

Year Two of the Long-Term Assessment of Mining Impacts

in Donoso, Colon



2015



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Executive Summary

Large-scale mineral extraction is an inherently disruptive activity. It implies the creation of massive pits in the earth's surface, the dislodging of crustaceous materials, the disruption of natural cycles, and possibly the dislocation of people and animals. In a world where population and consumption levels are increasing, the necessity of ameliorating irreparable damages to ecosystems caused by activities of the human economy creases as well. However, mining does not need to damage life-support systems; the practice and mentality of responsible mining must be encouraged so that extractive operations secure an optimal net benefit to host countries and citizens over the long-term with the lowest possible social and environmental impact.

Yet how can this sort of responsibility and accountability be guaranteed in an obscure and internationalized world? The experience around the world during the past few decades has been mixed in terms of providing the economic and social benefits companies promise to local citizens and governments. What is more, accompanying this riddled history are changing ideals in the development process. Human-centered and basic needs philosophies, the growing voice of indigenous groups and human rights advocates in the international policy arena, as well as a norm shift toward an expectation of greater social and environmental justice in civil society, have been adding legitimacy to participatory forms of development and research.

The impetus for the long-term mine impact monitoring assessment in Donoso comes out of the growing recognition for a reconfiguration of the relationship of large-scale industrial activities such as mining to the biophysical and human communities in which they operate. An essential component in establishing a new relationship between these actors and in generating a new dynamic for modern economic development is opening new channels for participation, communication, and information. By collecting data throughout 30 years, the long-term monitoring assessment of mining impacts intends to act as such. It will provide an independent source of information about changes in the biophysical and human environment that may occur in conjunction to the operations of Cobre Panama and the recently closed Petaquilla Gold. Each year, a group of Panama Field Study Semester (PFSS) students and a group of researchers will assemble data on [1] the state of the watershed by testing physical and biological parameters; [2] the socio-economic changes in the communities adjacent to the mining projects through surveys and interviews; and [3] changes in human ecology and land use through a mixed set of methodology.

The foundations for this long-term program were created in 2014 through the work of Panama Field Study Semester interns, Courtney Quinn and Jeanne Pouliot, under the guidance of McGill University professor and specialist in environmental history of Latin America, Daviken Studnicki-Gizbert. The program receives institutional support in Panama by INDICASAT, la Universidad Santa Maria de Antigua (USMA), and the Smithsonian Tropical Research Institute (STRI). Initiated in 2014 under the Foro de Sostenibilidad in conjunction with the UNESCO Chair for Dialogues on Sustainability, the project may be seen as part of a new wave of attention in Panama toward improving practices in development, particularly those regulating and monitoring mining activities, with a focus on ensuring sustainability and thus responsibility.

In 2015, our goal as interns was to further community integration into the monitoring program. So doing, we seek to [1] simultaneously avoid the marginalization of local communities and add holism and greater legitimacy to our research by giving attention to different bodies of knowledge, sets of needs and experiences; [2] bring greater potential efficacy in terms of influencing and guiding state and corporate policy (i.e. furthering integrated situation management decisions) by cost-effectively gathering a wide range of data; as well [3] assist in guaranteeing the long-term participation of community members in the program itself and therein the mutual sustainability of the monitoring process and the mine's operations.

To advance toward this objective of integration during our four months of work, we held a series of informative and interactive community meetings in San José del General, worked with interested locals to establish a plan for a community-based water monitoring group, and gained the participation of the community in the PFSS mine monitoring week. As well, throughout the semester, we focused on brainstorming ways to overcome barriers to communication via the dimensions of collaboration, coordination, and visualization.

It is important to keep in mind that this project is still in its scoping years. Therefore we expect that there are flaws in our methods and concepts, but we must be attentive to these and willing to try new strategies in order to improve and become sustainable for the long-term.

As a whole, this long-term monitoring program seeks to reverse the negative trends in development seen around the world. It intends to provide communities, governments, researchers, and companies a means and reason to come together and discuss issues in a productive manner. This project seeks to act as an impetus for greater sustainability and responsibility in research and development practices and theory around the world by opening a safe zone for discussion, critique, and learning.

Resumen Ejecutivo

La extracción a gran escala mineral es una actividad intrínsecamente quebrantadora. Esto implica la creación de hoyos masivos en la superficie de la tierra, desalojando materiales crustáceos, la interrupción de ciclos naturales, y posiblemente la dislocación de la gente y animales. En un mundo donde la población humana y niveles de consumo están aumentando, también la necesidad de mejorar daños y perjuicios irreparables a ecosistemas causados por las actividades de la economía humana están creciendo. La minería no necesitaría dañar los sistemas en que la vida depende. Es necesario que la práctica y la mentalidad de minería sean responsables para que las operaciones aseguren una ventaja óptima neta para recibir países y ciudadanos a largo plazo con impactos medioambientales y sociales más bajos.

¿Aún, cómo pueden estos tipos de la responsabilidad y la responsabilidad ser garantizados? La experiencia de operaciones extractivas en el mundo durante las pocas décadas pasadas ha sido mixto en términos de proporcionando ventajas económicas y sociales las empresas prometen a ciudadanos locales y gobiernos. El acompañamiento de esta historia mixta es una cambio de los ideales en el proceso de desarrollo. La filosofía

de necesidades básicas y desarrollo humano, la voz creciente de grupos indígenas y abogados de derechos humanos en la arena internacional de política, así como un cambio de normas en la sociedad civil hacia una expectativa de justicia social y ambiental mayor han estado trabajando juntos para legitimar las formas participativas de desarrollo e investigación.

El ímpetu para el estudio a largo plazo que supervisa la minería en Donoso es del reconocimiento para una nueva configuración de la relación entre actividades a gran escala industriales, como la minería, y las comunidades biofísicas y humanas en las cuales ellos funcionan. Un componente esencial en el establecimiento de una nueva relación entre estos actores y en la generación de un nuevo dinámico para el desarrollo moderno es abre nuevos canales para participación, comunicación, y información. Por recogiendo datos a lo largo de 30 años, la evaluación de supervisión tiene la intención de actuar estos dinámicos nuevos. Esto proporcionará una fuente independiente de información sobre cambios del medio ambiente biofísico y humano que puede ocurrir con tiempo con las operaciones de Panamá Cobre y Petaquilla Gold. Cada año, un grupo de estudiantes del Semestre de Estudios de campo de Panamá (PFSS) y un grupo de investigadores montará datos sobre [1] el estado de agua en los ríos; [2] los cambios socioeconómicos de las comunidades adyacentes a los proyectos de minería, [y 3] cambios de ecología humana y empleo de tierra.

Las fundaciones para este programa largo plazo fueron creadas en 2014 con el trabajo de dos internas en PFSS, Courtney Quinn y Jeanne Pouliot con la supervisión de un profesor de la Universidad McGill y especialista en la historia ambiental de América Latina, Daviken Studnicki-Gizbert. El programa es apoyado institucionalmente en Panamá por INDICASAT, la Universidad Santa María de Antigua (USMA), y el Instituto de investigación Smithsonian Tropical (STRI). Iniciado en 2014 bajo Foro de Sostenibilidad, el proyecto puede sido visto como la parte de una nueva oleada de atención en Panamá hacia prácticas que se mejoran en el desarrollo, en particular aquellos la regulación y la supervisión de actividades de minería, con un foco en la aseguración de la sostenibilidad y así la responsabilidad.

En 2015, nuestro objetivo como internas eran mejorar la integración de las comunidades en la programa de supervisión. Tan haciendo, buscamos a [1] simultáneamente evitan la marginalización de comunidades locales y añaden holismo y la legitimidad mayor a nuestra investigación por prestando atención a los cuerpos diferentes de conocimiento, juegos de necesidades y experiencias; [2] traen la eficacia mayor potencial en términos de influencia y dirección de la política estatal y corporativa (p. ej. la fomentación de decisiones de la dirección de situación integradas) por rentablemente la reunión una amplia gama de datos; también [3] ayudamos en el hecho de garantizar de la participación a largo plazo de miembros de comunidad en el programa sí mismo y allí a la sostenibilidad mutua del proceso de supervisión y las operaciones de la mina.

Para alcanzar este objetivo de integración, sostuvimos una serie de reuniones informativas e interactivas en las comunidades de San Jose del General, trabajó con vecinos interesados para establecer un plan para un grupo de supervisión de agua a base de comunidad, y ganó la participación de la comunidad en la mía semana de supervisión PFSS. También, a lo largo del semestre, enfocamos la reunión de reflexión caminos de

vencer barreras a la comunicación vía las dimensiones de colaboración, coordinación, y la visualización.

Es importante tener presente que este proyecto es todavía en sus años de mirando y planeando. Por lo tanto esperamos que haria defectos en nuestros métodos y conceptos, pero es necesario que estemos atentas a estos y que intentemos nuevas estrategias para mejorarse y hacerlo sostenible para el a largo plazo. Por lo tanto, mientras nos gustaría construir la consistencia y una base estable para el programa, es esencial que nosotros recibamos la crítica y estamos atentas a probemos nuevas estrategias en esta temprana fase.

En total, este programa a largo plazo trata invertir las tendencias negativas en el desarrollo visto en el mundo entero. Esto tiene la intención de proporcionar comunidades, gobiernos, investigadores, y empresas un medio y una razón de juntarse y hablar de cuestiones en una manera productiva. El propósito de este proyecto es de actuar como un ímpetu para la sostenibilidad mayor y la responsabilidad en prácticas y teoría de investigación y desarrollo en el mundo entero.

Project Work Days:

San José del General: 23

Panama City: 24

Overview

The literature review in this paper will be divided into two sections: 1) On the context of resource exploitation and 2) community-based participatory research. The following sections seek to outline the processes taken in the monitoring program thus far and those recommended for future years.

I. Context: the Changing form of Resource Extraction

Mineral resources have a long history of extraction and utilization by human societies as a means of signifying status and engaging in cross-cultural interaction. The use of precious metals such as gold, silver, and copper stretches from Paleolithic times to the twenty-first century, in which these metals appear mainly in jewelry, electronics, and currency. These extractive activities, typically at a small or artisanal scale, have always had both environmental and economic costs and benefits. Following the early twentieth century Industrial Revolution, however, these mining activities and the range of their impacts changed in form and distribution: scaling up and increasing in scope.

These trends relate to the current geological epoch known as the Anthropocene, the era in which a certain 'sociometabolism' determined by the size of the human population, post-industrial patterns of consumption, and a conscious manipulation of the environment appears to wield influence over natural cycles.^{1, 2} As evidence, observers point to mass extinction events and biodiversity loss, climate change, rises in water and surface temperatures, and what some deem an overall increase in the vulnerability of the natural world. What is at play is a fundamental imbalance between the size of the human economy and the resources available within the earth's ecosystem. Though mining is a longtime practice, "the idyll has shifted."³ Today there exists a vast array of literature supporting the notion that mining operations are included in the number of other large-

¹ R. Goodland, "Responsible Mining: The Key to Profitable Resource Development," *Sustainability* 4 (2012): 2099-2126.

² M. Fischer-Kowalski, Krausmann F., and Pallua I., "A Sociometabolic Reading of the Anthropocene: Modes of Subsistence, Population Size and Human Impact on Earth," *The Anthropocene Review* (2014): 8-33.

³ Goodland, "Responsible Mining," 2099.

scale human activities causing social and environmental disruption.⁴ From protests, displacement, and impoverishment, to acid mine drainage (AMD), fish kills, and erosion, the experience in multiple ecosystemic communities surrounding large-scale mining operations has of late been infused with a heavy cost burden and fleeting benefits. In order for mining to remain a viable economic activity, it must readjust its operations to encompass the aggregate scale of the industry and to reflect the limitations of living in a world with finite resources.

II. Shifting the Discourse on Development

There is a movement in the academic world of economics, driven in part by the sub-field of ecological economics, toward de-growth. The economists advocate a downscaling of economic activities and a philosophy that both respects and accounts for the limitations of biophysical systems. This movement joins a wave of recognition which began to take hold in the 1970s around the world about the importance of the concepts sustainability and resilience, and of redefining the economic strategy known as development.

Development as a strategy proposes a means of improving livelihoods and expanding economic opportunities through the harnessing of natural resources and capital. But as new perspectives (e.g., indigenous and female) gain purchase on this development dialogue, the costs and benefits accrued to ecosystemic and human communities through mineral extraction come under greater scrutiny. For instance, the Brundtland Report

⁴ S. Wickstrom, "The Politics of Development in Indigenous Panama," *Latin American Perspectives* 30 (2003): 43-68.; R. Goodland, "Strategic Environmental Assessment and the World Bank Group," *International Journal of Sustainable Development & World Ecology* 12 (2005): 111.; Goodland, "Responsible Mining," 2099.

released in 1987 by the World Commission on Environment and Development (WCED) promoted the concept of sustainable development, defining it as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”⁵ What is more, the report speaks of fair shares for future generations and those considered poor; the writing implies a need for equity and justice.⁶ Accompanying this revision of development is the contribution by economist Amartya Sen, champion of 'human development.' His work outlines a notion that human development (beyond the pure economic development of individuals or states) consists in an expansion of individuals' freedoms through the development process; enhancing their personal capabilities so that they may lead lives with value in and of themselves, lives complete with the ability to make decisions and exercise a degree of control over the course they might take.⁷

These academic shifts accompany a shift in global societal norms, as attention amasses about the need to protect not only the environment around large-scale development operations but also the people (particularly indigenous and future generations) who might not have a voice in the development process. Sustainable development must account for the ability of all to have a fair chance at development, or an equitable role in the process. There is recognition that while our future is shared, the direction taken to get there is perhaps guided by a limited vision. The McGill Research Group Investigating Canadian Mining in Latin America's (MICLA) article on *Mining and Development* highlights the

⁵ McGill Research Group Investigating Canadian Mining in Latin America (MICLA), "Mining and Development," accessed April 24, 2015

⁶ "Our Common Future," *Brundtland Report*, WCED, (1987)

⁷ Amartya Sen, "Development as Freedom," *Oxford University Press* (1999).

work of Arturo Escobar in being extremely influential in this growing critique of development. His work highlights the concept of development as a Western discourse which leads to marginalization of Global Southern citizens by perpetuation of certain values.⁸ This is to say, that as a greater number of [non-governmental organizations, academics from throughout the Global South, and civil society as a whole] become involved in the creation of protocols and international institutions, including norms, the dialogues around mineral extraction have come to include issues of environmental, social, and intergenerational justice. There is recognition that inequitable development and asymmetrical power relations are related to such issues as corruption, exploitation, negligence, and overall social [discord.]⁹ To add, Veiga, Scoble and McAllister state that "social instability and discontent ... can play a far greater role in determining the ultimate success of a mining operation than had been historically calculated in mineral investment decisions," companies must learn to pay proper credence to the entirety of variables in their operating environment.¹⁰

III. Establishing a Common Language and Value

As an extractive industry, mining inherently depletes a stock (non-renewable) resource. While minerals themselves cannot be preserved or maintained over time, the focus of sustainability in the mining industry must be on the surrounding biophysical environment and human and animal communities that make this their home. According to George Francis, sustainability refers to "an ethical commitment based on a belief that the natural

⁸ MICLA; Arturo Escobar, "Encountering Development: The Making and Unmaking of the Third World," *Princeton University Press* (1994).

⁹ Goodland, "Responsible Mining," 2009.

¹⁰ M.M. Veiga, Scoble M, and McAllister M.L., "Mining with Communities," *Natural Resources Forum* 25 (2001): 198.

world and its component life forms, including humanity, have value in and for themselves."¹¹ Sustainability is not just a way of doing things, but also an ethical and philosophical consideration.

As the world around them changes, mining companies must respond. These companies are accountable not only to their shareholders, but also to the local, statewide, and international communities within which they operate. As these actors come to demand greater responsibility, accountability, and sensitivity from mining operations, a response is necessary or else profits will suffer and costs will increase. In the special series on mine closure released by the Natural Resources Forum, Veiga, Scoble, and McAllister give support to this, saying, "Investors, insurance companies, banks, governments, and citizens increasingly want little to do with an industry that is seen as indifferent to the present and future socio-economic and biophysical welfare of local communities."¹² The International Council on Mining and Metals (ICMM), the Prospectors and Developers Association of Canada (PDAC), the Initiative for Responsible Mining Assurance (IRMA) and the World Bank, among others have also espoused a commitment to ensuring a greater sense of responsibility in extractive operations.¹³ Where long-term reputation, credibility, and ultimately business are at risk, mining companies must adjust their activities according to these new expectations and recognize that the interests of their business and society must and can be compatible.

¹¹ Veiga et al, "Mining with Communities", 200.

¹² Veiga et al, "Mining with Communities," 191.

¹³ Initiative for Responsible Mining Assurance. Accessed March 30, 2015.

<http://www.responsiblemining.net>; International Council on Mining & Metals. "Engaging with Society – ICMM Annual Review 2014." Accessed March 30, 2015. <http://www.icmm.com> ; Prospectors and Developers Association of Canada. Accessed March 30, 2015. <http://www.pdac.ca> ; The World Bank. Accessed March 30, 2015. <http://www.worldbank.org>

According to Goodland's work on responsible mining, taking heed of this social pressure can actually offer companies "quicker and bigger profits, with no conflicts with surrounding communities and with fewer impacts than irresponsible mining."¹⁴ By taking preemptive steps to avoid loss-inducing messes and to increase the trust of ethically minded investors and governments, mines can potentially increase their net profit and stock price at the same time as increasing the net benefit to the host country over the long-term by inflicting the lowest social and environmental costs.¹⁵ For Goodland, the term "responsible" signifies "having a capacity for moral decisions and therefore being accountable; liable to legal review or, in case of fault, to penalties; based on or characterized by good judgment; and honest, reliable, and trustworthy."¹⁶ Decisions and judgment on the part of companies, governments, and citizens requires accurate and reliable information. Therefore, the basis for a relationship of trust and responsibility between mining companies and the public is the availability of information and communication.

With this established, it must be noted that minerals are public assets and thus despite their physical location within privately granted concessions or identification as part of the national patrimony, "their exploitation must be transparent, participatory and subject to informed scrutiny by civil society."¹⁷ Through increasing transparency of companies actions and logic, inviting everyday citizens to become a part of the decision-making

¹⁴ Goodland, "Responsible Mining," 2100.

¹⁵ Goodland, "Responsible Mining," 2103

¹⁶ Goodland, "Responsible Mining," 2102

¹⁷ Goodland, "Responsible Mining," 2100

process through informed debate and participatory development, a greater degree of information and communication can be facilitated. By creating an open dialogue and basis for constant communal participation and interaction, mining companies also enhance the sustainability of their operations by gaining a better understanding of the benefits and risks of their actions and allowing communities to have a direct influence over their futures and use of their resources. By opening up a direct pathway for feedback, companies can potentially avoid conflicts, feelings of exclusion, and oversight as to possibilities for adjusting and adapting company strategies. For Veiga, Scoble and McAllister, the ability to engage in an "equitable partnership" with the associated community is a key hurdle in establishing a viable presence.¹⁸

IV. Strategies for Improvement

The following questions arise: what is the best form in which mining companies can engage with communities to form such an equitable relationship? How can mines become sustainable and responsible to the human and biophysical communities in which they work? How can trust and responsibility be fostered; parameters of ecosystemic integrity respected? How can a net benefit be attained for both the community and company in the long-term?

Could the solution to all these questions be the same? Could participatory development, involving the practices of community-based monitoring and notions of citizen science be a basket-solution for the troubled relationship between mining companies and citizens?

¹⁸ Veiga et al, "Mining with Communities," 192

Participatory strategies in development have been growing in popularity since the 1970s with the upsurge of the basic needs approach (BNA). Closely related to Sen's before-mentioned work on human development, the BNA depends on a context-specific assessment of a given community. Thus this approach relies on more thorough interaction and consultation with community members to gain insight into the conditions that define their capabilities before designing policy; individuals must have a voice in the development process if they are to avoid being impoverished and marginalized. To reconcile conflict deriving from divergent understandings between the local community's understanding of development and a development envisioned by international or corporate actors, mining companies must engage in more substantive dialogue with local communities through strategies of participatory development.¹⁹ Participatory development is responsible development. Communication and transparency open mining companies--their logic and their actions--to active critique by citizens, governments, and other interested individuals. Thus, these companies also open to improvement.

One of the most important aspects of responsible and sustainable development, relating also to the production of reliable information, is an environmental and social impact assessment (ESIA) conducted prior to any large-scale industrial activity such as mineral extraction. The main of an ESIA is to internalize all social and environmental costs and to use full-cost pricing to determine whether a project is economically feasible.²⁰ However, these assessments are not always done, nor done correctly, and oftentimes can be conducted under contract by the operating company itself or a mining industry proponent,

¹⁹ MICLA

²⁰ Goodland, "Responsible Mining," 2103

thereby raising the question of bias. As noted in a report constructed by Pouliot and Quinn (2014), limitations of ESIA's include foremost the reliability of baselines; bias according to who conducts the assessment (as they may deliver only a partial view of impacts, as well may selectively chose and identify parameters for measurement); that these studies are typically only ever done once and not conducted as a follow-up post-project approval; may show a lack of attention to scale of operations (e.g., commodity cycles left out of social sustainability/long-term profitability calculations); and finally, the form and process of documentation is often inaccessible to local communities.²¹ Following a discussion of these limitations, the authors Quinn and Pouliot conclude that perhaps an intermediate solution to this riddled process of assessment, which can sideline citizens and other potential commentators, is a long-term monitoring program "as a form of EIA follow-up."²² This report seeks to add to their discussion of what this sort of program would look like in the context of the Cobre Panama mine.

V. Reasons for the Monitoring Program

The long-term mine impact monitoring program, officially launched in 2014 under the guidance of McGill professor Daviken Studnicki-Gizbert and with the work of Courtney Quinn and Jeanne Pouliot, aims to provide independently funded and conducted information on the changes occurring in the biophysical and human environments surrounding the mining operations in the Panamanian district of Donoso. Here, independence signifies that though the program intends to be inclusive to all stakeholders, it will not be funded by the Panamanian government nor mining industry.

²¹ Courtney Quinn, and Jeanne Pouliot, "Long-term Monitoring Impact Assessment of Mining Activity in Panama," *McGill University* (2014): 10-12

²² Quinn and Pouliot, "Long-term Monitoring," 12

The program receives institutional support in Panama through INDICASAT, la Universidad Santa Maria de Antigua (USMA), and the Smithsonian Tropical Research Institute (STRI). Initiated in 2014 under the Foro de Sostenibilidad, as part of a new wave of attention in Panama toward improving practices in development, particularly regulating and monitoring mining activities, with a focus on ensuring sustainability, this program falls under the *Foro's* interests in a greater amount of reliable public information on matters related to development and large-scale projects. By conducting observations in the socio-physical environment around the Cobre Panama mine for 30-years, the duration of the mine's operating and post-closure years, the assessment intends to provide an independent and reliable source of information on changes occurring within the physical environment and everyday lives of people in the area. As well, researchers involved in the program will be positioned to act as liaisons between communities and government bodies, thereby strengthening the processes of feedback that occur between the two and potentially contributing to increased efficacy and responsiveness in decision- and policy-making.

What is more, the program intends to be carried out in an integrative manner: incorporating community members into the various steps of monitoring and evaluation. This entails adopting some of the policies and theory of citizen science, which involves "making non-experts an integral part of the scientific process."²³ While in 2014 Pouliot and Quinn concentrated on the basic of conducting an environmental impact assessment and setting up the framework for long-term monitoring, including such activities as

²³ B. Lewenstein, "What Does Citizen Science Accomplish," *Cornell University* (2004)

consultation with local and national stakeholders,²⁴ this year, the focus of the project was to look for ways to open the project to a greater dimension of community participation with a focus on aspects related to improving communication.

VI. Strengths of Community-Based Research

Community-based participatory research (CBPR), as the approach is known in health and environmental research, is growing in popularity due to the value it adds for both researchers and communities.²⁵ This school of research [parallels] citizen science in its focus on local ownership and production of knowledge as well as highlighting the aspect of personal and communal enrichment that come with scientific understanding.²⁶ As Conrad and Hilchey (2010) state, one of the reasons for integrating citizens into monitoring programs is to fill in a data 'void' and add richness to the work being done.²⁷ This added value and ability refer to the creation of bridges between scientists and communities through the use of shared knowledge and valuable experiences;²⁸ the development of culturally appropriate measurement instruments which may lead to the increased efficacy and efficiency of projects;²⁹ an increase in methods and definitions used to identify problems;³⁰ the establishment of mutual trust which can enhance the

²⁴ Quinn and Pouliot, "Long-term Monitoring", 1-106

²⁵ M. Viswanathan, A Ammerman, E Eng, G Garlehner, KN Lohr, D Griffith, S Rhodes, C Samuel-Hodge, S Maty, L Lux, L Webb, SF Sutton, T Swinson, A Jackman, and L Whitener, "Community-Based Participatory Research: Assessing the Evidence: Summary," *Agency for Healthcare Research and Quality, Evidence Report Summaries* (2004): 1.

²⁶ Lewenstein, "What Does Citizen Science Accomplish," 1

²⁷ Cathy C. Conrad and Krista G. Hilchey, "A Review of Citizen Science and Community Based Environmental Monitoring: Issues and Opportunities," *Environmental Monitoring Assessment* 176 (2011): 273.

²⁸ Viswanathan, "Community-Based Participatory Research," 10

²⁹ Viswanathan, "Community-Based Participatory Research," 15

³⁰ P. Brown, "Popular Epidemiology and Toxic Waste Contamination: Lay and Professional Ways of Knowing,"

quantity and quality of data collected as well as the research experience of all participants;³¹ and what Viswanathan *et al.* (2004) dub the "ultimate benefits": a deeper understanding of a community's unique circumstances and with this, a more accurate framework for testing and adapting best practices to a community's needs.³² This lends itself to the claim that the participatory processes and aspects involved in CBPR (also known as participatory or community-based research or citizen science, among other titles) can increase the decision-making abilities of all those involved in a situation or project, including researchers, policy makers, and communities alike.³³ This is to say, the integration of a community into a long-term research program can add multi-dimensional richness to a project. By becoming more adaptive and iterative, this approach can serve to enhance information and strengthen partnerships amongst stakeholders and institutions themselves.

Capacity Building: CBPR, Sustainability, and Resilience

Given the context of the dialogue headed by the Foro de Sostenibilidad in Panama and the growing interest in this notion of sustainability worldwide, the involvement of community members can be interpreted as adding resilience both the project itself and to the community as whole in the long-run. While an originally ecological concept, sustainability also refers to "an ethical commitment based on a belief that the natural world and its component life forms, including humanity, have value in and for

Journal of Health and Social Behavior 33 (1992): 273.

³¹ Viswanathan, "Community-Based Participatory Research," 10; Quinn and Pouliot, "Long-term Monitoring", 18

³² Viswanathan, "Community-Based Participatory Research," 1

³³ Marisol Estrella and John Gaventa, "Who counts reality?: Participatory Monitoring and Evaluation: A Literature Review," *Brighton: Institute of Development Studies* (1998): 5.

themselves."³⁴ Sustainability therein requires the recognition and preservation of multiple forms value.

In their paper, *Mining with Communities*, Veiga, Scoble, and McAllister (2001) address the issue of mining as a sustainable option for community development. In their discussion, the authors highlight not only the importance of conducting an EIA to constitute a commitment by companies to local environments and communities, but also of the benefits toward sustainability achieved through a prolonged involvement of the community by companies through consultation and capacity building.³⁵ Here, the authors actually suggest a more fundamental change in the logic of development projects, one "related to the questions of power, resources, and control" that might address issues of social equity, saying, "Until community members themselves feel that they are partners in decisions that intimately affect their own lives and the environment in which they live, little progress on the path to sustainability will be achieved."³⁶ In order for development to be sustainable, it must be a collaborative effort. By marginalizing or ignoring values and voices, policy and project planners risk inequity, instability, and decreased resilience. Following Veiga, Scoble, and McAllister (2001), "Adaptability, flexibility, responsiveness, and respect for people and the biophysical environment... are the principles upon which future mines need to be built if they are to follow a more sustainable path."³⁷

³⁴ Quinn and Pouliot, "Long-term Monitoring", 1-106

³⁵ Quinn and Pouliot, "Long-term Monitoring", 55-106

³⁶ Quinn and Pouliot, "Long-term Monitoring", 80-106

³⁷ Veiga, et al, "Mining with Communities," 201

Sustainable development is an espoused goal of both the state of Panama and the company Minera Panamá as well.³⁸ As these two parties aim to ensure the longevity of their operations and biophysical environment, perhaps they should take heed of Veiga, Scoble, and McAllister's (2001) point that sustainability is not merely a "technical difficulty" to be tackled, but instead requires a different philosophy for operating and understanding situations.³⁹ This relates to the premise of J.I. Barnes *et al.* (2011) that in order for projects to be locally inspired and relevant, or successful in the long-term, they must be compatible with local logic or the cultural context in which they operate. If sustainable development entails 'increasing standards of living' (as proposed by the company), both this increase and standard of living must be compatible with locals' understanding of these concepts.⁴⁰ To ensure this, we suggest incorporating community members into conversations about the mines' objectives as well as our own parameters for assessing the 'socioeconomic situation' or quality of livelihoods. As described in Brown's paper on popular epidemiology, citizen science (or CBPR) encompasses for "lay ways of knowing" that are overlooked by traditional scientific approaches.⁴¹ By bringing all stakeholders (community members, researchers, and company representatives) into a common discourse should help avoid feelings of marginalization and in fact bestow a sense of control over the direction of their future for individuals.⁴²

³⁸ S. Wickstrom, "The Politics of Development in Indigenous Panama," *Latin American Perspectives* 30 (2003): 43-68; "Transformando la riqueza mineral en desarrollo sostenible," <http://www.convencionminera.com/perumin31/encuentros/topmining/martes17/1730-steven-botts.pdf>, Accessed March 30, 2015.

³⁹ Veiga, et al, "Mining with Communities," 201

⁴⁰ Jeffrey Ivan Barnes and John E. Wall, "Missed Understandings: Cultural and Communication Disconnects in Indigenous Livelihood Revitalization and Conservation," *Society and Natural Resources* 24 (2011): 972-983.

⁴¹ P. Brown, "Popular Epidemiology and Toxic Waste Contamination: Lay and Professional Ways of Knowing," *Journal of Health and Social Behavior* 33 (1992): 270

⁴² J. F. Gerber, F. Adaman, D. Avcı, C. I. Aydın, G. U. Ojo, B. Özkaynak, B. Rodríguez-Labajos, P. Roman, and I. Yáñez, "Socio-Environmental Valuation and Liabilities: What Strategies for EJOs," *EJOLT* No. 13. (2014): 13

Democratization of Knowledge

From this perspective, the essential element of CBPR--cumulative, collaborative knowledge generation--should be clear in its benefits to the operating company as well as the state and its citizens. Conrad and Daoust, citing Burgos *et al.* (2013) point out that the actual experiences of data collecting and analyzing build a base of communal scientific knowledge beyond the limits of academia and professional expertise.⁴³ Citizen involvement with ecological monitoring acts to enhance scientific understanding and *democratize* science by providing participants with opportunities to generate scientific knowledge themselves;⁴⁴ therein "extending and enhancing scientific communities."⁴⁵

This accumulation of knowledge coincides with the recognition by some governments and policy-planners that CBM can be used to involve stakeholders and citizens in planning and management⁴⁶ as citizens themselves seek opportunities to learn more about the environment.⁴⁷ This builds on the discussion earlier of the iterative value of CBPR. According to Conrad and Daoust (2007), knowledge generated from community-based monitoring processes can be used as a tool for education and public-awareness campaigns.⁴⁸ Indeed, Functowicz and Ravetz (1994) go so far as to extend this argument

⁴³ Catherine T. Conrad and Tyson Daoust, "Community-Based Monitoring Frameworks: Increasing the Effectiveness of Environmental Stewardship," *Environmental Management* 41 (2007): 360.

⁴⁴ Pollock and Whitelaw, "Community-Based Monitoring," 213

⁴⁵ Pollock and Whitelaw, "Community-Based Monitoring," 214

⁴⁶ M. Cuthill, "An Interpretive Approach to Developing Volunteer-Based Coastal Monitoring Programmes," *Local Environment* 5 (2000): 127–137.

⁴⁷ Lukasik, L. M. "Volunteer environmental monitoring groups: community-based water quality monitoring in the Gulf of Maine Watershed." *Master's dissertation, Dalhousie University, Halifax, Nova Scotia* (1993).; J. Bliss, Aplet, G., Hartzell, C., Harwood, P., Jahng, P., Kittredge, D., Lewandowski, S. & Soscia, M. L. "Community-based ecosystem monitoring." *Journal of Sustainable Forestry* 12 (2001):143–167.; Cuthill, "An Interpretive Approach," 128-130; Pollock and Whitelaw, "Community-Based Monitoring," 211.

⁴⁸ Conrad and Daoust, "Community-Based Monitoring," 363.

to suggest that citizens become 'knowledge generators' themselves, a process witnessed in those communities that undertake ecological monitoring.⁴⁹

For our program of community-based monitoring in particular, the democratization of knowledge that occurs through community involvement is important because it aids in transcending the barriers between ourselves as researchers and the community members as subjects. Paraphrasing Pollock and Whitelaw (2005), community-based monitoring aids in dissolving expert/lay dichotomies perpetuated through the methods of dominant science. Where we seek to create a sustainable long-term monitoring assessment that is holistic in the data it collects as well as non-marginalizing toward the communities in which it operates, the inclusion of communities in the monitoring processes is essential.

Cutting Cost but not Worth

The attraction to CBPR is due in part to the robustness multiparty participation can bring to data and the research process as before stated. Yet, in reference to Canada, a number of authors also point to the increase of community-based monitoring (CBM) due to reasons including "public and non-governmental organization (NGO) concern over government's capacity to monitor ecosystems in light of severe cutbacks in environmental programs;"⁵⁰ and individual government departments' incapacity to carry out monitoring alone or address increasingly complex and emerging environmental and sustainability issues.⁵¹

⁴⁹ S.O. Functowicz and Ravetz, J. R., "Uncertainty, Complexity and Post Normal Science," *Environmental Toxicology and Chemistry* 13 (1994): 1881-1885.

⁵⁰ Pollock and Whitelaw, "Community-Based Monitoring," 211-228

⁵¹ Hague Vaughan, and Graham Whitelaw, Brian Craig, and Craig Stewart, "Linking Ecological Science to Decision-Making: Delivering Environmental Monitoring Information as Societal Feedback," *Environmental Monitoring and Assessment* 88 (2003): 399-408.

Therefore, because CBM can provide governments with the potential for a cost-efficient way to increase its monitoring capacity,⁵² and capacitate citizens to collect, analyze, and disseminate data, CBM can serve as an alternative for those scientists and government agencies that require data but lack the resources to collect them.⁵³ This is directly relevant to the situation in Panama, given the government's demonstrated difficulties in monitoring the activities of the Santa Rosa and Molejon mines and ANAM's dubitable capacity to assess the potential impacts of Cobre Panama.⁵⁴ Through the implementation of a community-based mining impact assessment we seek to support an alternative method of development and research to the country of Panama and most specifically to the communities of San José del General so that they might participate in and redefine their experience of development.

Social Capital

For Doyle and Craig, the most important aspect of CBPR is the shared learning process and experience of all those involved.⁵⁵ This group interaction spills over into other areas of communal integration, building local social capital consisting of "the links, shared values and understandings in society that enable individuals and groups to trust each other and so work together."^{56, 57} In a community setting such as San José del General, social capital is especially important. The little campesino towns of this area not

⁵²Conrad and Daoust, "Community-Based Monitoring," 358

⁵³ Conrad and Daoust, "Community-Based Monitoring," 367

⁵⁴ Simms, R. & Holtby, D., "The Pillage of Panama: How multinational mining companies are rupturing Panama's environmental and social fabric," (2012).

⁵⁵ Brian Craig and Marlene Doyle, "Linking Community-based Ecosystem Monitoring to Local Decision-Making and Policy Development on Sustainability," *Parks Research Forum of Ontario (PRFO) Proceedings* (2003):186

⁵⁶ OECD. Accessed February 18, 2015. <http://www.oecd.org/insights/37966934.pdf>

⁵⁷ Conrad and Daoust, "Community-Based Monitoring," 358

particularly wealthy in the western sense of capital-based wealth nor do they have particularly plentiful supplies of social capital. Ever since the entrance of mining to these communities, households have felt a growing divide between those for and against extractive activities.

If a community-based long-term monitoring program could facilitate dialogue and interaction between these interested but estranged parties, it could therefore have a large role in ameliorating negative tension and social deterioration within these unstable and divided communities.

Summation of Logic for CBPR Implementation

Though a community-based long-term socio-environmental mining impact assessment is of yet unprecedented, these components have come together in our monitoring program. An impact assessment in the biophysical communities surrounding Cobre Panama can provide an independent and reliable source of information to the people, state, and company itself throughout the duration of the mine's operations. This is warranted by the concern voiced in the past about the responsibility and monitoring work of governments and mining companies (see *Section III*, this paper). This program intends to be community-based in order to reap the benefits previously discussed (*Section VII*, this paper), but which can be summarized as the following. The community-based monitoring assessment outlined in this paper proposes an alternative framework for development, research, and evaluation which seeks to avoid marginalization of local communities by

giving attention to different bodies of knowledge; to add legitimacy and holism to research and evaluation by bringing attention to a greater set of needs and experiences; to bring greater potential efficacy in terms of influencing and guiding state and corporate policy (i.e. furthering integrated situation management decisions) by cost-effectively gathering a wide range of data; as well as to assist in guaranteeing the long-term participation of community members in the program itself and therein the mutual sustainability of the monitoring process and the mine's operations.

Last year the scoping phase of the program commenced (first five years), this year, as part of the task of assembling a sturdy framework for the project, a guiding question we asked ourselves was how can community-based (i.e. citizen or participatory) monitoring work in a context like San José del General?

VII. How to Implement CBPR: A Basic Breakdown

Based on a literature review, a basic list of components and steps on how to conduct a community-based monitoring program can be assembled.⁵⁸

As defined by Estrella and Gaventa (1998), 'participatory monitoring and evaluation,' a main component of community-based participatory research, is a "Process of evaluation of the impacts of development interventions carried out under the full or joint control of local communities in partnership with professional practitioners" in which, "Community representatives participate in the definition of impact indicators, the collection of data, the

⁵⁸ Note that this list does not promise to be fully comprehensive, especially due to the nascence of the field of community-based research.

analysis of data, the communication of assessment findings, and in post-assessment actions designed to improve the impact of development interactions in the locality."⁵⁹ Using pre-existing knowledge, abilities, interests, and networks, "Participatory evaluation builds on what people already know and do, using and developing people's current abilities and skills to monitor and evaluate their own progress."⁶⁰ Pollock and Whitelaw divide the implementation of participatory research into two general phases: 1) the establishment of a local CBM group or network—involving six related tasks: governance analysis; consultation and outreach; identification of champion(s); partnership development; fundraising; and selection of an appropriate organizational structure and 2) the implementation of CBM—launch CBM and ensure the data collected relevant to policy and able to influence decision making—including six tasks: community visioning; membership skills assessment; capacity building; monitoring; achieving influence; and communication.⁶¹

To break the process down farther Conrad and Daoust (and others) suggest the following:

- a) *A general and systematic framework*⁶², including:
 - 1) Clear objectives including the identification and communication of a community's information needs,⁶³ as a monitoring program should start with the end point to identifying the kinds of information managers and policy makers require to make informed decisions.⁶⁴
 - i. Conrad et al. (2007) support this in saying that,

⁵⁹ Estrella and Gaventa, "Who Counts Reality?" 7

⁶⁰ Estrella and Gaventa "Who Counts Reality?" 23

⁶¹ Pollock and Whitelaw, "Community-Based Monitoring," 214; tasks not necessarily in given sequence

⁶² Conrad and Daoust, "Community-Based Monitoring," 360

⁶³ Shrivastava S.R., Shrivastava P.S., and Ramasamy J. "Community monitoring: A strategy to watch out for." *Gateways: International Journal of Community Research and Engagement* 6 (2013): 175

⁶⁴ Conrad and Daoust, "Community-Based Monitoring," 362

"Without a comprehensive policy framework, there is little incentive for many of the stakeholders to participate in any sort of community group-led initiative, making it difficult for CBM groups to achieve their mandate and have their monitoring data considered by decision-making bodies. This unfortunately may lead to a loss of interest among volunteers caused by frustration that their efforts are going unheeded."⁶⁵ (Conrad et al 2007: 361)

- 2) Creating a local profile or situation analysis illustrating the dynamics between local stakeholders themselves and their resources.

b) *Collaboration, communication, innovative partnerships; building networks, trust and relations*

- 1) This may specifically consist of interdisciplinary, or multi-stakeholder, groups to consider the issues, perceptions, and problems of the broad community formed locally.⁶⁶
- 2) According to Pollock and Whitelaw: "...for effective information delivery, communication should be used at all levels and stages of CBM, both *internally* between participants and *externally* to media and the wider public. Educating people about the values of CBM, identifying local priorities and reporting back the results of monitoring rely on good communication mechanisms."⁶⁷
 - i. As, "in order to sustain citizen engagement and ensure data validity in monitoring, greater public understanding of science is often necessary: the success of CBM programs is linked with data analysis,

⁶⁵ Conrad and Daoust, "Community-Based Monitoring," 361

⁶⁶ Conrad and Daoust, "Community-Based Monitoring," 360

⁶⁷ Pollock and Whitelaw, "Community-Based Monitoring," 223

reporting and meaningful citizen engagement.⁶⁸

c) *Information delivery, capacity building, community mapping, governance analysis, participation assessment, and information gathering.*⁶⁹

1) The continuous process (before and throughout project) of community mapping and assessment of community participation and capacity building are related to *feedback mechanisms*; dialogue between source (researchers/analyzers/data collectors) and recipients (community at large) allow the process of CBPR to be adaptive and iterative.⁷⁰

The concerns and challenges to long-term CBPR predicted by the Pouliot and Quinn (2014) and Conrad and Daoust (2008)⁷¹, among others, include: loss of volunteer interest; lack of reliable funding; data fragmentation and inconsistency; questions of bias in data collection, evaluation and dissemination; incentives to entice participation of community members and academic support; and general lack of interest among decision makers in linking CBM data to the decision-making process.

The following sections will explore the implementation and difficulties faced thus far in the long-term community-based mining impact assessment program.

⁶⁸ Pollock and Whitelaw, "Community-Based Monitoring," 224

⁶⁹ Conrad and Daoust, "Community-Based Monitoring," 363

⁷⁰ Shrivastava et al, "Community Monitoring: A Strategy to Watch out for," 175; Vaughan et al., "Linking Ecological Science," 400-401

⁷¹ Conrad and Daoust, "Community-Based Monitoring," 369

VIII. Possibility for Integration in Coclesito

The first year of scoping for the project was 2014. In this year, the focus of internship duties was on the preliminary design of the long-term monitoring program. This included laying out the overall structure of the project and its pieces, such as the three dimensions of water quality, land-use, and socioeconomics that are examined during the PFSS-run monitoring week.

Despite recognition of the importance of communal involvement,⁷² there was minimal focus on actually improving community engagement. However, this was merely the project's first year. In the second year, our focus now has been on fine-tuning that preliminary project structure and continuing the scoping process by strategizing ways to increase this desired level community participation. Therefore, the focusing question this year was: how can community-based monitoring work in the context of San José del General?

I will first address the difficulties that we encountered during this stage of the scoping process, followed by a description of our methodology for confronting these difficulties and furthering the integrative nature of the project.

The geographic area of interest, San José del General, is broken into several smaller communities nestled on the Atlantic side of the Panamanian cordillera. These communities include Coclesito, Villa del Carmen, Los Molejones, San Juan de Turbe,

⁷² Quinn and Pouliot, "Long-term Monitoring," 5

Nazareño, and San Benito. In addition, there are two Ngäbe-Buglé (indigenous Panamanian) communities that exist deeper within the mining concession called Nuevo Sinaí and Chicheme. Though the current scope of our interactions has not reached these Ngäbe communities as of yet, a future aim of the project is to establish contacts in these areas and potentially initiate monitoring there.

The principal hurdle of a participatory monitoring project in the area of San José del General is communication—within and among the communities, as well as between the community members and ourselves. The difficulties with communication that we encountered can be broken into three main aspects: collaboration, coordination, and visualization.

Collaboration and Coordination

In our experience, collaboration and coordination go hand in hand, though they are not precisely the same. Both of these are limited most acutely by the physical constraints of the area, and may also be limited by inter- and intra-community divisions. The distances between the smaller communities as well as the lack of cellular telephone reception and/or internet service is a major limiting factor in any attempt to coordinate community-based projects and organize collaboration. Time and space effectively work to prevent the travel capable of bringing interested parties together. For instance, a meeting held between the communities, Minera Panamá, and local government representatives in Villa del Carmen was unknown to what could have been likely attendees in the more distant San Benito. Word of mouth, flyers posted on *tiendas* (small stores), serendipitous

encounters, sparse internet service, and lucky cell phone reception are the most commonly used modes of communication in the area.

Travel and communication difficulties can severely limit community interaction, and seem to result in a more disconnected community that isn't particularly conducive to sparking collaboration. Estrangement between these people can subdue [recognition] of a common grievance (e.g., water quality), and thus limit their ability to redress this effectively. Inter- and intra-community divisions that can and have arisen due to differences in politics, opinions, and personality over the past five decades also deter fruitful collaboration and communication. A main question for our project in this moment is thus how to find, facilitate, and connect the already interested and invested parties, as well as grow upon that preliminary base of communal involvement by further educating less-informed community members and gathering support from all age groups. This brings us to the issues involved with visualization.

Visualization

Due to the wide geographic spread of the communities, it is frequently difficult for members of each of the different communities to get an idea of the extent and type of impacts that might be caused by the mining activity. The absence of clear visualization promotes a dearth of understanding at the individual level of the scope of potential problems. Without proper comprehension of the whole picture, complacency and inaction on both the individual and communal level are much more likely.

Though other monitoring programs besides our own already exist in the area, community members have reported that the results of these programs are either not adequately distributed or else are inaccessible in some other way, most frequently due to obscure scientific language, length, or remoteness to the communities (e.g., the Cobre Panama ESIA is located around four hours away in Panama City). At this moment, other monitoring programs include tests done by Panama's Autoridad Nacional del Ambiente (ANAM), a governmental organization; Minera Panamá, the mine company itself; and AVANZAR, a Canadian company that is paid by Minera Panamá. None of these currently provide an entirely neutral and comprehensive picture of the area. We hoped to address the absence of result communication by making an accessible and reliable report at the end of our week of monitoring, to be returned to the communities within a few months. In order to gauge the optimal format for presenting results, we asked the community members who were present at our meetings before the week of monitoring to tell us what forms of information made the most sense to them and what type of publication (hard copy or web-based; short or long; picture or text-heavy) or verbal presentation would be of use to them.

IX. Advantages and Limitations

Though we were also limited to the same extent, if not more, by the physical restrictions to communication in San José del General, we found we could act as the impetus and a conduit for communication by means of several mechanisms.

Firstly, there are several baseline advantages of our presence. We found that the presence of foreigners wishing to study the area helps otherwise uninvolved community members get a sense of how large the scope and impact of Cobre Panamá really is. In other words, our presence has the ability to increase the community's attention to what might otherwise be an invisible issue.

In addition, we had the organizational advantage of being singularly focused on coordinating community participation and communication for the four-month duration of our involvement in the area. In contrast, residents of the area have a whole host of family, work activities, and everyday concerns to attend to which may hinder participating in a project such as ours. With this in mind and the knowledge that there are any number of possible pitfalls that community-based monitoring programs can be subject to, given a review of last year's report created by Quinn and Pouliot, we entered the second year of scoping. From this, we set out a program for improved community participation that involved the following methodology, each part of which was meant to combat some element of the difficulties outlined above.

VI. Attention to McGill's Ethical Requirements

As established in the previous year by Quinn and Pouliot, because aspects of our this project and methodology necessitate working with, interviewing, and surveying human subjects, we must adhere to the *Code of Ethics* of McGill University. During monitoring week while collecting data for analysis via interviews and surveys, we prefaced this interaction with a clear statement as to the purpose and objectives of our internship

project. We asked for interviewees' consent to use the information they gave us as well as to quote them or publish their name in our final report both verbally and through a signed indication. If information wished to be given anonymously or an interview halted, we made sure to follow this request as well.

XI. How to Encourage Participation: A Test Run

As stated in our literature review, there are a certain number of steps involved in implementing participatory research. The first broad step, as set out by Pollock and Whitelaw⁷³, is the establishment of a core Community Based Monitoring (CBM) group. According to Pollock and Whitelaw (as stated in *Section VII*), the process of actually implementing community-based monitoring involves six differentiated tasks, including governance analysis, consultation and outreach, identification of champions, partnership development, fundraising, and selection of an appropriate organizational structure.

However, our experience in the Coclesito was that several of these steps blended and overlapped, and so while almost all of the disaggregated tasks were addressed, they were not necessarily addressed in an individual or separate manner. In order to establish a core CBM group, or network of people that would be reliable and willing to participate, and who would self-identify as members of and champion our project, we began what could be deemed a process of community mapping. This can take two main forms: individual conversation and group meetings.

⁷³ Pollock and Whitelaw, "Community-Based Monitoring," 223

Community Mapping: Identifying Key Players

Through regular community meetings we hoped to bridge the physical and mental distance between the communities and foster communication and collaboration. We held at least one community meeting per month (four in total) in order to build and maintain interest, discussion, and confidence surrounding the monitoring project and the issues it seeks to address.

The first of these community meetings was organized by our initial contact in Coclesito, a woman named Pamela. This circumstance is particular as she was born and raised outside of the community, has previously worked for Minera Panamá, and also had a more extensive educational background in environmental sciences than the majority of community. As well, we were acquainted with her by chance of her prior involvement in PFSS in 2012. All of the following meetings were planned and coordinated solely by my partner and I.

The initial meeting was held in the community of San Juan de Turbe (location chosen by Pamela) and concentrated on introducing our monitoring project and our purpose. Unlike most of our later meetings, the invitation to this first meeting was not an open invitation to the communities at large, but instead was targeted at specific people that Pamela had reason to believe might be interested in our project. It included members of the municipal government as well as other active community members and totalled around fifteen people. This meeting proved to be extremely useful in identifying potential key actors

who later participated in our other meetings and monitoring week, and who might be anticipated to become more involved in following years.

We organized two further meetings with this original group. The second meeting was held in Los Molejones and consisted of a presentation about topics that the community members had been asked us to look into further after the first meeting, including the disturbances of large-scale mining on the water cycle, as well as a collaborative discussion about where the areas of greatest concern were, aided by maps of the area. In addition, we discussed what different pH levels meant, some of the types of water testing that were feasible for a community based program (e.g., physical tests and macroinvertebrate analysis), and how research into possible funding for a monitoring program could be started.

Though our long-term monitoring project also records land use and socioeconomic dimensions of change in addition to water quality, most of our meetings and discussions were focused on the water aspect, because this was overwhelmingly the main concern expressed by community members.⁷⁴

The third meeting with the smaller group proved to have been planned too far in advance (in early February for late March), and due to difficulties in communication, turnout was minimal. Attempting to organize these meetings was our first direct experience with what

⁷⁴ For more information on water monitoring, see [Section iv.](#) in the Appendix.

forms of invitation do and do not work, as well as how to plan for the logistics of attaining a projector, generator, and chairs (among other meeting necessities).

General Outreach

In order to spread the word about our project and attract other potential interested parties, we also organized four meetings in Coclesito, the largest of the communities in San José del General. These meetings occurred at random intervals over the space of four months due to our scholastic schedule, with approximately one meeting per month. Invitations to these '*foros*' were technically extended to every member of the surrounding communities, though due to difficulties in contacting people outside of Coclesito (see *Section VIII.*) most of our invitation efforts were concentrated in the Coclesito and Villa del Carmen area. The invitation process for these community-wide open forums was a multi-step process. We started by posting *avisos*, or flyers, on *tiendas*. At each stop, we would speak with the owner about the project and ask that they spread the word. Whether or not they followed through on this is unknown.

The other manner in which we spread the word in an attempt to garner interest and build attendance levels was by walking through the communities and handing out invitations to people that we encountered on the street, as well as going door to door. This generally occurred during early morning and evening hours when a greater number of people were likely to be around the houses. When approaching people to hand them an invitation, we would introduce ourselves and then, in a consistent manner, tell them about the long-term monitoring project and explain what the meeting would be about and why their

participation was important and greatly desired. Many of these face-to-face invitations turned into entire discussions about the opinions and experiences of those we were inviting. We also asked people that we invited to invite their friends and family, and we always attempted to contact people from previous meetings by whatever means they had provided us with, but face-to-face invitation and discussion proved to be our most reliable form of building community attendance at our community-wide meetings. We noted as time went on that the turnout at our meetings was largely composed of those with whom we had most recently spoken in person.

To increase attendance at meetings in the future, we would highly recommend that, if possible, meetings should be held with more regularity (set a date, hour, and place) so that community members might know when the meetings will occur without having to remember random dates or double check. As well, interns should be sure to arrive in the area early enough to invite and remind locals about the event and find a means of posting flyers enough ahead of time. Though we realise that given the intensive and hectic schedule of the Panama Field Study Semester that future interns might also find establishing this kind of regularity difficult.

The format of our meetings followed a general pattern, though the progression of each meeting varied slightly depending on who was in attendance. They consisted of an introductory presentation of the project and ourselves followed by more informal small-group conversation, and then a final wrap-up including any questions or ideas that had been raised and invited any final comments. The smaller group discussions were often *de*

facto, prompted by specific questions or concepts that we asked people to brainstorm about. Since there were frequently more attendees than there were the two of us, we would split our attention between groups in order to gather useful feedback, and answer any lingering questions. It was our experience that these smaller group discussions were the most productive part of the meetings in that they allowed for more open sharing of thoughts and concerns and allowed community members to engage with the information in a way that passively listening to a lecture-type presentation did not. Before calling an end to the meeting, we would set the date, time, and location of the next meeting by asking for a general consensus. We ended each meeting by giving out our contact information and the attendees for their contact information in return, if they wanted to give it.

Not to be overlooked in these meetings is the aspect of personal connection. After each meeting was formally over, we almost always spent a significant amount of time talking to the attendees, sometimes while waiting for transportation, building a relationship outside of our role as foreign researchers by asking them about their lives and sharing a little bit about ourselves. This also helped us to learn communal dynamics, where motivation for participation came from, and what role they might be able to play in a CBM group or other forms of community participation.

One of our biggest unforeseen obstacles in planning community meetings were the logistics involved. The basic aspects required to hold a productive meeting, such as chairs, a table, projector, projector screen, and a generator had to come from somewhere

within the community. This required knowing who would and could contribute these elements. Even when these things were located, transportation of them was occasionally tricky to coordinate. We planned ahead to borrow chairs from the Minera Panamá office or the Granja Alternativa, or else benches and chairs from surrounding houses were used. The Junta Comunal provided the generator for the projector several times.

XII. Monitoring

Another aspect of the project where participation of community members was pivotal was the week of April 7-12, 2015, during which monitoring activities in San José del General took place. In order to garner community interest leading up to this week we detailed the breakdown of the monitoring activities into the three dimensions of water quality, land use/territory, and socio-economic changes at our other meetings; as well, spoke of monitoring with individuals encountered on the streets. Due to confidentiality concerns involved in the personal nature of the socio-economic surveys, the main areas where community member participation was needed were in the water monitoring and land use groups.

As a preliminary participatory activity, during meetings we used maps of the San José del General area, to ask for input as to where water tests might be considered most necessary, as well as asking where the best vantage points for repeat photography might be. Groups generally broke into smaller numbers, as many individuals did not feel they knew enough to mark points. In collaboration with attendees, they were more comfortable with the process, though on the whole the strategy seemed to be best suited for only a few people.

We asked for community members and volunteers who were interested in participating in or learning more about the monitoring activities to attend an introductory meeting on April 8 which also included the attendance of the PFSS students, McGill professors, and Panamanian students. On this day, they were able to identify in what capacity they would be willing to help. During this meeting the details and logistics of traveling to the different sites, guided and assisted by community volunteers, were decided upon. Teams of students and volunteers then visited the different communities over the course of 3 days, collecting data in the three dimensions of water, land-use, and socioeconomics. The methods used are detailed in the report from last year, but also can be found summarized (in Spanish) in the Appendix. As well, we have included a summary of the adjustments suggested by PFSS students to improve the methodology for the following year, as well as strategies to make the program more participatory.

XIII. Planning for Pitfalls

In organizing and creating our methodology this year we attempted to address the possible limitations that any community based research program is likely to encounter according to Pouliot and Quinn (2014) and Conrad and Daoust (2007).

Maintaining Interest

The first of these is loss of volunteer interest. Loss of volunteer interest is of special concern in a sustained long-term project. Humans in general are more likely to react to acute visible changes than the chronic effects that may occur in the area of San José del

General area due to mining which are possibly not immediately visible. Without a constant reminder or certain level of awareness, concern about issues can easily fade.

In addition, the monitoring program's current structure is such that a different set of interns and group of students visits the community only once a year for a relatively brief period of time, making it difficult to maintain some relationships and build trust. At the beginning stages of this project this particular problem is especially apparent, though hopefully with time the communities will come to expect our visits and retain [awareness]. Thus, time and a dependable and sustained interaction will be the biggest asset in building trust within the communities and establishing our reputation. This is a community that has seen many development initiatives come and go without any direct benefits; their expectations of us at this moment are low. It is of utmost importance that all promises are kept throughout the years, both in big matters and small. Lack of volunteer interest could also be impacted if the project is perceived as unnecessary or unhelpful. We attempted to discourage this possible perception by working to educate the community, through our meetings, discussions, and other interactions about the possible long-term effects of mining projects of this scale and by addressing topics that they specifically expressed interest in, so that the desire to learn the information we were providing was might stem from the community members themselves.

Fragmentation and Inconsistency

A second possible concern is data fragmentation and inconsistency. We recognise that data management is an integral component of any research initiative. The role of the data management can be more complex in a long-term participatory research project.

Substantial consideration must be given in the future as to how to integrate volunteers into scientific work and related data decisions. Not every volunteer is the same, and thus a mechanism must be established to assess and account for differing abilities and circumstances. As well, what the impact of this involvement will be on the data gathered, the research process, on individuals' lives and on the community.

XIV. Dissemination of Information

Another crucial aspect of data management is dissemination of information. According to Adamchak *et al.*⁷⁵, disseminating results can provide further insight on certain risk and protective factors, thus shaping future efforts and allow researchers to make necessary improvements; as well to attend to participants concerns, making them more likely to feel supported by the monitoring and evaluation process or research program as a whole. Importantly, sharing results can also help stakeholders understand what the program is doing, how well it is meeting its objectives and whether there are ways that progress can be improved.⁷⁶ Through publicity, results can help ensure social, financial and political support and help a program establish or strengthen the network of individuals and

⁷⁵ Adamchak S, Bond K, MacLaren L, Magnani R, Nelson K, and Seltzer J., "Using and Disseminating Results" in A Guide to Monitoring and Evaluating Adolescent Reproductive Health Programs. *University of North Carolina Chapel Hill*. 149

⁷⁶ *ibid.*

organizations with similar goals and give public recognition to stakeholders and volunteers who have worked to make the program a success, as well as potentially attracting new volunteers.⁷⁷ In San José del General, there is the additional benefit of attending to a specific complaint that monitoring programs never seem to adequately return and interpret results for the community. By addressing this specifically we will also hopefully be able gain more trust and establish the project's reputation as bringing something new to the community.

Therefore, a central part of the data management for this long term mine monitoring project will include the annual analysis, processing, and dissemination of monitoring results. Yet an additional opportunity for participation also arises in the design of this product. On choosing final products to communicate our activities we followed the guidelines established by the United Nations Development Program (UNDP) on developing knowledge products from monitoring and evaluation (<http://web.undp.org/evaluation/handbook/ch8-3.htm>). Thus, the questions we asked were:

- 1) *What is the purpose of sharing these results?*
- 2) *What is the relevance of project/program objectives to the needs and interests of stakeholders?*
- 3) *What is appropriate for where and whom? (Depending on geographic and social layout)*
- 4) *What is the impact of the activities being undertaken?*

⁷⁷ *ibid.*

Following our observations over four months of the communities' ability to communicate and transfer information, consultation with groups during meetings, and given specific questioning during the socioeconomic interviews conducted during Mining Week, it was decided that the most beneficial and practical means of sharing our results would be through the creation of two publications. One, of larger length detailing our processes and preliminary findings as well as explaining the project as a whole, intended to go to the most interested parties in the project with good access to the rest of the population, such as the local government office and to the student center, IFARHU. A secondary publication in pamphlet format for wider dissemination was also produced with the general public in mind. The intention with these publications is to help build a good rapport with the community and decrease the chances of loss of interest or faith in the project, as well as create tangible records for community members about the program and our results.

XV. Steps for the Future

The first years of any long-term project are crucial in establishing a firm basis from which to grow. The next steps for this project will need to include first and foremost the maintenance and building of community relationships, most likely through increased time spent in the area. This will serve to keep lines of communication and feedback open. Another crucial next step is the acquisition of adequate funding. This can be a complicated process especially due to the financial uncertainty associated with investing in a research project that is still in such early stages. The continued evolution of the format of the presentation of results is also something that should be considered. Different methods of presenting and returning results to the communities may become

more appropriate or more possible over time and brainstorming about these possibilities should be conducted on an annual basis. Finally, through our experience this year in attempting to connect members from each of the different communities into one large collaborative project, it is our opinion that it may be a better first step towards the creation of a year-round community-based monitoring group is to focus on creating smaller groups within each of the communities separately first and then bringing together these different groups. That is, to take up the strategy of working poco a poco, working group by group to form a community-based monitoring initiative in the area.

A last note to future interns is that the next hurdle to be tackled is the information deficit in the community. This is of course the role of the project, but in order to get a community that sees an interest in participating in monitoring the impacts of a mine or viewing changes in their environment, they must have some idea of how either a mine or their environment works.

XVI. Acknowledgements

We would like to take this opportunity to thank first and foremost all the members of the communities of San José del General for their patience and kindness. In particular, gracias a Pamela, Edgar, Eulalio, Linda, Maryluz, Cruz, Alcibiades, Santana, Deisy, Jorge, Liliana, Angelica, and Mirna. They are the reason we are determined to persevere in establishing this project and achieving its aims. We also need to pay homage to our wonderful team of PFSS students for their excitement, support, and ability shown throughout the semester and especially during Mining Week.

As well, we must thank our supervisors Daviken Studnicki-Gizbert and Franque Grimard for guiding (or stumbling with) us down the confusing road of community work. We salute you in your efforts and promise our help if it should be needed. Victor Frankel and Ana Spalding must also be recognized for their willingness to advise us and attend to our questions and pre-occupations throughout our research in Panama.

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XVIII. Apendix

i. *Community Participation in Monitoring Activities*



*ii. Reflections on Year Two and Recommendations for the Future:
Mining Week 2015*

As the focus this year was on increasing community participation, groups were asked to write their letters with this aspect in mind, focusing on the difficulties and methods to improve community involvement in the monitoring processes. Every year these letters will be written by the PFSS students who participate in Mining Week in order to improve and refine the processes and methodology for the following year. What is included in this document are the relevant excerpts from the 'Letters to Next Year' written by each of the six specific groups. This document should be reviewed as early as possible in the semester by the monitoring assessment interns and by the facilitators for water, territory, and socioeconomics in order to allow an appropriate adjustment and troubleshooting period.

General aspects to keep in mind going forward:

How do we ensure the validity and neutrality of volunteers in our monitoring efforts?

How do we factor in the exceptionality of certain community members' circumstances (e.g., level of knowledge)?

How can we standardize our self-presentation to community members?

Note to future LTM interns: standardize the format of these letters and recommendations.

I) WATER

Community Involvement:

Make sure that the local people in your group (i.e., volunteers from the community) are fully engaged and are learning the different tests (e.g., physical chemical parameters using simple lab kits) and also that they understand what each parameter means. A good way to make sure everyone understands the tests well is to teach a few members of the volunteer group, and then have them teach others themselves to see how well they understand. Ultimately, we want this project, especially the monitoring of the physical and chemical parameters, to be self-sufficient, so the community can continue the monitoring without us. It's really important that they are able to test the water at different times throughout the year on their own.

Water Monitoring Test Kits:

We think it is imperative that the community has a water testing kit (similar to the backpack lab we used) to measure the physical and chemical parameters. Sampling the water once a year is not enough to understand the health of the rivers, especially since rivers are such dynamic environments and can change so quickly in short amount of times. This is why we have looked up some potential kits that could be used in the community. The community would need help coordinating the ordering the kits, and they should be involved in the choosing of the one that is most appropriate both cost-wise and for the tests that are most important in the area. We have included some links for you to further research. It would be also a good idea to look into potential tests for heavy metals such as arsenic. We found some online, but most seemed to be fairly expensive. Some of the links provided do not have the costs on the websites, and so the companies need to be contacted for either their catalogues or for a quote.

<http://www.lamotte.com/en/education/water-monitoring/5848.html>

<http://www.lamotte.com/en/education/water-monitoring/3-5886.html>

<http://www.monitorwater.org/TestKits.aspx>

<http://www.backpacklab.com/>

<http://www.hannainst.com/usa/prods2.cfm?id=027004&ProdCode=HI%203814>

<http://www.freedrinkingwater.com/products/water-quality-testing/testkit-complete-water-quality-examing.htm>

Implementation in Schools:

We think that a good way to get more people involved in the water monitoring projects would be to have a couple workshops at schools in the area about water quality. They don't have to be very long or complicated, but it would be great for kids to better understand the importance of clean water. They are the future of this project and it would be super cool if they could become involved early. This project will hopefully last 30 years, so even the youngest kids will be adults well before the end of the monitoring project. One option would be to show the simple chemical tests in the class or even better in the field at the river. Another option would be a workshop on bioindicators/bioassays using the methodology created by the International Development and Research Centre (IDRC) called AQUAtox. We have attached a document that explains the AQUAtox program. ****ASK EMMA ABOUT THIS**

Written by Véronique Cartier-Archambault, Kamil Chatila-Amos, Pierre Rogy, Benny Zank, and Emma Zapf-Gilje

II) TERRITORY

i) Rivers:

Suggestions for Improving Observations of Physical Characteristics of the River

- 1) More local involvement. We did the routes with Máximo, a native to Coclesito, and Cruz, who had only lived in Coclesito for 6 months and was from El Salvador. They both were extremely helpful and provided good input, however we feel that it would be even more beneficial to get guidance and direction from locals who live along the river and are very familiar with it. They can identify points of interest, changes they have noticed, and physical characteristics in different conditions that people unfamiliar with the area may not consider.
- 2) Be aware that there may be issues with the GPS and the map. This year, often the GPS coordinates we took did not match up entirely with the map. When we checked with another GPS, they had the same coordinates, so the GPS itself was not malfunctioning. We think the discrepancy could be due to poor satellite connection in heavily forested areas, or in valleys, because when the area was wider, clear, and more open, the GPS and map matched up better. Another possibility could be the rivers on the map or the coordinates on the map are inaccurate. We suggest taking the using the landmarks we outlined, and try GPS points again to see if there is a change. Maybe see if you can access a second map. This was a constant issue for us, so we outlined on the maps what we thought was our route and where we stopped and took observations.
- 3) More visuals would be good for the results. Hand or computer drawn maps to present to the community are a good way to present results for people of all education levels. More photos would also be more beneficial for the communities and people in the following years. We strongly suggest a waterproof camera in order to take pictures while it rains or when going through deeper parts in the river.
- 4) The appearance of the river is highly dependent on weather conditions, so make sure that weather conditions of the last couple days are recorded and taken into account when making observations in order to make an accurate comparison. A rain gage would be a helpful instrument to see how much water is accumulated in a rainstorm. A Nalgene bottle would work for this, so

rainfall can be measured and we can start to generate an understanding of the dynamics between precipitation and hydrological patterns.

- 5) At each waypoint make observation regarding the particular spot you are at but also think about the general properties of the river between waypoints. This makes for a more coherent map of the rivers. Look for depth, sediment deposits, riverbanks, river beds, where the rocks or sediment might be coming from, water color, canopy cover, etc. One aspect that we suggest adding would be points where the river trajectory has changed. Locals have reported the river has changed course, but we are unsure exactly where and why; this would be an interesting avenue to explore.
- 6) To cross reference maps, we recommend using Bing Maps (the search engine). We were not aware of Bing before and therefore could not use it, but it has an incredibly clear picture of the rivers and the land use around them, compared to Google Maps, where the rivers do not always show up. Bing Maps can be used in the field but also to create result maps to put in the report and show to the community.

Suggestions for Improving Human Use Interviews

- 1) Many people had trouble dating events such as floods and fish kills, which made it difficult to develop any timeline of events for each river. A timeline would be hugely beneficial in order to track if these events coincide with events connected to the mine. We suggest encouraging locals to keep track, either by photos or writing, so that the coming years a timeline can be developed with locals and PFSS students.
- 2) Try to get GPS points of each household in order to track where the houses are along the river, and make a log so people in the years to come can revisit those houses, or try to interview new houses. This could also be helpful in creating a more accurate map.
- 3) Explain the project and the goals to the people you are interviewing. Our interviews were very informal and casual which made for a friendly interaction, however it did not encourage any of the interviewees to be involved in the project because we did not fully inform them of all the aspects of it. The idea of the project is to incorporate locals, therefore the more people informed the better.

Walking along the rivers, Cruz and Máximo pointed out some things that they attributed to the mine that are important to pay attention to. Firstly, Cruz pointed out any large boulders that had a square cut in them and told us that they were deposits from the mine. In addition, the fine sediment build up in Río Molejones, as well as some banks of cobble, Cruz attributed to materials washed downstream from the mine as well. The most significant observation that we made that Cruz and Máximo attributed to the mine was the presence of Cal. They described it as a powder that is used to help separate the gold. When we saw it in the water, it was brown and orangey, very slimy looking and stringy, attached to rocks in the water. It looked distinctly different from the other green and brown algae we'd be seeing, and it was not grainy like sediment. When dried, it was black and sticky and looked like thin tar, spread out over some rocks and sucking them together like glue. We were not familiar with Cal as a powder, or its effects in the environment (and neither was Daviken) so the presence and effects of it have not been confirmed. It is important to maybe try to look into this through research, or ask an expert, because while local knowledge is valuable and reliable, it is good to have multiple sources just to get a better understanding. That was a major challenge in this project, combining local knowledge and observations with your objective observations, and trying to maintain your status as an independent survey. That being said, local knowledge is incredibly valuable and an increase in local involvement could lead to a clearer understanding.

Written by Rachael Ryan and Hans Hermann-Alvarez

ii) Farms:

Farms and Farmers:

It would be interesting to actually visit the fincas of the farmers you will interview. Ask them if they can give you a tour of their fincas to see where the crops and animals are - it will be easier to engage in a conversation about cultivation and production that way. You will have to spend more time at each farm, though, so you may want to plan ahead and make sure the farmers will have the time to take you to their fincas. It would be useful and helpful if at least one of the interviewers is an agriculture student (if possible; if not, to do your research!). From our experience, it is easier to bond with the farmers if they see that you are genuinely interested and curious about what they do and that you have some level of knowledge about tropical agriculture. At the end of the interviews, some farmers even had questions about pest-related problems and asked for our recommendations.

We were asked last year to start making a visual survey of the agricultural landscape in the communities. We didn't do any for Molejones since the idea was only brought up after seeing how our first day in the field went, and we didn't do any for San Juan because of logistics issues, but we did three sketches in San Benito. The sketches, along with the coordinates of the location, are in the notebook. You could go back to these locations and make new sketches (although it probably won't have changed much. A possibility is that the fincas group can return to the same locations and make new sketches every 3 years or find other landscape points. Another idea that was brought up by the whole territory group is to map all the farms in the communities to have a general idea of the agricultural land uses in the region. For that, you will definitely need the help of a local that knows where the fincas are.

Last year, we had problems getting hold of farmers. In the morning, the men are usually in the field working; only the women and the children are at the house and most of them will not accept to participate in a study without the input of their husband/father. There is probably a better chance to catch the men at their house if you visit the farms at 13h00 or later. In the morning, you could do the landscape surveys instead. If you can find someone from the local community who can help you locate fincas on a map or who knows farmers you can talk to, it could really facilitate your farm searching process.

Our Approach:

We noticed that people were wary when we mentioned the mine in our introduction. Sometimes, just by saying we were studying at a Canadian university, the farmers seemed to associate us with the mine. We found that putting an emphasis on agriculture first and then mentioning the mine if they seem interested, while making sure they understood we were not affiliated with the mining company or the government, was the best approach to introduce ourselves and the study.

We also had a few issues with the questions in the survey. The farmers did not always understand the questions the way they were written in the survey -you may have to work your way around to get answers. If they say they don't know the answer, try to rephrase the question, in terms they can relate to (more on this in the notebook). We don't know if the format of the survey will have changed by now, but the survey could be ordered a little more logically. Once you figure out the order you want to ask the questions, it is not too hard to jump back and forth the questionnaire.

In terms of general observations from our interviews last year, we found that many farmers knew that the mine may contaminate the water or have impacts on the quality of the land, but they haven't felt the environmental consequences of it on their own farms yet. The mine still has an influence on agriculture in terms of practices and inputs, however. The mining company offers workshops to teach the farmers about different agricultural practices (e.g. how to deal with pests) and they distribute seeds and organic

fertilizers for free to some farmers. This can be seen as a positive impact the mine has on agriculture and could be investigated further by you this year. It could also be interesting to investigate how the farmers perceive the roads and other services offered by the mine could change the way they practice agriculture (e.g. more access to chemical fertilizers/pesticides/herbicides, more opportunity to sell their products, etc.) It is important to think not only of negative environmental consequences when discussing on the impacts the mine may have on the local community, but also of positive or negative influences it may have through the social services it is offering.

Written by Kesner Dabady and Florence Tan

iii) Photography:

General Recommendations:

Don't be afraid to pass over fences and by people's land, especially in San Benito. They are all very nice and don't be shy and go ask people there for help, we've only got positive responses. Be honest about what you are doing and why you are there.

For the photos, we looked for the highest point in different areas to have a good view of the land, so try to look at the highest hill/mountain or the highest altitude of non-forested area. This will most likely be the point we chose.

Read all the different definitions of the sites where we took photos because a lot of time we came back to points we had already passed by, so it'd be easier for you if you read. We usually wrote on the definition that it should be taken before photo #X or after.

We would also recommend writing how you got at the points we marked in your own words because we might have lacked details due to assuming certain details were more obvious than they were in reality. This will provide for more description in the future to get to those points.

Also the GPS points (in the excel sheets) and maps between site 2-II, might have a bit of inaccuracy because the GPS points were in some units that we found hard to convert to decimal degrees, so it would be good to talk to locals and Daviken about the points in order to locate them accurately.

Written by Alexandre Dallaire and Munib Khanyari

iv) Interviews:

General Recommendations:

- 1) Ask for as many materials from Minera Panamá as you can when you visit. I happened to have a USB stick with me when we went and was able to get them to give me the electronic versions of some documents that they otherwise didn't seem willing to give (perhaps because they were short on physical copies).
- 2) Ask more about who goes to community meetings with Minera Panamá and who doesn't. What kind of people show up? How many people go? Etc.
- 3) Many people, if it's a weekday, will be out of their house until around 4 or 5, so this was a slight problem in conducting interviews.

Written by Madeline Craig

III) SOCIOECONOMICS

Limitations:

Trust

One major limitation that needs to be considered is the fact that we are a group of strangers entering a town and trying to obtain personal information from the community. For example, one group got rejected from 15 households in one day despite their best efforts to introduce the project and engage the family. This group happened to consist of a single white male. We are unsure whether his physical characteristics were to fault, whether it was his approach, or whether it was simply a matter of chance.

A potential lack of trust in combination with sensitive questions could lead to skewed answers. It is important to recognize that despite an interviewer's best efforts, responses may not encompass the entire truth. The mine is a controversial subject in most of these towns and despite the promise of confidentiality, some people still may not be comfortable with sharing their personal views. Other sensitive questions tended to be on the subject of health and income. In addition to not sharing this information because it is personal, some people genuinely do not know the answers to these questions or other questions in the extensive survey. Increasing our presence in the various communities via group-wide PFSS interactions (e.g., having meetings, watching movies, or playing sports) prior to beginning the surveys could potentially improve the quality of our results.

Accessibility

The survey as it gives a general idea of the economic and social structure of the community according to the socioeconomic standards established by the creator of the survey, *Golder and Associates* (hired by the mining company, Inmet during the environmental impact assessment). However, in the opinion of our team and given the reactions of community members, the survey seems very mechanical and lacks a personable, human aspect. As well, it does not seem like it has been adjusted properly to fit the context of Coclesito and the other communities surrounding the mine.

As we tried to maintain consistent methodology between households, thorough descriptions of questions were not feasible because we did not have a chance to standardize explanations. This was a limitation because some questions were quite technical or worded poorly, perhaps in part due to a language barrier, which led to confusion among survey participants. In one case, the eldest daughter in the household sat with us and "translated" our Spanish into more user-friendly Spanish for her mother to understand. Cultural and language differences made it difficult in some cases to get our point across. This was also a challenge in terms of a general explanation of the project. Explaining our intentions without seeming invasive was at times tricky. This could hopefully be overcome by providing additional information in the form of a pamphlet and rewording some questions. Additionally, our lack of preparation and introduction to the overall monitoring program was a hindrance in terms of our ability to give a comfortable introductory explanation.

Community Involvement

Another limitation relating to the previous comments is the level of community involvement. This project is not for our own benefit as researchers, but hopefully for the betterment of the community in the long term. In order for this to be the case, we need to consider the wants and needs of the community by implementing their inputs into the survey. Between our group of 12, it was decided that meetings would be a good way to gain this input. Two meetings took place during our time in Coclesito. One was an overview of the different sections (pre-monitoring) and the other a presentation of the results (post-monitoring).

The main challenge was diverse participation in these interactions. The number of local attendees was relatively low despite our wide distribution of invites. We feel that a possible way to overcome this shortage is to spread the word of the meetings more substantially ahead of time and create flyers and posters to disseminate around the towns.

Discussion and Recommendation:

Survey Improvements

Moving forward into future years there are a few aspects of the project we believe could be ameliorated in order to achieve the most accurate results that will best depict the community and challenges at large. This project, having been only in its second year and it still being in the scoping phase, meant understandably there were going to be areas that would need improvement.

Moving forward the survey should be adjusted so that it is more approachable and understandable. Some ways to do this would be to make the text less technical, to create an established introduction prior to the preamble, which describes our goals and the project in a less technical and more personable way. Future survey groups should work to clarify confusing questions especially in regards to water quality and use. Additionally, the survey should include less repetition (agriculture and health) and more questions that fit the context of the communities and the local issues being faced to get a better understanding of the communities and the locals point of view.

In describing our intentions, we did not have complete answers regarding what would be done with the information or how this information would be redistributed to the community. We recommend that a clear answer be worked out so that LTMM can be a reliable and respected project.

The entire survey was edited in the days following mining week, so hopefully some of these issues have been eliminated. We did not have the chance to test the new survey, so some of these concerns may still be relevant. A copy of the edited survey is attached in the next section of the Appendix.

Key Points for the Introduction

Some important/helpful that will help when introducing who we are whilst doing interviews next year are as follows. Additionally, it would be useful to distribute the pamphlet that we prepared and include more training prior to arriving in the communities.

Intro: Somos estudiantes canadienses, y estamos haciendo unas entrevistas con la gente de la comunidad para un proyecto de monitoreo sobre los impactos de la minería....

Independence: No estamos asociados con ninguna empresa ni un gobierno. Así que no recibimos nada plata del gobierno canadiense ni del gobierno panameño, ni de una empresa tampoco.

Neutrality: Nos quedamos neutral, no estamos por, ni contra la minera, pero es importante tener información para ver los cambios y si hay impactos beneficiosos o negativos. Además, si hubiera problemas con la empresa, es importante de tener esta información independiente que daría a la gente de la comunidad unos recursos.

Project: Estamos haciendo un proyecto a largo plazo (30 años) con nuestro profesor con el intento de generar una fuente de información que sea aparte y independiente de las empresas mineras y también del gobierno. Esto es para mostrar lo que realmente es la situación en las comunidades aca para comparar con lo que dicen las empresas mineras y el gobierno; para representar la verdad.

Our role: Reunimos información **para** las comunidades, para la gente de tener información **accesible**. Nosotros somos como una herramienta para la gente, para reunir información, pero es el papel de la gente de utilizar esta información.

Preparation

Another aspect we concluded would be highly beneficial for future groups working on this project would be prior training and information sessions specifically for the socioeconomic group. This meant we had little to no time to revise all of our materials and make changes where we felt necessary such as in the survey. We had tablets but some of them were lacking the software needed and there was little we could do to fix this once in Coclesito; this was a repeated issue from the year before, to which either the professors or interns must attend. It follows that we also had minimal time to practice how we would go about performing our surveys, and what to expect which created a learning curve. This could have been avoided and would have allowed us to be more efficient. In order to prevent this in future years we suggest information sessions prior to arriving at Coclesito so that everyone can go over the survey and make adjustments where needed. This would also allow students to become comfortable with the tablets and the survey procedure.

The production of better maps (drawn with and validated by community members) would also aid students in the field to cover ground more efficiently, as well allow for a greater range of interaction with community members and therefore their participation in the monitoring program. Naturally we are limited by the scale of the surveying that needs to be done and as well as the limited amount of time and students we have on a year-to-year basis (approximately 120 surveys in 3 days by 12 students). On this note, again we emphasize that prior information sessions in which students and groups could organize and review the methodology and materials would greatly increase efficiency and the quality of results. These prior sessions could take place in Panama prior to leaving for mining week or ideally could take place in Montreal during the fall semester. Students would be expected to review all the materials such as past reports, past letters to students, and past surveys. Students would be expected to become comfortable with the methodology, materials, and surveying process. We expect this would greatly increase efficiency and the quality of the results.

Receptiveness

For future surveyors it is essential to be comfortable with the materials and information prior to arriving in Coclesito as mentioned above. Gaining the locals' confidence and making them comfortable is key in having locals accept to participate in the surveys. Observations we made which may aid in this include: having groups of two students, with ideally one female and one male in each group and having at least one of the students as a strong Spanish speaker who can go over the introduction and explain the project, the goals, the fact we are a neutral organization, and that all the information is confidential. Generally once locals understood all of this they were comfortable in participating in the survey but many were skeptical and nervous initially. Additionally, it is ideal to have a community meeting before monitoring explaining who you are and what the project is prior to performing the surveys. Doing this in each of the six communities in San José del General would be beneficial in order to increase awareness of our presence and get more context-specific comments about the project.

A common theme as well was that locals want to see some kind of result or get some form of feedback from our project, so asking what kind of feedback they would like as well as in what way after finishing a survey or at a meeting is important. Having information in a pamphlet form about the general monitoring program to give the community while surveying could be greatly beneficial. Finally, gaining more insight from the community regarding their desired direction for the project could be beneficial in increasing our reputation (and of course in increasing community engagement). One suggestion is to organize livelihood-assessment/definition workshops with communities while we are still in the scoping years.

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iii. Revised Survey to Reflect Communication Difficulties and Community Suggestions

Encuesta Social Programa de Monitoreo Minería

Familia número: _____ (marcar el número de familia en todas las paginas del cuestionario)

Nombres del encuestadores: _____

Fecha: _____

Verificado por _____

Fecha _____

Ingreso de datos por _____

Fecha _____

Introducción del proyecto estandarizado

Preámbulo:

La siguiente será prestado a los respondientes:

“Buenos días, mi nombre es X y trabajo con un equipo de investigadores de una universidad canadiense. Nosotros estamos empezando un proyecto de monitoreo a largo plazo de los impactos socio-económicos. Le meta es de establecer un espacio de evaluación independiente cuyos resultados serán difundidos a todos los sectores de la sociedad Panameña con interés en la problemáticas minería como las comunidades, las empresas, y las organizaciones y instituciones gubernamentales. Quisiéramos hacerle algunas preguntas para aprender acerca de sus condiciones de vida aquí en _____ (nombre de la comunidad) en el último año. La entrevista durará aproximadamente una media hora si decide continuar. Le solicitamos respetuosamente responder estas preguntas de la mejor manera posible. Toda la información se tratará de manera confidencial. Los investigadores que tendrán acceso a su información son los Dres. Franque Grimard y Daviken Studnick-Gizbert, su información de contacto está en esta hoja que voy a dejar con usted. La información que recogemos de usted y otras familias en las demás

comunidades que estamos visitando se utilizará para preparar la creación de un programa de monitoreo sobre los impactos socio-económicos y ambientales de la minería. Es importante saber que no es probable que usted beneficie directamente de participar en este estudio, pero la información que usted proporciona puede ayudar a mejorar los programas de política de diseño y desarrollo en esta área. "

Consentimiento:

"¿Entiende lo que he dicho? ¿Tiene alguna pregunta? ¿Está de acuerdo para participar en este estudio y ser entrevistado

Comunidad: _____

Nombre del jefe de familia: _____

Nombre de la persona que responde (*en caso de ser distinto*) _____

Participará usted en la encuesta? Sí _____ No _____

(En caso negativo) Puede explicar por qué no desea participar en la encuesta?

_____ Podemos regresar y conversar con alguien más?

Si _____ No _____

La firma de este documento significa que la investigación del caso, incluyendo la información que se encuentra arriba, le ha sido oralmente descrita y que accede a participar voluntariamente.

Firma del participante Fecha _____

Firma del testigo Fecha _____

Información de contacto:

Si tiene alguna pregunta acerca de sus derechos como sujeto participante en una investigación o acerca de qué hacer si sufre algún daño, puede comunicarse con McGill University Ethics Manager at 001-514-398-6831 o lynda.mcneil@mcgill.ca. Por más información sobre el proyecto o su participación, también puede comunicarse con: Su participación en esta investigación es voluntaria y no será penalizado o perderá

1. Professor Franque Grimard, Department of Economics McGill University, Montreal, Canada (email: franque.grimard@mcgill.ca)

2. Professor Daviken Studnicki-Gizbert, Department of History, McGill University, Montreal, Canada ,email: daviken.studnicki-gizbert@mcgill.ca)

Parte 1: Demografía

23. Religión (*marcar una*)

- 1) Protestante _____
- 2) Católica _____
- 3) Cristiana evangélica (*especificar*) _____
- 4) Otra (*especificar*) _____
- 5) Ninguna _____

24. Hay indígenas que viven en la comunidad?

- 1) Si _____
- 2) No _____

25. De qué grupo étnico? _____

26. (*En caso afirmativo*) Hay indígenas en la casa?

- 1) Si _____
- 2) No _____

27. Algunos miembros de este hogar viven en algún otro lugar temporalmente? (*marcar uno*)

- 1) Si _____
- 2) No _____

28. (*En cas afirmativo*) Cuantos miembros viven en otro lugar? (*cantidad*)

- 1) Por qué viven en otro lugar? Por estudios? (*cantidad*)? _____
- 2) Por qué viven en otro lugar? Por trabajo? (*cantidad*)? _____
- 3) Por qué viven en otro lugar? Por motive de salud? (*cantidad*)? _____
- 4) Por qué viven en otro lugar? Por otro motivo? (*especificar motivo e indicar cantidad*)

29. Por cuánto tiempo esta familia ha vivido en esta comunidad? (*indicar numero*)

_____ meses
 _____ años
 _____ todo la vida

30. (*Para las familias que llegaron en los últimos deis años*) De dónde se mudaron? (*marcar uno*)

- 1) De la misma comunidad _____
- 2) De otro comunidad en Donosos o La Pintada _____
- 3) De otro lugar en Panamá (*especificar*) _____
- 4) De otro lugar (*especificar*) _____
- 5) No aplica _____

Parte 2 - Agua y Energía

31. De dónde obtiene esta familia toda o la mayor parte del agua para uso doméstico? (marcar uno)

- 1) Río o quebrada _____ (especificar el río)
- 2) Pozo tradicional (brocal) _____
- 3) Pozo mecánico _____
- 4) Acueducto _____
- 5) Ojo de agua _____
- 6) Otros (especificar) _____

32. Este agua es potable?

- 1) Si _____ 2) No _____ 3) No sabe _____

33. Toma esta agua?

- 1) Si _____ 2) No _____ 3) No sabe _____

34. Si si, trata el agua?

35. Si no es potable, de dónde obtiene esta familia todo o la mayor parte del agua para tomar?

- 1) Río o quebrada _____
- 2) Pozo tradicional (brocal) _____
- 3) Pozo mecánico _____
- 4) Acueducto _____
- 5) Ojo de agua _____
- 6) La compra
- 7) Uso un filtro (especificar que tipo) _____
- 8) Otros (especificar) _____

36. Si no cuenta con servicio de acueducto hasta su vivienda, cuánto tiempo le toma caminar hasta esa fuente de agua? (*indicar cantidad*) _____ minutos

37. Qué usa este hogar como combustible para cocinar todos o una mayoría de los alimentos? (*marcar el principal y sólo uno*)

- 1) Carbón _____
- 2) Leña _____
- 3) Gas _____
- 4) Otros (*especificar*) _____

38. (*De emplearse leña*) Cuánta leña se usa semanalmente? (*marcar cantidad y unidad*)

_____ (unidad es haz/bulto)
 _____ no aplica

39. De dónde procede la leña? (*marcar uno*)

- 1) De su finca _____
- 2) Del bosque _____
- 3) La compra _____
- 4) Otra procedencia (*especificar*) _____

40. Cuánto tiempo le toma llegar al lugar donde consigue la leña?

_____ (minutos u horas)
 _____ no aplica

41. Este hogar tiene electricidad?

- 1) Si _____
 - i. Batería _____
 - ii. Panel solar _____
 - iii. Generador _____
 - iv. Tendido eléctrico _____

2) No _____

42: (*En caso afirmativa*) Por cuántos horas cada día tiene electricidad?

_____ horas

Parte 3: Economía

43.Cuál es la fuente económica más importante para el hogar? (*marcar sólo uno*)

- | | |
|---|---|
| 1) Agricultura | |
| 2) Agricultura de subsistencia | |
| 3) Ganadería | 12) Pequeña empresa familiar |
| 4) Ama de casa | 13) Trabajo por cuenta propia |
| 5) Minería artesanal | 14) Transportista |
| 6) Cosecha de recursos naturales (bosque) | 15) Artesano |
| 7) Pesca | 16) Remesas |
| 8) (En Coclesito) Empleo de PTQ | 17) Cheque de apoyo del gobierno
(Jubilado, beca escolar...) |
| 9) (En Coclesito) Empleo de MPSA | 18) Otro (<i>especificar</i>) _____ |
| 10) Empleo de gobierno | |
| 11) Otro empleo (salario) | |

44.Cuál es la segunda fuente económica más importante para este hogar? (*marcar sólo uno*)

- | | |
|---|----------------------------------|
| 1) Agricultura | |
| 2) Agricultura de subsistencia | |
| 3) Ganadería | 9) (En Coclesito) Empleo de MPSA |
| 4) Ama de casa | 10) Empleo de gobierno |
| 5) Minería artesanal | 11) Otro empleo (salario) |
| 6) Cosecha de recursos naturales (bosque) | 12) Pequeña empresa familiar |
| 7) Pesca | 13) Trabajo por cuenta propia |
| 8) (En Coclesito) Empleo de PTQ | 14) Transportista |

- 15) Artesano
- 16) Remesas
- 17) Cheque de apoyo del gobierno

- (Jubilado, beca escolar...)
- 18) Otro (especificar)_____

45. Cuál es la tercera fuente económica más importante para el hogar? (*marcar sólo uno*)

- 1) Agricultura
- 2) Agricultura de subsistencia
- 3) Ganadería
- 4) Ama de casa
- 5) Minería artesanal
- 6) Cosecha de recursos naturales (bosque)
- 7) Pesca
- 8) (En Coclesito) Empleo de PTQ
- 9) (En Coclesito) Empleo de MPSA
- 10) Empleo de gobierno
- 11) Otro empleo (salario)
- 12) Pequeña empresa familiar
- 13) Trabajo por cuenta propia
- 14) Transportista
- 15) Artesano
- 16) Remesas
- 17) Cheque de apoyo del gobierno
(Jubilado, beca escolar...)
- 18) Otro (especificar)_____.

46. Esta familia ha ganado algo de dinero en efectivo en el mes pasado? (*marcar uno*)

- 1) Si _____
- 2) No _____

(En caso afirmativo, llenar la siguiente tabla)

Tipo de actividad que genera el ingreso	Cuánto se recibió durante el mes pasado (B./)	Es una fuente de ingreso regular o eventual? (R o E)
Venta de cultivo		
Venta de productos agrícolas procesados		
Venta de ganado		
Venta de productos ganaderos		
Consumo de pescado		
Venta de recursos naturales (miel de caña, madera, etc.)		
Venta de productos artesanales		
Ganancias de pequeñas empresas		
Ingreso del empleo		
Pagos de renta (casas, potrero, tierra, etc.)		
Remesas		
Otros (<i>especificar</i>)		

47. Lo que ganó el mes pasado es lo que ganó normalmente durante un mes?

- 1) Es más o menos igual _____
- 2) Mucho más bajo _____
- 3) Mucho más alto _____
- 4) Varía mucho por mes _____

48. Hay algún momento en el año en que la familia no tiene suficiente alimentos para comer?

- 1) Si _____
- 2) No _____

(En caso afirmativo, llenar la siguiente tabla)

Mes	Escasez (S o N)
Enero	
Febrero	
Marzo	
Abril	
Mayo	
Junio	
Julio	
Agosto	
Septiembre	
Octubre	
Noviembre	
Diciembre	

49. (En caso afirmativo) Cuál es la razón más importante de la escasez de alimentos? (marcar una) (no insinuar la re)

- 1) Mala calidad de la tierra (del suelo) _____
- 2) Terreno insuficiente _____
- 3) Si _____
- 4) Falta de agua para los cultivo/ganado _____
- 5) Falta de insumos como fertilizante, herramientas, equipos _____
- 6) Falta de crédito _____
- 7) Falta de mercados _____
- 8) No hay suficiente cantidad de mano de obra en la familia
- 9) Falta de instrucción y capacitación
- 10) Poca salud _____
- 11) Falta de empleo _____
- 12) Mala suerte /hechicería _____
- 13) Plagas y enfermedades en cultivos y animales _____
- 14) Factores climáticos extremos _____
- 15) Depende de la estación _____
- 16) Otros (especificar) _____
- 17) No aplica _____

	Uso	Cantidad
n tierra _____		

Parte 4 – Agropecuario

50. Con cuánto terreno cuenta la familia para su uso? (marcar cantidad en hectáreas)
_____ hectáreas

(Llenar la siguiente tabla)

51. Compra o cultiva la mayoría de su comida?

Vivienda (predio familiar)	
Negocio o pequeña empresa	
Cultivos agrícolas	
Fincas de frutales	
Potrereros	
Tierra agrícola en descanso/barbecho/rastrojo	
Bosque no cultivado/ plantaciones forestales	
Alquilado/prestado a terceros para uso	
No usado (tierra sin valor para el dueño)	
Total (debe coincidir con la pregunta anterior)	

1. Compra _____
2. Cultiva _____
3. Ambos _____

52. (Llenar la siguiente tabla) (Indique cantidad POR AÑO)

Rubro o Cultivo	Cantidad de Terreno		Vendido (%)	Escala de importancia (1=mas común, 10=menos común)
	Cantidad	Unidad		
Arroz				
Maíz				
Yuca				
Guineo				
Plátano				
Café				
Otros:				
Otros:				
Otros:				

53.Cuál es el estatus legal de su tierra? (*marcar uno*)

- 1) Derecho posesorio _____
- 2) Título de propiedad _____
- 3) Alquilada _____
- 4) Prestada _____
- 5) Otro (*especificar*) _____

54. En caso de necesitar más tierra para la agricultura o la ganadería, qué hace usted?

- 1) Comprar _____
- 2) Tumar montaña de su propiedad _____
- 3) Tumar montaña _____
- 4) Alquilar _____
- 5) Pedirla prestada _____

55. Cómo prepara su terreno de cultivo? (*marcar uno*)

- 1) _____ No prepara (0 labranza)
- 2) _____ Con máchate (manualmente)
- 3) _____ Tracción animal
- 4) _____ Tracción mecánica
- 5) _____ no aplica

56. Usa abone químico? (*marcar uno*)

- 1) Si _____ 2) No _____ 3) No aplica _____

56. Usa abono orgánico?

- 1) Si _____ 2) No _____ 3) No aplica _____

57. Compra semillas alguna vez? (*marcar uno*)

- 1) Anualmente _____ 2) A veces _____ 3) No _____ 3) No aplica _____

58. Contrata personal para trabajar en la finca?

- 1) Si _____ 2) No _____ 3) No aplica _____

59. Cuántos de cada uno de los siguientes tipos de animales cría? (*marcar e indicar número*)

- 1) Vacas _____
- 2) Cabras _____
- 3) Cerdos _____
- 4) Pollos/Gallinas _____
- 5) Caballos _____
- 6) Patos _____
- 7) Gansos _____
- 8) Otros (*especificar*) _____
- 9) Ninguna

60. Aparte de su finca, qué recursos naturales del bosque son importantes para el sustento familiar? (*llenar en el siguiente tabla, considerar solo los dos tipos mas importantes de cada recurso*)

Recursos del Bosque	Con qué frecuencia cosecha lo utiliza?				Cuando es necesario
	Anualment e	Mensualment e	Semanalment e	Diariament e	

					0
Leña					
Cría de abejas					
Frutos/plantas para comer <i>(especificar)</i>					
Cacería <i>(especificar)</i>					
Medicinas <i>(especificar)</i>					
Pesca <i>(especificar)</i>					
Materiales construcción <i>(especificar)</i>					
Otros <i>(especificar)</i>					

Parte 5 – Salud

61.Cuál es la enfermedad más común en este hogar? *(marcar uno)*

- 1) Diarrea _____
- 2) Otra enfermedad gastrointestinal _____
- 3) Infección ocular _____

- 4) Enfermedad respiratoria/resfrío/influenza _____
- 5) Erupción cutánea _____
- 6) Leishmaniosis (“bayano”) _____
- 7) Dengue _____
- 8) Malaria _____
- 9) Presión arterial _____
- 10) Diabetes _____
- 11) Otras (*especificar*) _____

62. Hay alguna persona discapacitada en la familia? (*indicar cantidad*)

- 1) Hombres _____
- 2) Mujeres _____
- 3) Menores de 15 años _____
- 4) No aplica _____

63. Qué enfermedades tuvieron las personas en esta familiar el mes pasado? (*verificar las que se apliquen y poner LA CANTIDAD de hombres, mujeres, niños*)

Enfermedad	Hombres	Mujeres	Niños (14 y menos)	Tratado por (ver código abajo)
Diarrea				
Gastrointestinal				
Infección ocular				
Respiratoria/resfrío/influenza				
Erupción cutánea				
Leishmaniosis				
Dengue				
Malaria				
Presión arterial				
Diabetes				
Otros (<i>especificar</i>)				

Códigos:

- 1) Remedio casero
- 2) Curandero tradicional
- 3) Puesto o centro de salud (comunidad cercana)
- 4) Hospital/clínica en Coclesito/Cocle del Norte/La Pintata/Penonomé
- 5) Hospital/clínica en Santa Fe
- 6) Otros hospitales

64. Hay un curandero en esta comunidad?

- 1) Si _____ 2) No _____ 3) No sabe _____

65. Hay una doctora en esta comunidad?

- 1) Si _____ 2) No _____ 3) No sabe _____

66. Cuanto tiempo tarda para llegar al centro de salud mas cercano?

_____ minutos
_____ horas
_____ días

67. Cuánto tiempo ha transcurrido desde que alguien en esta familia, menor de 50 años, estuvo demasiado enfermo para trabajar? (*marcar número*)

_____ días
_____ semanas
_____ meses
_____ años
_____ no ha sucedido
_____ no aplica

68. Cuánto tiempo ha transcurrido desde que un estudiante en esta familia estuvo muy enfermo para ir al colegio? (*marcar número*)

_____ días
_____ semanas
_____ meses
_____ años
_____ no ha sucedido
_____ no aplica

69. Cuánto tiempo ha transcurrido desde que alguien en esta familia visitó a un curandero? (*marcar número*)

_____ días
_____ semanas
_____ meses
_____ años
_____ no lo usan

70.Cuál fue la razón de esta visita al curandero? (*marcar uno*)

- 1) Curar una enfermedad _____
- 2) Evitar un problema de salud _____
- 3) Ambas _____
- 4) Control de salud _____
- 5) Alguna otra razón (*especificar*) _____
- 6) No lo usan _____
- 7) No aplica _____

71. Cuánto tiempo ha transcurrido desde que alguien en esta familia visitó a un puesto de salud, un centro de salud, un hospital (cualquier facilidad de salud pública o privada)? (*marcar número*)

_____ días
_____ semanas
_____ meses
_____ años

_____ no ha sucedido

72. Cuál fue la razón de esta visita? (*marcar uno*)

- 1) Curar una enfermedad _____
- 2) Evitar un problema de salud _____
- 3) Ambos _____
- 4) Control de salud _____
- 5) Otro _____
- 6) No fueron _____
- 7) No aplica _____

73. El nacer de su ultimo hijo de esta familiar fue (**aplicable si hay hijos menores de 15 años**)

(Llenar le siguiente tabla)

	Antes del nacimiento	Durante el nacimiento	Inmediatamente después del nacimiento
Sin asistencia			
Asistido por en miembro o amigo de la familiar			
Atendido por un asistente de salud			
Asistado por una enfermera o doctor			
Atendido por una partera			
No aplica			

74. Es esta familia se usa algún tipo de planificación familiar?

- 1) Si _____
- 2) No _____
- 3) No aplica _____

75. Piensa usted que hay problemas con el alcoholismo/abuso de drogas en su comunidad?

- 1) Si _____
- 2) No _____
- 3) No sabe _____

76. Hay problemas con la delincuencia en la comunidad?

- 1) Si _____
- 2) No _____
- 3) No sabe _____

77. Si sí, que tipos de delincuencia? (*especificar*)

1. Pequeños robos _____
2. Asesinatos _____
3. Otros _____

Parte 6 – Social y Educación

78. Participan los miembros de esta familia como miembro de? (*marcar lo que sea aplicable*)

- 1) Junta comunal o local _____

- 2) Directivos _____
- 3) Grupo de agricultura/ganadería _____
- 4) Cooperativas o asociaciones _____
- 5) Grupos conservacionistas _____
- 6) Comité de salud _____
- 7) Grupos religiosos _____
- 8) Asociación de Padres de Familia _____
- 9) Clubes deportivos _____
- 10) Club de amas de casa _____
- 11) Otros (*especificar*) _____
- 12) Ninguna _____

79. Esta familia comparte bienes y servicios con otras familia cercanas? (*marcar lo que sea aplicable*)

- 1) Cultivar campos (ejemplo juntas de trabajo – paga peón) _____
- 2) Cosechar recursos naturales (minería, pesca, caza) _____
- 3) Compartir equipos/herramientas/transporte, etc. _____
- 4) Cuidar a los niños o ancianos _____
- 5) Encontrar trabajos _____
- 6) Pedir dinero prestado _____
- 7) Otros _____
- 8) Ninguna _____

80. Cuánto tiempo tarda usted/ sus hijos para llegar a la escuela más cercana?

_____ minutos
 _____ horas

81. Hasta que grado ofrece la escuela (ex. Sexto grado, séptimo grado)? _____ grado

Parte 7 – Activos

82. Esta familia tiene? (*marcar lo que sea aplicable, indicar cantidad de cada cosa*)

- | | | |
|-------------------------|----------|----------|
| 1) Radio | cantidad | _____ |
| 2) Televisión | cantidad | _____ |
| 3) Refrigeradora | cantidad | _____ |
| 4) Bicicleta | cantidad | _____ |
| 5) Estufa de gas | cantidad | _____ |
| 6) Teléfono celular | cantidad | _____ |
| 7) Motor fuera de borda | cantidad | _____ |
| 8) Bote o canoa | cantidad | _____ |
| 9) Computadora | cantidad | _____ |
| 10) Carro | cantidad | _____ |
| 11) Servicio higiénico | Si _____ | No _____ |
| 12) Techo de zinc | Si _____ | No _____ |
| 13) Piso de cemento | Si _____ | No _____ |
| 14) Otra casa | cantidad | _____ |

83. Tiene un préstamo con alguien?

- 1) Miembro familiar _____
- 2) Amigo _____
- 3) Empleador _____
- 4) Prestamista _____
- 5) Grupo u organización local informal _____
- 6) Institución formal (cooperativa, caja rural, etc.) _____
- 7) Ninguna _____

84. Esta familia tiene ahorros?

- 1) Si _____ 2) No _____

Parte 8 – Preguntas Abiertas

85. Qué cree que es su preocupación más grande para el futuro de su familia?

86. Qué sabe acerca los impactos positivos o negativos de la mina?

87. Conoce algunos programas ofrecidas por la empresa minera?

Si sí, cuales?

Participa en ellos?

88. De dónde saca la información acerca de la mina?

89. Sería interesado/a en ver la creación de una organización que provee más información acerca de la mina y sus impactos? Estaría interesado/a en participar en la organización?

90. Qué sería la mejor manera de devolver los resultados a la comunidad?

91. Tiene algún otro comentario que desee hacer sobre el Proyecto de Cobre de MPSA?

92. *(El encuestador marcará si hay comentarios)*

- 1) Comentarios positivos _____
- 2) Comentarios negativos _____
- 3) Comentarios positivos y negativos _____
- 4) Sólo preguntas _____

CIERRE

Este estudio se realiza para obtener información sobre la población que vive cerca del sitio de la mina cobre de MPSA propuesto. Por favor firmar para confirmar haber comprendido esto.

Nombre de la persona que responde _____

Firma de la persona que responde _____

(Agradecer a la persona que responde)

iv. Recommendations for a Future Water Monitoring Program

COMMUNITY-BASED WATER MONITORING IN SAN JOSÉ DEL GENERAL
ADDITION TO THE LONG-TERM MINING IMPACT ASSESSMENT

This year, the main task for the long-term monitoring assessment was to make this program more participatory. To do this, my partner and I looked for ways to integrate the monitoring assessment's research activities into the communities' everyday lives and for means to improve our communication methods. One of our main findings was that community participation in and ownership over monitoring activities is essential for the sustainability of a project, and has the potential to make the research and other processes involved more meaningful and useful for a community.⁷⁸

In our preliminary introduction to the project, my partner Madeline and I heard from our supervisor, Daviken, that there was a major concern about the quality of water in the communities. From our first visit to Coclesito and onward, this became more apparent. Located within the same watershed as two mining operations—Petaquilla Gold (600ha) and Cobre Panama (13,600ha)—the communities have already seen changes in the quality of their rivers. Upon conversation, citizens report witnessing fish kills and coloration changes as well as suspecting an increase in skin rash incidence.

To pay proper heed to these concerns and to give basis to any sort of formal action communities might seek to take (against the mine or government), members of the communities within San José del General, Coclesito, Villa del Carmen, Nazareno, San Juan del Turbe, Los Molejones, and San Benito, seek to autonomously monitor the status of their rivers. While the PFSS powered long-term monitoring assessment does monitor the quality of rivers, it does so only once a year. Though this will pick up shifts over time, this is insufficient to capture instances of acute contamination. There is a need for data collection throughout the course of the year and in multiple locations in order to establish more accurate parameters of water quality in the rivers in varying places to create a more comprehensive picture. This would allow our own monitoring assessment to verify changes from 'baseline' conditions as well as for the communities to confidently testify to abnormal circumstances.

Over the past four months, we held two meetings with a self-identified group of community members (approximately 18 people in total) interested in becoming capacitated to monitor water. Members of this group also came to our week of monitoring in April and participated in collecting and analyzing insects and physical parameters in their area's rivers along with PFSS students.

In the year 2014, Hope Bigda-Peyton, a PFSS student at the time, conducted research in the possibility of instating a community-based water monitoring program in the same area. Yet in this project, she was working for the Panamanian organization ANCON, and focusing on monitoring for the impacts of the nearby Petaquilla goldmine (no longer in operation) and of the three-pit copper-gold mine, Cobre Panama. According to her report:

Community based water monitoring, which has become common since the Rio Earth Summit initiated national and regional State of the Environment Reporting (UNEP/DEIA, 1996), forms an important tool for both educational purposes and long term environmental monitoring. Such community based water monitoring is especially important to implement in areas where changes to water quality are likely, such as areas

⁷⁸ For a more detailed explanation, see *Final Report 2015*

impacted by industrial mining activities. (Literature Review: Community Water Quality Monitoring in Panama: 2)

It is not currently within the scope of the McGill's monitoring program to train and equip this group. However, given the university's affiliation with the communities and work in monitoring rivers, as well as proclaimed aim this year to increase integration with the community in terms of goals and interaction, my partner and I attempted to begin the process of capacitating the group by consulting with the small group and INDICASAT water specialists, Dr. Luis Fernando de Leon and Anakena Castillo. One of our colleagues, Benjamin Zank, also had the opportunity to consult with a water-testing specialist from Panama's Ministerio de Salud (MINSa). These consultations, combined with Bigda-Peyton's review have given us the ability to compile a sketch of what a complementary community-based water monitoring program would look like.

Over the course of two weeks to one month,⁷⁹ communities should ideally be trained to monitor both benthic macroinvertebrates as bioindicators and to take basic physical measurements in acidity and alkalinity, dissolved oxygen, coliform tests, and phosphorous and/or nitrogen. Particular tests for heavy metals may be of increased importance as Cobre Panama's mining activities get under way, and especially if there are visible changes in the rivers. The Backpack lab by Henna, which is used by PFSS in monitoring carries each of these tests and supplies expect for coliform and heavy metals. Each test costs around \$50.00 and can be done without a laboratory, though they may be more controlled if done in a lab setting. Macroinvertebrates will require a lab for microscopic analysis among other components. While democratic and inclusive intentions favor allowing the participation of as many people as possible, pragmatism may require focusing training for analysis on those who learn most rapidly and comprehensively. Though community-wide presentations on water quality and change are essential as well and should potentially be led by members of the community-based water monitoring group.

The self-identified water monitoring group or other members of the community must be willing to potentially invest time and money into acquiring equipment and learning how to use it. These are the next and most pressing steps in the process of facilitating community-based water monitoring.

According to the representative from MINSa, it is within the communities' rights as Panamanian citizens to ask for monitoring assistance from ANAM for their own safety. This assistance may come through funding, training, or monitoring alongside locals.

As well, this year we were able to discuss with Dr. de León the possibility of creating an internship through INDICASAT that could operate in parallel to those under the supervision of Daviken. The intention of this internship is to create a direct link between the water analysis being done for INDICASAT on our assessment and the capacitation needs of the community. By providing the community with a direct link to INDICASAT and potentially other Panamanian agencies, this would begin to provide the institutional support necessary for the survival of their own monitoring practice in the long term.

Though outside of our monitoring program's direct scope, facilitating the implementation of this community water monitoring initiative would assist in: a) generating a greater supply of data on the quality of water in the area by opening the opportunity for testing more points and with greater frequency; b) giving locals direct access and understanding of data about their watershed; c) building communal knowledge, awareness, and concern on changes occurring in the biophysical environment; d) give locals

⁷⁹ Timing will likely fluctuate depending on schedules and individuals' learning abilities

greater purchase on the policy- and decision-making debates that concern their aquatic resources; e) adding cost-effective and complementary information to the general monitoring program conducted in the area; and f) may actually aid the processes of communal organization and dissemination of information.

As a link between the communities of San José del General, academia, and the government of Panama, it should be within the interest of this monitoring project to see that the water concerns of locals are attended to through the implementation of such a program or a [more substantial response by the government.]