA challenge against El Salvador begins,* June 1, www.councilofcanadians.org.

CSR Centre. Centre for Excellence in Corporate Social Responsibility, Government of Canada, www.cim.org/csr/.

Curtis, Mark (2009). *Mining and tax in South Africa: costs and benefits,* February, www.curtisresearch.org.

Earthworks and Oxfam (2004). *Dirty Metals: Mining, Communities and the Environment,* http://www.nodirtygold.org/pubs/DirtyMetals_HR.pdf

ECLAC (Economic Commission on Latin America and the Caribbean) (2100). *Economics of climate change in Latin America and the Caribbean,* United Nations.

Economist (2010a). *Australia's resource tax — shafted,* May 6.

Economist (2010b). *Chile's copper industry: reviving CODELCO,* October 21.

Edsall, Richard E. (2007). *Indirect expropriation under NAFTA and DR-CAFTA: Potential inconsistencies in the treatment of state public welfare regulations,* Boston University Law Review, vol 86:931-62.

Eggert, Roderick G. (2001). *Mining and economic sustainability: national economies and local communities,* MMSD, No. 19, October.

ENS (Environment News Service) (2010). *Canada rejects gold-copper mine over environmental concerns; and Newmont Gold Mine to Pay Ghana Millions for Cyanide Spill,* January 22.

E-Tech International (2010). *Evaluation of Predicted and Actual Water Quality Conditions at the Marlin Mine, Guatemala,* August.

Financial Times (2011). '*Resource nationalism' returns to commodities,* June 11.

Frankel, Jeffrey (2010). *The natural resource curse: a survey,* Faculty Research Working Paper Series, RWP 10-005, Harvard Kennedy School, February.

Gallagher, Kevin and Lyuba Zarsky (2007). *Enclave economy: foreign investment and sustainable development in Mexico's Silicon Valley,* Cambridge, Massachusetts: MIT Press.

Gibson, R. *Favouring the higher test: Contribution to sustainability as the central criterion for reviews and decisions under the Canadian environmental assessment act,* Journal of Environmental Law and Practice, 10(1): 39-54.

Goldcorp (2011a). *Goldcorp's second update to the Marlin mine human rights assessment report,* April 29, http://www.goldcorp.com/_resources/Goldcorp_Response_to_Marlin_Mine_HRA_Report_Update_04_29_2011_English.pdf

Goldcorp (2011b). *Operations.* http://www.goldcorp.com/operations/

Goldcorp (2011c). *Marlin Sustainability: Community Relations and Development in Guatemala.* http://www.goldcorp.com/operations/marlin/sustainability/

Goldcorp (2011d). *Corporate Responsibility.* http://www.goldcorp.com/corporate_responsibility/

Goldcorp (2011e). *Corporate Responsibility: Current Issues* http://www.goldcorp.com/corporate_responsibility/current_issues/

Goldcorp (2010). Annual Report, http://www.goldcorp.com/_resources/financials/Goldcorp_2010AnnualReport_FINAL_FullBook.pdf

Goldcorp (2010a). *Guatemalan government responds to Marlin mine suspension request,* June 24, http://www.goldcorp.com/news/goldcorp/index.php?&content_id=787.

Goldcorp (2009). *Annual Report,* www.goldcorp.com.

Goldcorp (2009a). *Goldcorp's Marlin Mine Receives International Cyanide Code Certification,* August 13, http://www.goldcorp.com/news/

GoldPrice, online information service http://www.goldprice.org/gold-price.html (accessed February 19, 2011).

Guatemala Times (2011). *Poverty in Guatemala increased to 54.1percent due to economic crisis,* February 4m www.guatemala-times.com.

Hall, Gillette and Harry Anthony Patrinos (2005). *Indigenous peoples, poverty and development in Latin America: 1994-2004,* World Bank.

Helwege, Ann (2010). *Sustainable mining in Latin America: why so elusive?* Draft, October 7.

Howell, Chris and Dave Christophersen (2009). *Three-Phase Mining Effluent Treatment Plant to Meet Stringent Standards,* Engineering and Mining Journal, April.

Hudson, Travis L., Frederick D. Fox and Jeffrey S. Plumley (1999). *Metals mining and the environment,* American Geological Institute.

ICMC (International Cyanide Management Code) http://www.cyanidecode.org

ICEFI and CESR (Central American Institute for Fiscal Studies and Center for Economic and Social Rights) (2009). *Rights or privileges? Fiscal commitments to the rights to health, education and food in Guatemala,*

IDB (Inter-American Development Bank) (2010). *Guatemala receives $250 million for climate change,* News Release, November 2.

IFC (International Finance Corporation) (2004). *Marlin, Environmental impact assessment summary,* available on line at www.ifc.org.

IKN (2010). *Goldcorp, Guatemala, Marlin, Criminal Charges and General Country Risk* http://incakolanews.blogspot.com/2010/10/goldcorp-gg-guatemala-marlin-criminal.html

ILO (International Labor Organization) (2009). *Report of the Committee of Experts on the Application of Conventions and Recommendations.* http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_103484.pdf

IACHR (Inter-American Commission on Human Rights) (2010), *Annual Report on the Inter-American Commission on Human Rights 2010,* http://www.cidh.oas.org/annualrep/2010eng/TOC.htm.

INAP (International Network for Acid Prevention) http://www.inap.com.au/what_is_acid_drainage.htm (accessed March 4, 2011).

Intrinsik (2010). *Hazard Assessment of Chemical Constituents from the Marlin Gold Mine, Guatemala,* March.

Irlbacher-Fox, Stephanie and Stephen J. Mills (2007). *Devolution and resource sharing in the Canadian North: achieving fairness across generations,* Forum Discussion Paper, Walter and Gordon Duncan Foundation, www.gordonfdn.org.

Jarvis, Adam and Jaime Amezaga (2010). Technical review of mine closure at San Martin, University of Newcastle, Caritas (Honduras)/CAFOD International, June.

KP Consulting (2010). *Environmental review for the Human Rights Impact Assessment-Marlin Mine Guatemala,* Denis Kemp, Burlington, Ontario.

Kuyek, Joan (2008). *The Need to Shift Canadian Tax Incentives to Reduce the Impact of the Mineral Industry on the Environment and Local Communities,* in Chalifour, Nathalie, et al (eds). Critical Issues in Environmental Taxation: International and Comparative Perspectives, Volume 5, Oxford University Press.

Kumah, Abraham (2006). *Sustainability and gold mining in the developing world,* Journal of Cleaner Production, 14:315-323.

Le Monde (2010). *Areva et la bataille mondiale pour l´uranium,* July 7.

Locke, Paul, Craig Clifton and Seth Westra (2011). *Extreme weather events and the mining industry,* Engineering and Mining Journal, April 21.

Melini, Yuri (2010). Director General CALAS, interview with authors, June 29.

Mines and Communities (2005). *The people of Sipacapa reject mining activities in their territory,* http://www.minesandcommunities.org/article.php?a=1066.

Mining Watch (2011). *Goldcorp asks shareholders to ignore international consensus to suspend operations at its Marlin mine in Guatemala,* May 19, www.miningwatch.org.

Mining Weekly (2010). *Mining companies encouraged to register for Royalty Act,* November 5.

Moran, Robert (2004). *New country, same story: review of the Glamis Gold Marlin Project EIA, Guatemala,* February.

MSDS (Material Safety Data Sheet) (2009). *Potassium Cyanide,* JT Baker, www.jtbaker.com/msds/englishhtml/p5708.htm.

NACE (National Advocacy Coalition on Extractives) (2009). *Sierra Leone at the crossroads: seizing the chance to benefit from mining,* www.nacesl.org.

NIH (National Institutes of Health), Office of Research Facilities, *Mercury Health Hazards,* http://orf.od.nih.gov

OECD, African Development Bank, United Nations Economic Commission for Africa (UNECA), United Nations Programme Development (2011). *African Economic Outlook 2011,* OECD Publishing.

OECD (2009). *Latin American Economic Outlook 2009,* www.oecd.org/dev/.

OECD (2008), *Measuring Material Flows and Resource Productivity: Synthesis report,* www.oecd.org/environment/resourceefficiency

On Common Ground (2010). *Human Rights Assessment of Goldcorp's Marlin Mine,* May, available on line www.hria-guatemala.com/.

Perlaz, Jane and Kirk Johnson (2005) *Behind gold's glitter: Torn lands and pointed questions,* New York Times, October 24.

Porter, M. G. (1984). *Mining and the economy—some key issues,* in L. H. Cook and M. G. Porter, editors, The Minerals Sector and the Australian Economy, Sydney, George Allen & Unwin,.

Portillo, Eliane (2011). *Guatemala will boost mining and oil industries,* Latin Daily Financial News, April 18.

Power, Thomas (2008). *Metals, mining, and sustainable development in Central America,* Oxfam America.

Prensa Libre (2010a). *Proyecto busca aumentar regalías por actividad minera,* Guatemala, August 9.

Prensa Libre (2010b). *Nuevo Ministro de Energía dice que apostará al diálogo,* Guatemala, June 29.

PWC (Price, Waterhouse, Coopers) (2010). *Income taxes, mining taxes, and mining royalties, a summary of selected countries,* PwC Global Mining Group, December.

Rizik, Roberto and Hipolio Garcia (2010). *Mining—Dominican Republic,* www.latinlawyer.com.

Robertson, Andrew M. (2009). *Dam Inspection – November 2009, Tailings dam review board report no. 9, Marlin Project, Guatemala,* Roberston Geoconsultants Inc. April 21, available on line at www.goldcorp.com.

Schertow, John (2010). *Guatemala says it Will Suspend Goldcorp's Marlin Mine,* International Cry, June 29. http://intercontinentalcry.org/guatemala-says-it-will-suspend-goldcorps-marlin-mine/.

Siglo Vientiuno (2010). *Polémica por la mina Marlin no frena inversion en Jutiapa,* July 19, http://www.sigloxxi.com/pulso.php?id:15377.

Stanley, Leo (2011). *Goldcorp's Marlin: contracts, royalties and super-profits,* draft.

Stevenson, Mark (2005). *Latin America gold rush comes with concerns,* Associated Press, April 15.

The Esperanza Project (2010). *Goldcorp's Marlin mine: Development for death,* June 24.

TodaNoticia (2010). *UN rapporteur calls on Guatemala approve law on indigenous peoples consultation,* June 18 (translated from Spanish), www.todanoticia.com.

Trading Economics, Guatemala, World Bank Indicators, www.tradingeconomics.com

Transparency International (2010). *Corruption Perceptions Index 2010 Results,* www.transparency.org/

UN Declaration on the Rights of Indigenous Peoples (2007). http://www.un.org/esa/socdev/unpfii/en/drip.html

UNCTAD and World Bank (2007). Chile: *The challenge of mineral wealth: using resource endowments to foster sustainable development,* March.

UNDP (2010) (United Nations Development Program). *International Human Development Indicators, Guatemala,* www.hdrstats.undp.org/.

US-EPA (US Environmental Protection Agency), Reducing mercury pollution from gold mining, http://www.epa.gov/oia/toxics/asgm.html (accessed March 4, 2011).

US-EPA, Superfund, *Iron Mountain Mine,* Region IX, http://yosemite.epa.gov/r9/sfund/

US-EPA (2006). *Compost-free bioreactor treatment of acid rock drainage,* Risk Management Research, EPA/540/R-06/009, March.

Van de Sandt, Jorls (2009). *Mining Conflicts and Indigenous Peoples in Guatemala,* CORDAID, September.

Van de Wauw, Johan, Roel Evens, Lieven Machiels (2010). *Are groundwater overextraction and reduced infiltration contributing to arsenic related health problems near the Marlin mine (Guatemala)?* University of Ghent, October 14.

Vancouver Sun (2011). *Goldcorp chief defends practices,* May 19, www.vancouversun.com/business.

Vandanbroucke, Esther (2008). *Environmental and socio-economic impacts of mining in Guatemala: the role of local communities and the ecological justice movement,* Thesis, Human Ecology and Sustainable Development, Vrije Universiteit Brussels, www.catapa.be/files/thesis_guatemala_0.pdf.

Woods, Wilfred (2010). *Taking it over: Holden Mine's legacy of gold silver and residue,* Wenachee World, March 30.

World Bank (2006) *Mining Royalties, A Global Study of Their Impact on Investors, Government and Civil Society,* Directions in Development, Energy and Mining (by J. Otto, C. Andrews, F. Cawood, M. Doggett, P. Guj, F. Stermole, J. Stermole, and J.Tilton).

World Bank/IFC (2005). *Office Memorandum, CAO Assessment Report: Complaint Regarding Marlin Mining Project in Guatemala.*

World Gold Council, http://www.gold.org/investment/statistics/ (accessed February 17, 2010)

Endnotes

i Benefit sharing with local communities is also required under international law.

ii The process leading up to Human Rights Assessment and the Assessment itself were contentious in local communities and many key stakeholders refused to participate.

iii On February 28, 2011, following a peaceful protest in SMI calling for implementation of IACHR, some 200 community members were forced off a bus by a group of mine workers and other community members. The protestors were robbed and beaten and two activist leaders were taken to the mayor's office where they were further beaten and threatened (Amnesty International, 2011).

iv Investors are also turning to silver as a store of value.

v There is also pressure not to adopt new Mining Law by indigenous communities who do not want any mining projects to be allowed.

vi In an interview with *Siglo Veintiuno,* Eduardo Villacorta, Goldcorp's Vice President for Latin America and Mario Marroquín, CEO of Montana Exploradora recognized the need for reform of the Mining Law, although they argued for an exhaustive analysis and a sustainable new scheme (Siglo Veintiuno, 2010).

vii Guatemala's Transparency Commission investigated claims but found no evidence that cracked houses of local residents were caused by blasting at the mine. However, Goldcorp agreed to provide compensation to help residents repair the cracks.

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