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FOREWORD

On behalf of Exceptional Women in Sustainability -eWisely, I am pleased to announce the publication of the second issue of the International Journal of Women, Sustainability and Leadership Studies. This Journal is a half-yearly peer-reviewed academic journal produced by the Research eWisely Lab. It aims to publish research, reports, and literature reviews relating to women, sustainability and leadership studies. We accept publications in English, Spanish and Portuguese that cover the following topics:

- Women and the Sustainable Development Goals (SDGs) and the Agenda 2030
- Women, Corporate Sustainability Reporting and Performance
- Women, Sustainable Energy and Extractives (Mining, Oil and Gas)
- Women, Sustainability and Climate Change
- Women, Education and Impact Research for Sustainable Development
- Women and Sustainable Lifestyles
- Women and Sustainable Fashion
- Women and Sustainable Entrepreneurship
- Women and Sustainable Livelihoods, Agriculture and Fisheries
- Women, Sustainability and Social Investing
- Women, Sustainability and Leadership

The way that women are represented or challenged within disruptive industries and challenging environments, the linkages with the industry and socio-environmental sustainability issues, attraction and retention of women at the work place, women entrepreneurs and implications for their livelihoods, for example, are some of the topics this journal covers. The journal is designed to be an interdisciplinary journal, and it encourages young scholars, practitioners and students within all relevant disciplines to submit their work for publication. In this issue, we feature the work of researchers from Australia, Japan, Colombia and Brazil:

Franco, I and Derbyshire, E (2018). Women Have Energy to Boost: A Capacity-building Approach for Sustainable Energy. *International Journal of Women, Sustainability and Leadership*, 1(2), 4-10

De Moraes, L., De Almeida, E and Arruda, M (2018). Inclusão De Mulheres Em Vulnerabilidade Social No Estado Do Mato Grosso (Brasil): Programa De Extensão Teresa De Benguela. *International Journal of Women, Sustainability and Leadership*, 1(2), 11-16

Powel, C (2018). Gender and Sustainability: Trends, Themes and Policies. *International Journal of Women, Sustainability and Leadership*, 1(2), 17-21

Cano, N and Espinoza, T (2018). Gender Mainstreaming Social, Economic and Institutional Contributions for Sustainable Community Development. *International Journal of Women, Sustainability and Leadership*, 1(2), 22-30

Accordingly, we invite contributions. The call for submissions is general, so as long as articles deal with issues concerning with women and sustainability theory we consider them for publication. Contributions will be blind peer-reviewed, and submitted work should be original. Authors are encouraged to submit their publications through eWisely.org. All communications, including manuscripts and general enquiries, should be directed to invest@ewisely.org

Isabel B. Franco, Ph.D
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Women Have Energy to Boost: A Capacity Building Approach for Sustainable Energy

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ABSTRACT- There is an increased concern in the literature about unsustainable energy practices and potential effects on vulnerable community groups, particularly on women and girls. This study explores how women can boost their assets and capacities to cope with the effects of unsustainable energy consumption, such as use of pollutants and waste, use of fossil fuels, inadequate compensation for the loss of livelihood options and lack of corporate accountability for adverse unsustainable energy practices. In the practicality, the international community and local stakeholders (higher education institutions, the private sector, governments, and civil society organizations) have joint efforts to build women's capacity by delivering technical assistance programs under the umbrella of the Sustainable Development Goals (SDGs). Research shows that existing capacity-building approaches do not strategically target women and fail in incorporating priority capacity-building areas valuable for women. However, these efforts represent a potential for fostering sustainable energy consumption patterns and therefore overall sustainability. This manuscript argues that boosting women's capacities to cope with the effects of increasing unsustainable energy consumption can foster overall sustainability in the long run. Based on a comparative case study methodology, the research reported in this manuscript identifies priority capacity-building areas valuable for women and proposes a capacity-building approach for sustainability in Japan, Asia and Colombia, Latin America, the selected case study locations.

KEY WORDS: Sustainability, energy, women, capacity-building, Asia, Latin America

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INTRODUCTION

Existing capacity-building initiatives for sustainability appear to have achieved a very low level of impact, as these actions are often disconnected to the local context or are irrelevant for women and girls. Yet there are many unanswered questions in this area and the research reported in this article aims to increase our understanding in this field. What the main capacity-building priority areas are and how valuable they are for women, are some of the questions that will be addressed in this article. Identifying and improving core capacity-building areas seems from this study to be the most effective way to enhance the ability of women to cope with pressing sustainability challenges over time. Based on stakeholders' perceptions in two case studies, this article pays attention to the nature and importance of these capacity-building priority areas.

This article argues that capacity-building impactful areas are those valuable for women and the contexts they are immersed. The focus of this research is to identify and investigate the actual level of impact of existing capacity-

building initiatives, and recommend priority areas, so that stakeholders in the case study locations can play a stronger role in helping women boost their assets towards sustainable energy consumption practices. This article also explores existing capacity-building approaches to assist women in protecting their assets and capacities and reverse the effects of unsustainable energy consumption. Scholarship debates show that capacity-building has been a subject of analysis by scholars from various disciplines like education, economics and more recently sustainable development. Coined as a long-term process to strengthen individuals' and organizations' skills to solve problems and achieve objectives, the notion capacity-building for women has been well covered in the literature; however, there are few scholars who deal with its impact to reverse unsustainable energy consumption at the local level. Although the subject of capacity-building is appealing from a rhetorical standpoint, yet at the community level, these initiatives appear to have achieved a very low level of impact, particularly for women. However, why this is the case has

not been explored extensively. This research gap needs further exploration, specifically in developing contexts, where capacity-building for women is essential in the face of escalating sustainability issues. Therefore, it is necessary to investigate the actual level of achievement of these initiatives, to identify barriers to their impactful implementation in local development agendas and to recommend ways of overcoming these barriers, so that stakeholders can play a stronger role in assisting women build resilient assets and reverse existing unsustainable practices at the local level. Following a qualitative methodological approach, this article compares two cases in Latin America and Asia.

LITERATURE REVIEW

Women and Sustainable Energy

Unsustainable energy practices are becoming a pressing issue in the global sustainable development agenda. Therefore, the importance of investigating this issue through gender lens to further examine the effects on women and girls. Boosting women's capacity and assets to cope unsustainable energy consumption patterns can create a positive change in the contexts in which they are immersed (Denton, 2002). Sustainable development, one of the key buzzwords which flooded academic literature and policy documents in the 1990's has been reinvigorated into a new phase of influence under the United Nations (UN) Sustainable Development Goals, 17 global aims to be achieved by 2030, the successor of the Millennium Development Goals. 'Sustainable development' a term defined in the 1987 Brundtland Report as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Commission, 1987:41). The importance of this often-quoted statement has had a growing influence as the threats and effects of energy issues become more evident in the present and worrisome for the future generations.

There is an increased concern in the literature that unsustainable energy practices have a major impact on vulnerable community groups, particularly on women and girls. A major issue of sustainable development policies and literature is the lack of active women's participation and involvement and therefore their lack of capacity to cope with unsustainable energy practices. Whilst women's rights have progressed throughout the past century, there are still many gaps in the literature and active participation in many forms across the globe. Amartya Sen (1999) posited the need for increasing women's agency as "women are increasingly seen as active agents of change: the dynamic promoters of social transformation." Sen (1999:191) also argues that "the survival disadvantage of women compared with men in developing countries seems to go down sharply- and may even get eliminated- as progress is made in women's agency." This statement highlights not only the importance

women's agency but also the vulnerability of the contexts in which women are immersed.

The complexities of the contexts in which women are immersed have escalated in the past years due to pressing socio-environmental unsustainable practices at the local level (Cecelski; 2000; Denton, 2002; Dankelman, 2010; Alston, 2014). Cecelski (2000), for example argues that from a social standpoint "women's economic contribution is often unpaid, unrecognized and undervalued" resulting in a lack of investment in technological advancements to relief their burden which limits their agency. On the environmental domain, it is argued that "the threats posed by global warming have failed to impress on policy-makers the importance of placing women at the heart of their vision of sustainable development" (Denton, 2002). Unfortunately, the role of women in society and the household places them at a great disadvantage to men particularly when disasters occur. A situation that worsens during recovery stages. This is due to the fact that women are often left with socio-cultural norms and care giving responsibilities which reduce their mobility in seeking shelter from disaster risks. They also lack access to energy sources, clean water, safe sanitation and health supplies which adds to their burden (Dankelman, 2010). Therefore, in order for climate change policy to be effective it must take into account the interests of all stakeholders, signifying that women and those particularly in developing countries must have a voice in policy decision that are more likely to affect them (Denton,2002).

Boosting women's capacity to tackle adverse unsustainable energy practices through supply of clean, regular energy will alleviate poverty of many people across the world. "Difficult, time-consuming work of collecting and managing traditional fuels (which) is widely viewed as women's responsibility, is a factor in women's disproportionate lack of access to education and income, and inability to escape from poverty" (Kaygusuz, 2011:936). In this regard, Alston (2014) argues that there is an urgent need for gender mainstreaming in policy documents particularly those with regards to climate change as the failure to do so "risks cementing gender inequalities in post-disaster and reconstruction efforts because of the inherently inequitable power relations, resource allocations and underpinning assumptions on which responses to climate disasters are based." Overlooking women's agency and their potential to cope pressing issues can become detrimental to future policy decision on climate change and overall energy sustainability (Alston, 2014).

Women, Sustainable Energy and Capacity-building: Making the Links

To reverse the impacts of unsustainable energy practices such as indiscriminate use of natural resources, use of fossil fuels and pollutants, waste production, inadequate compensation for the loss of livelihood options and lack of corporate accountability for adverse environmental impacts, international organizations have promoted a set of technical

assistance programs and community capacity-building initiatives in developing countries (UNDP, 1997). These global actions have been the subject of analysis by scholars from various disciplines such as education, economics and more recently sustainable development. Global agencies such as the United Nations (UNDP, 2011) and the scholarly literature (Loza, 2004), posit capacity-building as a core area to be addressed in both developed and developing contexts. Capacity-building initiatives for women have become a recent subject of debate. It is argued that women, particularly in developing countries lack education and therefore stakeholders should boost their capacities as well as those of the broader community's (Gylfason, 2001).

While the idea of women's capacity building as a long-term process is appealing from a theoretical standpoint, there are major challenges in its real-life application. Capacity-building initiatives, lack continuity due to the absence of a long-term commitment, resources, coordination and collaboration amongst stakeholders (Franco, 2014), relationships and dynamics of the community, management of power and resource imbalances and development of a community identity (Clifford and Petrescu, 2012). However, the major challenge is that institutional stakeholders are likely to believe that they know what the impactful areas of women's capacity-building are. Yet, an investigation of the situation shows this is not the case. This scenario creates confusion and resentment at the local level as institutional perceptions tend to overlook context-based barriers and impactful areas for capacity-building in sustainability (Wiek et al, 2012). Instead, the scholarship argues that community-based initiatives seem to be more effective when facing sustainability challenges. However, the scholarly literature indicates there are gaps in this area that need to be explored seriously (Nakata and Viswanathan, 2012). On the one hand, the literature shows that top-down capacity-building, usually implemented by the international community to achieve sustainable development goals through education, media and information-intensive campaigns can increase awareness but is not impactful enough to reverse unsustainable energy practices. It is argued that capacity-building, particularly for women are perceived by locals as a product to be sold, are usually poorly designed and underestimate the barriers women face to cope with unsustainable energy practices. Moreover, these initiatives fail in paying attention to the human side of capacity-building and therefore incorporating women's perceptions about priority areas and barriers to engage in sustainable patterns (Kempton et al, 1984; Kempton et al, 1992; Redman, 2013; Franco, 2014). On the other hand, policy-makers lack capacity to design impactful capacity-building initiatives for women (Mckenzie-Mohr, D. 2000).

METHODOLOGY

This manuscript is based on going research that explores the linkages amongst community capacity-building and sustainability. This study is qualitative in nature and was initially undertaken in Colombia. The Japanese case was

later explored and a global survey was conducted to identify priority capacity-building areas on sustainability for women and girls. Survey results have been triangulated through individual and group interview. 15 Semi-structured interviews were conducted with various stakeholders actively involved in capacity-building for sustainability in Colombia whilst 10 stakeholders were approached in the Japanese case. Literature and policy review were also conducted to explore existing global trends and capacity-building priority areas for sustainability. Focus groups were also conducted and involved the participation of multiple stakeholders, namely, higher education institutions, the private sector, governments and civil society.

Two case study areas have been selected, Risaralda, Colombia in Latin America and Okayama, Japan in Asia due to the complexities in existing capacity-building approaches in both cases. Representatives from higher education institutions and government representatives in both cases facilitated data collection and have been actively involved in ongoing research.

DISCUSSION

This section aims to discuss priority areas of capacity-building to help women boost their assets, cope with unsustainable energy practices, and realize their full potential. This section also discusses and underlines that women's abilities can be enhanced if priority areas are identified and adequate capacity-building is developed and delivered in the selected case study areas. Research findings indicate that priority or impactful areas for capacity-building are those aligned with women's aspirations (Amartya Sen, 1999) in collaboration with public and private stakeholders and in alignment with the Sustainable Development Goals (SDGs). Capacity-building areas for sustainability should follow the global agenda for sustainable development without neglecting the local contexts in which vulnerable groups, particularly women are embedded. Neglecting local expectations hinder women's ability to foster overall sustainability and questions the effectiveness of existing capacity-building approaches (Puk and Behm, 2003).

Risaralda, Colombia

In Risaralda, Colombia priority areas for sustainable development depend largely on the contexts in which women are immersed. Risaralda is a region located in the Colombian Andes in South America. This geographical area holds extensive reserves of gold, silver and coal. With the escalation of fossil fuel projects, stakeholders in Risaralda have attempted to maximize social benefits for vulnerable groups, particularly for women. Whilst, at the local level stakeholders join efforts to develop a capacity-building approach that tackles key community issues (Franco, 2014); at the regional level, high priority areas for capacity-building in Latin America include but not limit to SDG 4: Quality Education; SDG 6: Clean Water and Sanitation; SDG 9: Industry Innovation and Infrastructure; SDG 11: Sustainable

Cities and Communities; SDG 12: Responsible Consumption and Production; SDG 13: Climate Action; SDG 15: Life on Land (Franco et al, 2018).

Collaboration for capacity-building for sustainability is characterized by active community engagement. Despite the escalation of fossil fuel projects, communities, particularly women's capacities have been boost to cope with existing sustainability challenges. The success in the implementation of priority capacity-building projects depends on both state and non-state actors. Colombia is a resource country and so, the escalation of large fossil fuel projects. Very often, communities depend largely on extractive industries and their development aspirations are usually aligned with resource extraction. The extractive industry in Risaralda has somehow providing communities, particularly women with capacity-building initiatives. However, these actions are limited compared to the adverse impacts caused by the extraction of minerals and metals.

Disruptive industries such as mining, oil and gas will eventually affect the livelihoods of women in farming, jewellery design, artisanal mining, large-scale mining and other economic activities. Women farmers, for example, are choosing artisanal mining over agriculture (Franco, 2017). Research shows that although women's expectations have been considered in the implementation of capacity-building agendas, stakeholders involved, namely, governments the private sector and education institutions need to further assist women and surrounding communities in enhancing their capacities to cope with the indiscriminate use of natural resources. This will in turn have a positive impact on women and community sustainability. Women consultation in relation to their needs and expectations is highly valued by female leaders, resulting in immediate benefits for them and the broader community (Franco, 2014). Some female coffee and jewelry producers and women entrepreneurs have already express the importance of implementing capacity-building better aligned with their development aspirations:

"We have been trained in jewelry design ... the company has also provided us with some financial assistance to attend international fairs so that we can promote and sell our products" (Community Members, Interview).

The role of non-state actors such as extractive industries in boosting women's capacity to cope with unsustainable energy consumption has been a driver to enhance resilient women's and community's assets. Ensuring sustainable energy practices does not restrict to the role of the government but also involves other parties such as the extractive industry, governments, civil society and education institutions (Davies, 2005; Franco; 2014).

Joint efforts of involved parties are further required to help women boost their capacity and develop asset-based adaptation strategies to cope with unsustainable energy practices:

Both, women and men have a strong sense of community. They own agriculture-based community associations that stimulate the local economy, foster employment and leadership. For example, they own associations for blackberry and coffee production and commercialization" (Corporate Representative, Interview)

Another significant finding in the Colombian case study is the active participation of the women in the formulation of sustainable development agendas particularly in resource-rich regions. Women have benefited from capacity-building initiatives helping them to cope with livelihood transformations due to the impact of fossil fuel projects:

"the company helped the municipality to open a plant for waste collection which has the potential for generating income for women and the local community" (Community Leader, Jewellery CBO, Interview).

Such initiatives include development activities in agribusiness, dressmaking, jewelry, coffee production, and agriculture (Franco, 2014). These initiatives are the result of effective government-corporation partnerships and in response to requests from women. Upfront investment in priority areas will assist women in realizing their full potential in the case study area.

Based on stakeholders' and community's perceptions, these areas are income, employment, education and training, work experience and apprenticeships and infrastructure development (Franco & Kunkel 2017).

- Generating and managing income;
- Employment opportunities;
- Education and training;
- Work experience and apprenticeships and
- Infrastructure for development

The case study showed that stakeholders should boost these areas in order to help women become more resilient and cope with the impacts of unsustainable use of natural resources in the Latin American case study location.

Okayama, Japan

Okayama is a prefecture located in the southern part of Japan, Asia. Its economy comprises major industries such as petrochemicals, coal chemicals, and transport equipment, chemical, steel and general machinery/tool. Energy consumption patterns have increased the complexities in multi-stakeholder collaboration for capacity-building and education for sustainable development (Abe, 2017) Research findings show that impactful capacity-building areas in Asia and the Pacific need to further be focused on SDGs 4: Quality Education, SDG 15: Life on Land and SDG 17: Partnerships for the Goals (Franco and Vaughter, 2018). While quality education is becoming a major trend, research findings show that capacity-building should focus on connecting nature to people and sharing common ground to protect the environment. So far, the environment is not given the right

emphasis, hence many initiatives have been undertaken so that human society and nature can thrive together. Capacity-building for sustainability have been backed by strong government policies in Asian nations such as China, Japan and the Philippines (Ryan et al., 2010). However, it is argued that despite strong government support, there is a lack of collaboration for capacity-building for sustainability if compared to other regions (Naeem, 2011).

Multiple stakeholders in the Japanese case are collaborating in building community capacity in sustainability. Led by the local government, the existing approach targets from children at early stages in the education system to adults through non-formal education. Based on participants' perceptions, priority areas for capacity-building are as follows:

- Water quality
- Biodiversity
- Traditional Knowledge
- Teacher education on sustainability
- Aging communities
- Corporate sustainable responsibility

Although the broader community is systematically being integrated in the existing capacity-building approach to sustainability, the major challenge encountered by stakeholders is the inclusion of women in decision making in the identification of capacity-building priority areas:

'It is an interesting question because when we talk about the ration of participants of community-based activities the majority are women but when it becomes of decision making, most are men' (Higher Education Representative, Japan).

'Young mothers with children are involved in community capacity-building' because they have more time' (Civil Society Representative, Japan)

Vague responses were also provided by participants when addressing this issue: 'we are including these issue broadly' - stated one of the participants (Higher Education Representative, Japan). However, lack of women participation in decision-making processes around capacity-building seems a general issue and does not only pertains to the subject of this research.

'When women graduate from school they work but after giving birth their participation in the workforce declines. When they turn 40 and their children are grown up they get a part time job (Higher Education Representative, Japan).

Overlooking women's voices in the development of capacity-building approaches to sustainability cannot only escalate unsustainable patterns (Kempton et al 1984; Kempton et al, 1992; Redman, 2013; Franco, 2014) but also reflects the lack of capacity to design impactful capacity-building initiatives for women (Mckenzie-Mohr, D. 2000) and for the community as a whole. A situation that prevents

stakeholders from fostering overall sustainability in the long run, in the Japanese case.

A capacity-building Approach for Sustainable Energy

Research indicates that both cases acknowledge the participation of women in capacity-building approaches to sustainability. However, the Japanese case differs from the Colombian case study in fostering women's decision making to cope with sustainability challenges around energy and other pressing issues. Interestingly, women in Colombia are more empowered and have been able to integrate their development aspirations in the design of existing capacity-building approaches to sustainability. Whilst women are strategically targeted in existing capacity-building initiatives in Colombia; in the Japanese case, the inclusion of women in capacity-building for sustainability is mainly due to time convenience or to meeting government requirements. Interestingly, in both case study areas multi-stakeholder collaboration and alignment with SDGs are perceived as a determinant factors for the success of existing capacity-building approaches.

Research also shows that priority areas are those most valuable for women and the broader community. This inductive derivation indicates their critical importance to enhance women's capacities and protect their assets. Despite other forms of capacity-building sometimes being mentioned, these were constantly identified as central. A capacity-building approach to sustainability targeting some or most of these areas will assist women and the broader community in coping with sustainability challenges in energy and other pressing issues. Figure 1 shows a preliminary proposal of a Capacity-building Approach for Sustainable Energy in alignment with SDGs. Further research aims to draw recommendations to better align priority areas with SDGs.

Figure 1. A Capacity Building Approach to Sustainable Energy

SDGs Colombia	Priority Areas	SDGs Japan	Priority Areas
SDG 4: Quality Education; SDG 6: Clean Water and Sanitation; SDG 9: Industry Innovation and Infrastructure; SDG 11: Sustainable Cities and Communities; SDG 12: Responsible Consumption	Generating and managing income; Employment opportunities ; Education and training; Work experience and apprenticeships and Infrastructure for development	SDGs 4: Quality Education SDG 15: Life on Land and SDG 17: Partnerships for the Goals	Water quality Biodiversity Traditional Knowledge Teacher education on sustainability Aging communities Corporate sustainable responsibility

on and Production; SDG 13: Climate Action; SDG 15: Life on Land			
Multi-Stakeholder Collaboration			

CONCLUSIONS

The escalation of unsustainable practices are likely to result more detrimental for vulnerable community groups, particularly for women and girls. Successful integration of priority areas for capacity-building can boost women's capacities to cope with unsustainable practices in energy or other pressing issues. This manuscript recommended a strategic approach to boost women's abilities to sustain their assets despite the escalation of unsustainable practices. It also highlights existing issues when integrating a gender lens perspective to examine sustainability issues.

This paper also indicated that priority capacity-building areas which are the most valuable for women are those that help them achieve their own sustainable development aspirations. Although collaboration of state and non-state actors is pivotal to boost women's capacity, a bottom-up approach to capacity-building for sustainability is more

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Inclusão De Mulheres Em Vulnerabilidade Social No Estado Do Mato Grosso (Brasil): Programa De Extensão Teresa De Benguela

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ABSTRACT - O Programa de Extensão Teresa de Benguela objetiva a inclusão de mulheres em risco ou vulnerabilidade social, tendo um olhar humano e específico para esta parcela da sociedade carente de qualificação e oportunidade. O nome do programa é uma forma de homenagearmos a mulher guerreira que salvou muitas vidas através dos Quilombos no Estado de Mato Grosso. Em 2017 o Instituto Federal de Educação, Ciência e Tecnologia de Mato Grosso (IFMT) qualificou mais de 200 mulheres, em 12 projetos diferentes em diversos municípios do Estado de Mato Grosso. O programa é dividido em três etapas interligadas: 1. Empedramento da mulher: através de oficinas e dinâmicas no campo da psicopedagogia, em que as mulheres são motivadas e levadas ao autoconhecimento. Nesta etapa a principal ferramenta utilizada é a metodologia do Mapa da Vida. 2. Técnica e tecnologia: cada projeto que compõe o programa tem uma proposta de capacitação das mulheres em determinada técnica ou domínio de tecnologia, a partir da qual a mulher estará apta a se inserir no mercado de trabalho ou abrir o próprio negócio. 3. Empreendedorismo: capacitação acerca do tema empreendedorismo, ensinando-as como montar o próprio negócio e como produzir em escala comercial, podendo alcançar o mercado. Nesta etapa as mulheres estudam como agregar valor e renda em suas vidas, e de suas famílias, com as técnicas aprendidas. Com isto, preparamos cada mulher para a vida e para o mundo do trabalho. Com estas etapas, as ações desenvolvidas trazem o empedramento, a técnica e o empreendedorismo para cada mulher atendida, desenvolvendo competências transversais e emocionais que, somadas, as tornam capazes de serem donas de seus próprios negócios e exercerem com mais estima e dignidade sua cidadania. Com as atividades propostas no programa há uma emancipação individual das mulheres atendidas e o alcance de uma consciência coletiva que auxilia na superação de um estado de dependência social, cada uma descobre a capacidade de realizar, por si mesmo, mudanças necessárias para crescer e se fortalecer.

PALAVRAS-CHAVE: vulnerabilidade social; empreendedorismo; empoderamento feminino; mulheres.

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INTRODUÇÃO

Segun o Paulo Freire (1970) a educação é um processo que conduz a práticas libertadoras podendo transformar vidas. Nesse sentido, e tendo em vista pesquisas que apontam para a crescente presença da mulher no canteiro de obras devido a sua versatilidade e baixos índices de absentismo (ABrainc, 2017), o presente programa se justifica na necessidade de levar educação e capacitação a mulheres que se encontram em condições de vulnerabilidade social. O programa proporciona à essas mulheres a oportunidade de adquirirem uma profissão que permita o seu crescimento pessoal, a retomada da sua cidadania e a prática de seus direitos e suas responsabilidades, reinserindo-as novamente na convivência digna dentro de sua comunidade e de sua família.

O Programa de Extensão Teresa de Benguela fomenta o conhecimento e entendimento da situação das mulheres em vulnerabilidade, propiciando ambiente rico para pesquisas sobre as causas e soluções para as situações de risco ou vulnerabilidade social por qual passam as mulheres, apoiando as políticas públicas, principalmente na área social e de igualdade de gênero.

Mészáros (2002) afirma que as mulheres compõem 70% dos pobres do mundo e, além de serem responsabilizadas pela reprodução social, são também as maiores vítimas da precarização das políticas públicas. E são elas as que mais estão inseridas na informalidade e nos empregos precários, sem garantia ou direito trabalhistas assegurados.

Se observarmos vários aspectos relacionados à condição em que as mulheres se encontram, não é difícil perceber que elas estão em um patamar muito inferior aos homens. Globalmente, as mulheres recebem menos do que os

¹ Instituto Federal de Educação, Ciência e Tecnologia de Mato Grosso (IFMT).

homens. Na maior parte dos países, as mulheres ganham em média apenas 60 a 75% do salário dos homens (The World Bank).

O conjunto de ações desenvolvidas pelo programa é destinado a mulheres, justamente pelo fato de que elas, quando em situação de vulnerabilidade, têm mais dificuldades de reverter o contexto social e econômico em que se encontram, e em permear novos caminhos para autonomia financeira. Estes fatores podem muitas vezes estar vinculados à baixa autoestima, exercício da função de cuidadora no ambiente familiar, baixa ou nenhuma escolaridade, limitações de tempo e dificuldades de deslocamento.

A pobreza e a desigualdade social são medidas através de variáveis como rendimento. Porém, quando se fala em vulnerabilidade social feminina, leva-se em consideração a discriminação de gênero, posição de dependência, divisão sexual do trabalho e decorrente falta de tempo entre trabalho e atendimento à família (IBGE, 2010).

Nesse cenário, a educação é o instrumento que possibilita o desenvolvimento social e permite a superação de grupos em estado de vulnerabilidade social, dá autonomia e desperta a consciência de reais possibilidades, para optar por outros caminhos além das funções domésticas e maternais (FIUZA, 2016).

...mulheres que retornam ao estudo demonstram que a educação poderia se configurar em um novo horizonte, uma nova possibilidade de ser e se desenvolver enquanto sujeito pessoal, mas também enquanto sujeitos em comunidade. (FIUZA, 2016, p.11).

A educação profissional amplia esse novo horizonte uma vez que educando, prepara o indivíduo para o mercado do trabalho.

As temáticas abordadas no Programa Teresa de Benguela são atuais e de grande relevância internacional, inseridas na agenda 2030 para o Desenvolvimento Sustentável. O programa está relacionado aos seguintes objetivos de desenvolvimento sustentável (ODS):

01. Acabar com a pobreza em todas as suas formas, em todos os lugares. As mulheres são as que mais estão inseridas na informalidade e nos empregos precários e, sendo assim, o acesso dessas mulheres a educação e ao empoderamento feminino pode diminuir a pobreza extrema.

04. Assegurar a educação inclusiva, equitativa e de qualidade, e promover oportunidades de aprendizagem ao longo da vida para todas e todos. Nesse sentido, o Programa desenvolvido pelo Instituto Federal de Educação, Ciência e Tecnologia de Mato Grosso (IFMT) tem como objetivo atender a um público de mulheres em todas as faixas etárias e que precisam de integração social.

05. Alcançar a igualdade de gênero e empoderar todas as mulheres e meninas. Para atender a esse objetivo, o programa fomenta o empreendedorismo como uma maneira inovadora de promover esse crescimento.

08. Promover o crescimento econômico sustentado, inclusivo e sustentável, emprego pleno e produtivo e trabalho decente para todas e todos. A etapa do empreendedorismo do Programa tem o objetivo de promover este crescimento, sendo uma inovação.

10. Reduzir a desigualdade dentro dos países e entre eles. A partir do programa, as mulheres tornam-se capazes de abrir seus próprios negócios e são também capacitadas para o mercado de trabalho, reduzindo a desigualdade social através da elevação da renda.

METODOLOGIA

Em 2017 o Instituto Federal de Educação, Ciência e Tecnologia de Mato Grosso lançou um Edital de seleção de projetos para atender os objetivos do Programa Teresa de Benguela. Foram selecionados 12 (doze) projetos de qualificação para mulheres, voltados à promoção de cidadania e geração de renda às participantes. Cada projeto previa a realização de um curso, com carga horária de até 160 (cento e sessenta) horas, para no mínimo 25 mulheres e com período de vigência de 04 meses (agosto a dezembro de 2017). Cada projeto selecionado pelo edital do programa recebeu auxílio financeiro de até R\$ 1.500,00 (mil e quinhentos reais) mais duas bolsas para servidores e alunos, totalizando R\$ 58.800,00 (cinquenta e oito mil e oitocentos reais).

Cada projeto seguiu a metodologia proposta pelo programa para atingir os objetivos, sendo dividida em três etapas interligadas:

1. Empoderamento da mulher: através de oficinas e dinâmicas no campo da psicopedagogia, em que as mulheres são motivadas e levadas ao autoconhecimento. Nesta etapa a principal ferramenta utilizada é a metodologia do Mapa da Vida. O Mapa da Vida é um método ensinado aos Institutos Federais, a partir do advento do projeto-piloto Mulheres Mil, pelos Coléges Comunitários Canadenses, para estimular as mulheres a planejarem os sonhos profissionais. Por meio do mapa, elas refazem o caminho que percorreram desde que nasceram, relembram seus sonhos, por que desistiram deles e as rupturas pelas quais foram submetidas para depois recomeçarem o caminho rumo à realização dos seus sonhos, sonhos estes que podem ter mudado. O Programa Mulheres mil teve como objetivo promover a formação profissional e tecnológica de cerca de mil mulheres desfavorecidas das regiões Nordeste e Norte do Brasil, de acordo com as necessidades educacionais de cada comunidade e a vocação econômica das regiões.

2. Técnica e tecnologia: cada projeto que compõe o programa tem uma proposta de capacitação das mulheres em determinada técnica ou domínio de tecnologia, a partir da qual a mulher estará apta a se inserir no mercado de trabalho ou abrir o próprio negócio.

3. Empreendedorismo: capacitação acerca do tema empreendedorismo, ensinando-as como montar o próprio negócio e como produzir em escala comercial, podendo alcançar o mercado. Nesta etapa as mulheres estudam como agregar valor e renda em suas vidas, e de suas

famílias, com as técnicas aprendidas. Com isto, preparamos cada mulher para a vida e para o mundo do trabalho.

Com estas etapas, as ações desenvolvidas trazem o empoderamento, a técnica e o empreendedorismo para cada mulher atendida, desenvolvendo competências transversais e emocionais que, somadas, as tornam capazes de serem donas de seus próprios negócios e exercerem com mais estima e dignidade sua cidadania.

A metodologia do programa é formada por três etapas, sendo elas o plano de Acesso, Permanência e Êxito descritos abaixo:

1. Acesso

a) Viabilização dos espaços do campus ou de instituições parceiras, para a realização das atividades do curso.

b) Formalização de parcerias, com o apoio da Direção/Coordenação de Extensão do Campus ou da Pró-Reitoria de Extensão do IFMT (PROEX), por meio de um termo de cooperação técnica, quando houver necessidade.

c) Metodologia do contato, seleção e inscrição de candidatas, preferencialmente podendo contar com o apoio de uma entidade ou instituição parceira.

d) Divulgação do resultado da seleção em meio de comunicação acessível às inscritas, bem como da data de matrícula.

e) Reunião com a equipe que participará direta ou indiretamente para repassar os informes referentes à execução do curso e metodologia que será utilizada.

2. Permanência

a) Realizar a aula inaugural, apresentando a metodologia que será utilizada na realização do curso.

b) Iniciar as aulas e ministrar os componentes curriculares de acordo com o planejamento.

c) Elaborar e aplicar diagnóstico participativo da situação sociocultural, como ferramenta que possibilite intervenções pela equipe técnica do curso.

d) Identificar, entre as mulheres, processos inovadores que permitam incorporação de tecnologias e conhecimentos com vistas à geração de negócios.

e) Realizar oficinas, seminários e/ou palestras como complemento ao curso, sempre que for possível.

3. Êxito Pedagógico e Profissional

a) Identificar processos, produtos e serviços inovadores que permitam incorporação de tecnologias e conhecimentos com vistas à geração de renda/negócios.

b) Contribuir para o êxito das discentes através de articulação com o setor produtivo para inserção no mundo do trabalho e verificar possibilidades de continuidade da formação profissional.

c) Apresentar alternativas de ingresso no mundo do trabalho, como iniciativa empreendedora própria, formação de cooperativas, associações ou grupos de economia solidária.

d) As mulheres participantes do curso deverão ser orientadas para a elevação de escolaridade, que poderá acontecer por meio de parcerias firmadas com instituições de ensino estaduais, municipais e/ou federais, pelos centros de EJA, PROEJA, entre outros.

As doze ações foram desenvolvidas em vários municípios do Estado de Mato Grosso, Brasil, qualificando mais de 200 mulheres, conforme tabela abaixo:

Tabela 1. Resumo dos projetos selecionados pelo edital nº 63/2017/IFMT/PROEX do Programa de Extensão Teresa de Benguela.

	Título do Projeto	Campus	Resumo
1	Oficinas de cidadania para mulheres	Primavera do Leste	Oficinas de cidadania na área de Secretariado para mulheres da Favela da BR 070.
2	Industrializando esperança	Campo Novo do Parecis	Capacitar mulheres do projeto "Mulher Esperança" (projeto da Pastoral da Criança para famílias desabrigadas pelo alagamento) em industrialização de alimentos com ênfase em boas práticas de fabricação.
3	Capacitação para mulheres inspiradoras: utilização e manuseio cotidiano de agrotóxicos e afins no ambiente doméstico	Sorriso	Capacitação em forma de oficinas com total de 100 horas para mulheres em situação provisória ou permanente de alto risco social na temática de agrotóxicos no ambiente doméstico.
4	Gestão de resíduos sólidos	São Vicente	Formação em gestão de resíduos sólidos para catadoras de latinha do município de Jaciara.
5	Empoderamento feminino - uma ferramenta para o resgate da cidadania	Campo Novo do Parecis	Capacitar mulheres beneficiárias do Bolsa Família moradoras de bairro popular com base na demanda apresentada pelo Sistema Nacional de Empregos, resgatando a cidadania pela geração de renda.

6	Geração de Renda, Tecnologia e Valorização do Trabalho Feminino	Várzea Grande	Curso "Inclusão Digital, Tecnologia e Valorização do Trabalho Feminino" para inclusão educacional, produtiva e social de mulheres da Associação de Catadores de Resíduos Sólidos.
7	Mulher catadora: olhar transformador	Tangará da Serra	Curso de alfabetização e língua portuguesa básica (e outras oficinas) para mulheres da COOPERTAN (Cooperativa de Produção de Materiais Recicláveis).
8	Mulheres na Construção Civil	Várzea Grande	Curso de 160 horas para 40 mulheres, que residem nos bairros em torno do IFMT VGD, indicadas pelos Assistentes Sociais do CRAS da região, para atuarem no mercado de trabalho da construção civil, mais especificamente nas funções de azulejistas e pintor de parede.
9	Caminho das borboleta: orientação profissional e desenvolvimento de competências.	Campo Novo do Parecís	Treinamento comportamental de orientação profissional e desenvolvimento de competências com mulheres alunas do EJA e 3º ano do Ensino Médio da Escola Padre Arlindo.
10	Curso de qualificação para mulheres em vulnerabilidade: lutando em defesa da vida, cidadania e igualdade de oportunidade	Juína	Curso sobre temas sociais para mulheres em vulnerabilidade financeira, visando a geração de renda.
11	Capacitação em fabricação artesanal de produtos de limpeza e higiene pessoal	Lucas do Rio Verde	Curso de fabricação artesanal de produtos de limpeza e higiene pessoal para mulheres indicadas pela Secretaria Municipal de Assistência Social.
12	Artesanato em madeira: reconhecendo saberes e criando novas perspectivas por meio da arte	Sorriso	Curso de técnicas de pintura em madeira para mulheres ligadas ao CRAS São Domingos.

Fonte: Léa Morais.

Após a conclusão dos projetos, foram aplicados questionários de avaliação do programa aos extensionistas e às mulheres atendidas.

RESULTADOS E DISCUSSÃO

As doze ações foram desenvolvidas em vários municípios do Estado de Mato Grosso, Brasil, totalizando 329 (trezentos e vinte e nove) inscritas nos cursos. Destas, 251 concluíram as atividades, percebendo-se uma evasão média entre os projetos de 29,55% das mulheres, número considerado ótimo quando comparado a cursos regulares e programas com públicos específicos como Mulheres Mil e Pronatec.

Em Sorriso, a partir do desenvolvimento do projeto 12 (descrito na tabela 1), um grupo de mulheres aprendeu técnicas de artesanato em madeira, fabricaram diversos produtos para decoração e organizaram uma feira para comercializar e divulgar o trabalho. Outro grupo de mulheres, referente ao projeto 3, recebeu qualificação acerca de defensivos agrícolas e o descarte correto de cada tipo de embalagem.

Em Campo Novo do Parecís, projeto 5, mulheres beneficiárias do Programa Bolsa Família do Governo Federal aprenderam boas práticas de manipulação de alimentos, bem como diversas técnicas de confeitaria. Neste município há uma grande oferta de emprego na área de panificação e escassez de mão de obra qualificada. Parte do curso ocorreu em parceria com uma grande panificadora que acabou

absorvendo parte das alunas contratando-as para o trabalho. Outro grupo de mulheres, no projeto 2, de famílias desabrigadas por um alagamento, foi capacitado em industrialização de alimentos, aprendendo técnicas para iniciar produção e comercialização de conservas, doces e compotas. Ainda na mesma cidade, mulheres estudantes do EJA (Educação para Jovens e Adultos) puderam ter suas habilidades e competências desenvolvidas através de Coaching no projeto 9.

No município de Várzea Grande, mulheres indicadas pelo CRAS (Centro de Referência de Assistência Social) participaram do projeto 8, em curso na área de construção civil, com foco em aplicação de azulejos e pisos. A região está em expansão e falta mão de obra qualificada. A mulher se destaca em acabamentos na construção civil por ser detalhista e cuidadosa. Muitas destas mulheres terminaram o curso já trabalhando na área. Outro grupo de mulheres da Associação de Catadores de Resíduos Sólidos do Município de Várzea Grande, recebeu com o projeto 6 um curso com diversas oficinas com o objetivo da inclusão digital e tecnológica, valorizando o trabalho feminino.

Catadoras de resíduos sólidos do município de Tangará da Serra foram alfabetizadas e tiveram oficinas de língua portuguesa a partir do projeto 7. Outro grupo de Catadoras de resíduos sólidos, no município de Jaciara, recebeu diversas oficinas de língua portuguesa, informática, saúde coletiva, gestão de resíduos sólidos, entre outras pelo projeto 4.

Mulheres da Favela BR-070, em Primavera do Leste, que participaram do projeto 1, receberam curso na área de secretariado com vistas à empregabilidade e inserção social. Já em Lucas do Rio Verde, mulheres indicadas pela Secretaria Municipal de Assistência Social foram capacitadas pelo projeto 11 para fabricação artesanal de produtos de limpeza e higiene pessoal. Os produtos foram comercializados em feira e as mulheres puderam reduzir os gastos familiares fabricando os produtos que consomem e ampliando a renda vendendo-os.

Em parceria com o movimento UNEGRO pelo projeto 10, que tem como objetivo o combate ao racismo, toda forma de discriminação e opressão social, no município de Juína, foram ofertadas oficinas de artesanato e cuidados como manicure, maquiagem e penteados. As mulheres capacitadas puderam iniciar novas atividades laborativas, aumentando a renda familiar.

Após a conclusão dos projetos, foram aplicados questionários de avaliação do programa a todos os extensionistas e a um terço (33%) das mulheres atendidas.

- Pontuar os objetivos alcançados assim que atingidos, para ânimo das participantes.
- Auxílio financeiro para infraestrutura do projeto.
- Coordenação do projeto atuante.
- Demonstrar a cada participante como ela é importante para o projeto.
- Desenvolver o projeto no local em que estão as mulheres.
- Envolvimento de toda a equipe executora em todas as atividades.
- Evitar passar uma quantidade excessiva de conteúdo teórico, pois as participantes evitam algo maçante.
- Instrutores capacitados para tirar dúvidas.
- O interesse próprio das mulheres.
- Ofertar cursos que contribuam para a formação de renda das mulheres.
- Ofertar lanche.
- Ofertar uniforme e material escolar.
- Periodicidades nas ações.
- Procurar ter bom relacionamento com as alunas.
- Projeto ter um benefício vivível as participantes.
- Ser para um público que deseja e queira o trabalho. O projeto tem que fazer sentido para as participantes.

A permanência das mulheres no decorrer das capacitações é ponto crucial para sucesso do projeto. Diversos pontos devem ser observados a fim de evitar a evasão do público. A equipe extensionista que acompanhou cada projeto listou os fatores que acreditam que possa contribuir para esta permanência. Os fatores que mais se repetiram nas avaliações foram:

Trabalhar com as roupas ajudou a reformar meu guarda-roupa.

Tudo foi bom, mas eu gostei mais de aprender a fazer bolsa de artesanato, eu já vendi duas.

Faz-se necessário a realização de pesquisa quantitativa de comparação entre projetos que desempenharam determinadas ações para permanência e outros que não desempenharam, em relação à própria permanência destas mulheres.

A maioria das mulheres entrevistadas (66%) nos projetos do Programa Teresa de Benguela em 2017 são beneficiárias do Bolsa Família ou outro programa de assistência de órgãos do governo ou entidade assistencial. Este número revela a presença de mulheres em vulnerabilidade econômica nas capacitações, sendo atendidas com o objetivo de verticalizar suas rendas. Cerca de metade do público atendido (48%) não possui renda própria, estando desempregada ou estudando. Este público pode desenvolver habilidades técnicas específicas e vislumbrar o uso destas para criação de renda, através de inserção no mercado de trabalho ou desenvolvimento de negócio próprio. Uma grande parcela das mulheres atendidas (67%) nos projetos pretende abrir um negócio, atuar como empreendedora ou autônoma produzindo algo com as técnicas aprendidas nos cursos. Isto mostra a efetividade da capacitação em suas três etapas de empoderamento, técnica e empreendedorismo, desenvolvendo no público alvo o desejo de melhorar sua renda partindo da capacitação ofertada.

Não foram realizadas atividades de acompanhamento das mulheres egressas dos cursos do programa. Todavia, entendemos a importância da realização desse acompanhamento que seria capaz de fornecer dados a respeito da sustentabilidade da iniciativa.

CONCLUSÃO E CONSIDERAÇÕES FINAIS

Com as atividades propostas no programa há uma emancipação individual das mulheres atendidas e o alcance de uma consciência coletiva que auxilia na superação de um estado de dependência social, cada uma descobre a capacidade de realizar, por si mesmo, mudanças necessárias para crescer e se fortalecer como cidadã.

Dessa forma, ajudamos a sustentar e empoderar essas mulheres no espaço social que é o que tanto nos interessa, fazendo com que elas percebam que há um lugar para elas de crescimento e desenvolvimento.

Alguns depoimentos colhidos subsidiam e corroboram com estas conclusões:

Metas alcançadas com o Programa em 2017:

a) Fomento da oferta de cursos de qualificação nos Campi do IFMT que contribuam para a promoção do desenvolvimento tecnológico e socioeconômico local.

b) Atendimento a 251 mulheres em risco ou vulnerabilidade social, como forma de promover o desenvolvimento educacional, social e econômico dessas mulheres e suas famílias.

c) Promoção de inclusão socioprodutiva através da educação, atendendo a mulheres integrantes de comunidades tradicionais e em situação de vulnerabilidade.

d) Promoção do envolvimento e da cooperação de servidores e estudantes em atividades de extensão, fortalecendo a integração entre os Campi do IFMT e a sociedade.

e) Oportunidade de maior democratização do saber, fortalecendo a indissociabilidade entre ensino, pesquisa e extensão para atendimento a demandas sociais.

f) Contribuição para a formação profissional e cidadã dos estudantes.

g) Fomento a atividades didático-comunitárias articuladas ao ensino e à pesquisa, oportunizando a participação da comunidade acadêmica no desenvolvimento de projetos de extensão com aporte de recursos institucionais.

Foram identificados pontos a melhorar no programa realizado. Esses pontos foram listados e deverão ser utilizados para a elaboração e execução dos próximos editais:

a) Acompanhamento das egressas dos cursos.

b) Captação e destinação de mais aporte financeiro para apoio aos curso

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Gender and Sustainability: Trends, Themes, and Policies

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ABSTRACT - Since the 1990s, sustainable development has been the pre-eminent force behind the global development agenda. It has flooded academic literature and policy documents, before finally culminating in the United Nations (UN) Sustainable Development Goals — 17 global objectives to be achieved by 2030. These goals are orientated towards understanding, and combating, the complexities which underpin the nexus between poverty and inequality. The term, sustainable development, was first defined in the 1987 Brundtland Report, as, 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. The enduring salience of this often-quoted statement remains highly relevant for the global issues that confront humanity. Trends vis-à-vis energy security, climate change, employment, and population growth serve as examples of how unsustainable practices and gender inequality are mutually reinforcing.

KEYWORDS: Sustainability, Gender Equality, Sustainable Development, Energy, Education.

Amartya Sen (2001) highlights the importance of increasing women's agency and participation, as 'women are increasingly seen as active agents of change: the dynamic promoters of social transformation [page number required]. Sen (2001, p. 191) further argues that 'the survival disadvantage of women compared with men in developing countries seems to go down sharply — and may even get eliminated — as progress is made in women's agency.' Sen's argument not only emphasises the importance of promoting female agency — it also serves as an indication of the fragile vulnerability that women inhabit, which severely impedes upon their livelihoods and the proliferation of gender equality. Crucially, sustainable development goal number four and give target the provision of quality education and the expansion of gender equality ("Sustainable Development Goals," 2018). Gender equality encompasses the notion that equal rights and opportunities are accessible and applicable to both genders. It demands that the unique interests, and needs, of women are considered and legitimised (UNESCO, 2014, p. 11). Importantly, this review considers the argument that 'sustainable development and gender equality' are vital synergetic components of a broader strategy towards equal opportunity for women: 'gender equality can have a catalytic effect on achieving sustainable development' (Gender Equality and Sustainable Development, 2016, p. 111).

Gender, Energy, and Sustainability

The importance of understanding the issue of gender and sustainable energy practices is imperative — unsustainable energy practices are becoming a pressing issue in the global sustainable development agenda; moreover, unsustainable

energy usage imparts harmful effects upon realising the full potential of gender equality (Denton, 2002). The detrimental consequences of climate change and environmental pollution unleash the most hazardous effects amongst women, as women are more likely to be among the world's poor and impoverished, and rely more predominantly upon natural resources for their livelihood (Arora-Jonsson, 2011, p. 744; Women, 2009). Thus, it is imperative place women at the centre of co-operative solutions towards the future of climate change and energy sustainability.

There is an increased concern in the literature that unsustainable energy practices have a detrimental impact upon vulnerable community groups, and more particularly upon women (Arora-Jonsson, 2011, p. 745; Hemmati & Röhr, 2007, p. 7). In a more damaging vein, the complexities of unique contexts in which females are immersed in, and inhabit, have increased in the past years because of unsustainable socio-environmental practices within these contexts (Alston, 2014; Cecelski, 2000; Dankelman et al., 2008; Denton, 2002). For example, 'women's economic contribution is often unpaid, unrecognised and undervalued' (Cecelski, 2000) [page number required]. This causes less investment in female empowerment and agency, and, ultimately results in decreased sustainable development opportunities for women. The unfortunate reality is that women often face systemic disadvantage within society — this results in an increased risk to women when environmental and natural disasters occur, with the recovery stage of a disaster further exacerbating the systemic disadvantages that hamper women [add footnote with example/citation required]. Systemic disadvantages that

impede upon female empowerment and the expansion of gender equality, include embedded socio-cultural norms and care-giving responsibilities (Arora-Jonsson, 2011, p. 745). Furthermore, women also lack access to clean water, safe sanitation, and, house-hold energy supplies (Dankelman et al., 2008). Increasing female's capacities to face adverse unsustainable energy practices through the supply of sustainable and clean energy could lift many women around the world out of poverty (Parikh, Upadhyay, & Singh, 2012, p. 186). Kaygusuz (2011, p. 936) poignantly argues that the 'difficult, time-consuming work of collecting and managing traditional fuels [which] is widely viewed as women's responsibility, is a factor in women's disproportionate lack of access to education and income, and inability to escape from poverty.

Within the environmental domain, it is argued that threats caused by global warming and climate change have been unsuccessful in impressing upon policy-makers the importance of placing women at the centre of their plan for sustainable development (Denton, 2002). In this regard, a prominent issue which confronts sustainable development policies is the lack of active female participation in the shaping and construction of renewable and ecological policy [citation for this claim]. Although women's rights have progressed throughout the past century, there still exist cavities of knowledge regarding how active participation of women can be further encouraged. It is imperative that women, and particularly those in developing countries, have a voice in environmental policy decisions which directly implicate them (Denton, 2002). Importantly, this will increase the overall effectiveness of climate change policy. In this regard, Alston (2014) argues that there is an urgent need for gender mainstreaming in policy documents. Failure to insert the voice of women into policy 'risks cementing gender inequalities in post-disaster and reconstruction efforts because of the inherently inequitable power relations, resource allocations, and underpinning assumptions on which responses to climate disasters are based'

The Role of Higher Education Institutions and a Gendered Perspective for ESD and RSD

Education for Sustainable Development (ESD) and Research for Sustainable Development (RSD), is underpinned by the pivotal objective of empowering individuals to become 'global citizens,' and in turn 'proactive contributors' to a more peaceful, tolerant, and sustainable world (UNESCO, 2017, p. 7; 2018c). Crucial to ESD and RSD is the goal of social transformation by licensing learners to become empowered to 'transform themselves and the society they live in' (UNESCO, 2017, p. 7; 2018c). Moreover, RSD is principally focused on providing research that will generate relevant and sustainable knowledge ready for practice and implementation (Earth, 2015; Research, 2009, p. 8). Saliently, the nexus between ESD, RSD, and the expansion of gender

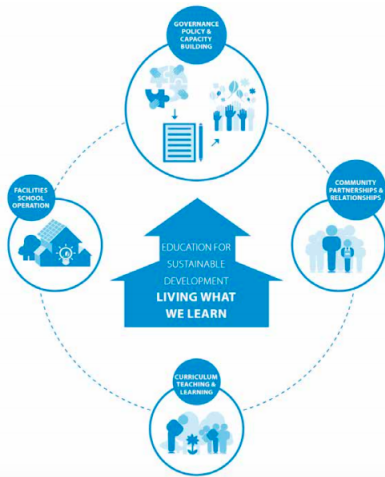
equality exists in target 4.7 of the SDGs, and aims to ensure that, 'by 2030...all learners acquire knowledge and the skills needed to promote sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and nonviolence, global citizenship and appreciation of cultural diversity (UNESCO, 2017, p. 8). Pursuant to target 4.7, it is evident that ESD, RSD, and gender equality are mutually reinforcing goals. The 2030 Sustainable Development Agenda emphasises the centrality of education and the role it plays in realising many of the SDGs; moreover, the inextricable link between gender equality and the right to quality education (Webb, Holford, Hodge, Milana, & Waller, 2017, p. 509). It is clear that 'quality education' is a domain of social policy that harbours the potential to degrade and erode the gender inequitable barriers that persist in societies across the globe (Vaughan, 2016, p. 5).

Harnessing ESD to expand gender equality around the globe

There exist many barriers and obstacles which hinder, and interfere with, women from having access to their right to participate in, and complete higher education (UNESCO, 2018a). These obstacles broadly include: geographic location, minority status, and traditionally charged attitudes concerning the status of women in society; however, these are a mere few of the exhaustive variables which hinder women from accessing education (UNESCO, 2014, p. 28). To mitigate these obstacles the UNESCO Priority Gender Equality Action Plan for 2014 – 2021 (GEAP II) maps an action framework for implementing gender equitable initiatives throughout education systems (UNESCO, 2014, p. 6 & 28). The plan recognises that gender equality is inseparable from sustainable education, and it 'is increasingly considered as one of the most effective investments (UNESCO, 2014, p. 28). The GEAP II plan aims to alleviate gender disparities and encourage gender equality by leveraging a sustainable education system.

Whilst there has been progress in the expansion, and proliferation, of access to education for women, there is still a considerable way to go (UNESCO, 2018a, p. 28). Almost 16 million girls worldwide will never set foot in a classroom; moreover, women account for 2/3rds of 750 million adults without rudimentary literacy skills (UNESCO, 2018a).

Figure 1: The whole-institution approach (UNESCO, 2018b, p. 53)



However, as emphasised above, ESD has the potential to break down and eliminate these gender inequalities and barriers. Sustainable education is argued to have an empowering effect if it is embedded within a curriculum that spotlights 'gender equitable agency' (Vaughan, 2016, pp. 17 - 18). Importantly, under an ESD framework, critical reflection on gender inequalities and how to empower female agency is facilitated.

Integrating ESD into a higher education framework to capitalise on gender equality

In order to integrate ESD and maximise potential for gender equality to flourish, relevant policies are needed to spur change within the education system towards a more sustainable future (UNESCO, 2018b, p. 48). Costa Rica serves as an emblematic example of a country that has successfully implemented ESD into a tangible policy. On the 17th October 2006, the Government of Costa Rica approved the National Commitment on the 'Decade of Education for Sustainable Development' (DESD) (UNESCO, 2018b, p. 49). Following this commitment, and under the Presidency of Laura Chinchilla, Costa Rica published the National Development Plan 2011 – 2014, which stressed the importance of improving secondary education, technological literacy, and learning a second language (UNESCO, 2013, p. 15). Similarly, Sweden presents another case in which ESD is firmly embedded within the education curriculum. Sweden's education system is firmly established on the key pillars of: democratic principles, gender equality, and social justice — values which ESD embraces (UNESCO, 2013, p. 105). However, it is important that educational policies realise an ESD strategy which encompasses a whole institution approach, which is aimed at mainstreaming educational sustainability. This requires the 'whole' transformation of the education system in order to maximise and harness the effectiveness of ESD (UNESCO, 2018b, p. 53). Figure 1 demonstrates how a whole-institutional

approach operates in a mutually-reinforcing and cyclical manner. Importantly, ESD can be strengthened by research for sustainable development (RSD).

Strengthening ESD through RSD

Research for sustainable development (RSD) is a crucial mechanism that can facilitate a holistic and transformative approach within the education system. In a report, Germany's UNESCO chairs emphasise that research and scientific co-operation supports and encourages global sustainable development (G. C. f. UNESCO, p. 8). Prof. Jörg Hacker emphasises that: 'science (research) [is] essential in the implementation for the Agenda 2030 and the Sustainable Development Goals' (G. C. f. UNESCO, p. 12). Sustainability research aims to understand complex and problematic global problems that confront society. In this regard, sustainability-related research faces the daunting challenge of integrating different disciplines and uniting divergent stake-holders; meanwhile, striving for 'methodological innovation' (Filho et al., 2018, p. 131). In their paper, Filho et al. (2018, p. 136) stress the importance of expanding 'local-level' research into sustainability – to more holistically understand the impacts of development. Similarly, they stress that it is vital to 'link' research and science to policymaking – with decisions being based on good research (Filho et al., 2018, p. 136). The outcome document of Rio+20 — 'future we want' stresses the importance of thorough and rigorous research regarding the environment and monitoring sustainable development, with the express enhancing national capabilities by drawing on RSD (Assembly, 2012). In sum, this section argues that research is an essential component of sustainable development and should be deployed in tandem with sustainable education principles. Finally, the conclusion of this review considers the broad themes underpinning this literature analysis, while reflecting upon gaps and areas for future research.

CONCLUSIONS

Research Gaps and Policy Recommendations

This literature review has addressed three large and broad topics which directly concern, and impact upon women and the proliferation of gender equality: climate change, and, education and research for sustainable development. While the themes were broad the interconnected thread uniting the subjects is the overpowering reality that women still lag behind men in development indicators (Duflo, 2010). More perturbably is the missing women phenomenon – where women are lacking in the areas of: education, labour market opportunities, and, political representation (Arora-Jonsson, 2011, p. 744; Duflo, 2010; Sen, 1990).

Accordingly, future research domains should focus on understanding why the absent women phenomenon persists, despite concerted efforts reverse the destructive

phenomenon. In 1990, Amartya Sen warned that analysis and understanding must look beyond the East/West dichotomy. He suggested that multi-dynamic variables embedded within economic and cultural frameworks hamper the expansion of gender equality (Sen, 1990). In order to understand and evaluate how economic and cultural structures impede upon gender equality, accurate data is paramount. Data and statistics play a crucial role in generating equal opportunity for women. Consequently, it is vital that international standards and methodologies are developed, and standardised (Gender Equality and Sustainable Development, 2016, p. 115). Precise data from different countries and cultures is systemically lacking. To that end, greater investment in accurate data is necessary; more pressingly it is one of the greatest impediments to understanding the root causes of gender inequality — work needs to focus specifically on data that captures land rights and ownership, access to education, family planning, and health care. Distressingly, up-to-date data hardly exists for these crucial indicators and ‘of the 14 indicators of progress associated with gender equality, most countries measure just three’ (Forum, 2017). Research for sustainable development can play a vital role in facilitating the collection of accurate data which tracks and measures gender. Consequently, nations and communities should focus resources and investment into data driven sustainable research which focuses on understanding barriers to gender equality.

Finally, beyond sustainable research, public policy initiatives should focus on decreasing the barriers and cost of education for women — this is imperative to maximise the full benefits of ESD and RSD. In tandem with this prominent figures have a responsibility to address ‘discriminatory norms and practices through the media, religious institutions, and community members’ (OECD, 2017, p. 94).

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Gender Mainstreaming Social, Economic and Institutional Contributions for Sustainable Community Development

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ABSTRACT - Gender Mainstreaming social, economic, environmental and institutional contributions for sustainable community development is vital for communities and women. Evidence in the Colombian case shows there has been an investment of 232.8 million COP for Indigenous and Afrodescendant communities. Such investment has improved teaching practices of 94% of local educators. Likewise, companies such as Mineros S.A have been able to improve the quality of water streams surrounding mining operations. Both, the company and small businesses have engaged in water quality improvements such as recycling. Another case in point is Codelco. The company has acknowledged the adverse impact of conflict on Chilean communities and has invested in both, Indigenous and Afrodescendant communities. Findings also show that 80% of corporations that handle effective community relations and invest in community needs have been able to develop better relationships, trust and win-win business environments. This approach is more likely to foster stability and sustainable regional development, particularly in the context of resource regions. Corporate practices have also had an impact on women themselves. At the work place women are often challenged with issues concerning education, leadership and employment. Nevertheless, there have been initiatives in place to empower women in the industry.

KEYWORDS: Sustainability, Gender, Mining Industry, Community Development.

◆

1. INTRODUCTION

The International Council on Mining and Metals (ICMM) founded in 2001 mandated 10 principles to which member companies must adhere. This article analyses the ninth principle 'Contribute to the social, economic and institutional development of local communities'. This principle will be examined against three cases Mineros S.A, Codelco and South 32 mining companies. All companies have had an important progress in regards to the benefits delivered to neighboring communities (e.g. education, health, productive projects, interinstitutional agreements, employment, infrastructure such as housing, roads, schools and recreational areas). Investment has also been made in the prevention, mitigation and compensation for environmental impacts caused by mining operations. In most cases, these corporate responsibility initiatives have created an environment of trust for local communities. This research also examines the role of women in mining against sustainability reports in regards to education, employment and leadership.

1. METHODS

Each mining company was compared in terms of their social, environmental and economic contributions to local communities adjacent to mining operations. Following the ninth principle of the International Council on Mining and Metals (ICMM), this research was conducted through a careful review of assessed mining company's sustainability reports.

Social:

- Scenario-building in surrounding communities to contribute to their needs, related policy, practices and behaviour.
- Potential opportunities to improve sustainable development.
- Communities and individual groups who are potentially affected by mining operations

Environmental:

- New technologies for air, soil and water quality improvements
- Environmental impacts in the last 5 years

Economic:

- Built infrastructure (education, health, housing and roads)
- Economic models that benefit communities
- Opportunities for improving community needs and environmental quality

Finally, our assessment also examined the role women in each company in regards to three components: education, employment and leadership.

2. RESULTS**2.1. Cerro Matoso S.A. Colombia, South 32**

The corporate sustainability approach at Cerro Matoso is thought since business planning stages, and then integrated into the Management System throughout the organization.

The mission of the corporate social responsibility committee is to establish guidelines for the implementation, monitoring and strengthening of the Corporate Social Responsibility strategy in line with South 32's values, policy and the overall loss control, environment, quality, community and strategy.

In addition, Cerro Matoso (at all levels of the organization) has managers responsible for sustainability issues concerning HSEC (health, safety, environment and communities). Managers are supported by trained staff who provide expertise and technical support. This allows the company to measure safety, health, environment, communities and control processes.

2.1.1. Social

- *Scenario-building in surrounding communities to contribute to their needs, related policy, practices and behaviour.*

The company conducts household surveys every year to meet the needs of the population of Alto San Jorge. Investments in 2014 consisted of 232.8 million COP for indigenous and Afro-Colombian communities. Likewise, there has been educational projects that have led to 279 (94%) out of 304 (100%) trained with improved educational practices. This will benefit 7,037 students from different neighbouring communities. Grants and scholarships have been generated for all students in surrounding communities. In addition, economic aid for tuition and support is given to young people in high school. A minimum of 7 wages per semester.

There is a regional development program called ANDA which promotes the strengthening of initiatives to meet community needs. The company has spent 28.6 million dollars towards the management of productive projects in the region. This project is operated by an international ONG.

- *Potentials opportunities to improve Sustainable development.*

Neighboring communities to the mining project have needs that have not yet been met. A case in point is the improvement of education in rural areas near the mine site. However, in regards to health, a healthcare facility been built to look after the needs of surrounding communities.

- *Communities and individual groups who are potentially affected by mining operations*

Some community members have reported serious health problems and social issues that affect communities in the municipality. For instance, the level of abortions is higher than the national average.

Also, there has been a large number of congenital malformations such as cleft lip or cleft palate, and even of cases of respiratory and skin affectations, and even cancer. Communities members argue this is due to the components used for ore extraction.

This is also in line with reports of indigenous communities in the area that indicated that out of 36 pregnancies, 14 of them have ended in abortions.

The Constitutional Court ordered the mining company to perform medical examinations for community members from Montelíbano, Córdoba to check health affections damages due to nickel mining.

2.1.2. Economic.

- *Built infrastructure (education, health, housing and roads)*

The company has invested COP \$55 billion for works in Montelíbano concerning improvements for hospitals and schools.

The regional centre of the Seine built by the company will have a positive impacting on more than 40 thousand people. A sports facility was also built, with investments of more than 1 billion COP. The company has also renovated the Child Development Center and supported the improvements of Puerto Libertador Road.

Investment was also allocated in the reconstruction of Puerto Arrows, one of the most socially vulnerable towns, with 140 home improvements, provision of drinking water, as well as a renovated school.

- *Economic models that benefit communities*

Scholarships are also allocated by the Educational Support Plan PAE. Scholarships have benefited graduate students in the region.

Another activity was the allocation of 9,952 m² to the Community Council of Black Communities of San José de Uré (CNU). A Community House will be built, serving as headquarters of the CNU.

Improvements at the Local Hospital Montelíbano will also improve the health of community members of the Alto San Jorge. Other large contributors of this initiative are the Government of Córdoba, municipal administrations of Montelíbano, Apartado, Puerto Libertador and Cerro Matoso. The contribution of the Company in the 3 municipalities has exceeded COP \$ 23,000 million.

- *Opportunities for the improvement of community needs and environmental quality.*

Montelíbano community has a poor water system. There is a need for potable water in the region. Investment is required to improve the quality of water in the Municipality.

Tons of slag slope and ferronickel powder are found in water streams. This has had an impact on mountains, where community members used to hunt animals, plant crops and have baths in clean water.

Another activity is the provision of technical advice for entrepreneurs to start productive projects and create new jobs in the region as well as funding opportunities and technology transfer in sector companies.

2.1.3. Environmental

- *New technologies for air, soil and water quality improvements*

Filters were constructed to retain ore particles in air in Cerro Matoso. A mechanical, electrical, and control system was developed [3] [4].

Colombian air quality standard sets a maximum concentration of 50 µg/m³ of breathable air (PM10). The value at the monitoring stations of Cerro Matoso does not exceed 25 µg/m³.

At Cerro Matoso 95% of the operation uses recycled water and only 5% of the water used comes from rainwater from Uré River. The uptake of Uré River was reduced, and

improvements in the recovery of water were made. A 25% of water use was achieved.

Today, there are over a thousand hectares of forests around mining operations. Some of these forests were planted by the company, through a system based on a river basin approach to protection. At the present, there are green forests or Biological Corridors surrounding Cerro Matoso's mine sites.

- *Environmental impacts in the last 5 years.*

Associated health problems are closely linked to extreme poverty, statelessness on basic needs, and lack of education, among others.

Another impact in riverbeds is the disappearance of some species in the river which were traditionally consumed by locals.

Other problems have been recorded by former workers such as lung cancer, skin cancer and bone issues, among other diseases.

- *Opportunities for improving community needs and environmental quality*

Epidemiological studies have been conducted to identify possible causes of different diseases across the population to find metal particles in the air.

Development, operationalization and maintenance of a monitoring network of groundwater and surface water in all mining areas across the country, so that information is available in real time to the public and authorities.

2.2. Mineros S.A

Mineros S.A is a private company, 100% Colombian, focused on the exploration and mining of metals, especially gold [5]. This company aims for sustainable mining. Since 2008 Mineros S.A engaged in sustainability reporting under the guidelines of the Global Reporting Initiative (GRI) [6]. The company shows compliance with social commitments and has voluntarily assumed its role as a corporate citizen, to create a positive impact on locals.

Likewise, in 2008 Mineros, S.A adhered to the UN Global Compact. This Pact aims for local development in the areas of Governance, Environment, Social Development, and Economic Development. Its ten principles are based on the Universal Declaration of Human Rights, the International Labor Organization's Declaration of Principles, the Rio Declaration on Environment and Development, and the United Nations Convention against Corruption [7].

2.2.1. Social

The social development is focused on the establishment of agreements that create trusting relationships with communities and institutions, promoting joint participation in decision-making.

- *Scenario-building in surrounding communities to contribute to their needs, related policy, practices and behaviour.*

Social Investment of the company in 2012 was COP \$2,140 million in programs of Social and Business Responsibility (18% more compared to 2011). Investment in social action (donations) amounted COP \$ 1,500 million in 2012 (13% more compared to 2011) [7].

It is expected that by 2014, Mineros S.A will generate 6,750 daily wages for each of the 35 year life plantation of 100 hectares of rubber [8].

Productive agroforestry pilot programs aim to recover degraded areas to help local families grow food on farms for their own subsistence. Mineros S.A gives families logistics, economic and educational support for sustainable self-programs and as an incentive for their activities. These are some of the benefits received by farmers or sharecroppers in charge of handling productive programs [6].

Additionally, Mineros S.A has a reforestation program. This program also benefits the community by providing jobs to rural communities. The annual average of employment for the next years is estimated to be 3,816 people [8]. Likewise, the wetland recovery program helps to ensure work for fishermen.

Community benefits from the program for rural labour is estimated at 3,816 annual work days for the next seven years. The company also has a donation program to municipalities in Antioquia Bajo Cauca River region. At the moment, local production reaches 200,000 seedlings [8].

The company has set an agreement to maintain the ecosystem. In doing so, the company involves farmers, the neighbouring community and fishermen, both on land and in water. The most outstanding component of this agreement is the implementation and development of a collaborative project aimed to:

- ✓ Providing consultancy services for the creation of eight cottage industries, and strengthening of four existing ones [7].
- ✓ Supporting training of 70 entrepreneurs of small family businesses in the areas of finance,

human management, marketing, costs, infrastructure, and safety, among others [7].

- ✓ Establishment of 240 productive self-consumption orchards in order to secure food supply for the rural communities of the municipalities included in the program [7].
- ✓ Implementation of a bookkeeping project for small rural entrepreneurs, so as to improve the living conditions of 135 families of El Bagre, Nechí and Zaragoza [7].
- ✓ Other contributions [7]:
- ✓ 543 associates accepted to donate funds to the local community
- ✓ COP \$ 95,020,000 allocated per year to associates
- ✓ COP \$ 95,020,000 contributed per year by the Company

- *Potentials opportunities to improve in Sustainable development.*

Workers' children education is very poor. The Municipality of El Bagre does not provide quality education. A situation that has forced children to go to Medellín city to attend school.

Another important aspect has to do with the fact that the community does not have access to potable water whilst the workers do have access to drinking water. There is not equality.

Improvements in sustainable development requires infrastructure for education and potable water plants, particularly in El Bagre.

- *Communities and individual groups who are potentially affected by mining operations*

Mineros S.A had an excellent relation with the community from the start. Mineros S.A is the only formal company operating in an area where 3,600 machines belong to illegal miners. 850 of its employees have a full salary, benefits and holidays. Evidenqce shows that only 13 percent of gold extracted annually in the country comes from formal enterprises [9].

2.2.2. Economic

In 2010, Mineros S.A created the MINEROS S.A. Foundation in order to foster alliances that leverage resources for the benefit of the communities and improvement of the living conditions of surrounding communities.

- *Built infrastructure (education, health, housing and roads)*

Mineros S.A does not invest in infrastructure for education and health, neither in roads. Instead they invest COP \$100.000.000 per year in productive projects and infrastructure for housing.

- *Economic models that benefit communities*

Mineros S.A invests COP \$200.000.000 per year in community building. This amount accounts for actions that contribute to organizational and community empowerment as well as citizen participation. Additionally, COP \$110.000.000 has been invested in information and community participation in order to create links that allow the exchange of information and further strengthen communication. COP \$109.000.000 has been invested in environmental education.

- *New technologies for air, soil and water quality improvements*

There is a need to improve schools, both in infrastructure and qualified personnel. Investment in human capital in the surrounding community can improve their livelihoods and income.

2.2.3. Environmental

Mineros S.A focuses on preventing, mitigating, controlling and compensating all possible mining impacts under the following parameters:

- *New technologies for improvements in air quality, soil and water.*

Mineros S.A carries out various environmental programs and projects, as follows:

- ✓ Rubber project: implementation of the Cocoa-Rubber Belt. It aims to planting rubber on 100 hectares of virgin soil. While the rubber plantation reaches its productive stage, investment is also made in associated crops, like pineapple (5 ha) in three variations: Gold honey, Cayenne and Apple; and guava (8 ha) in three variations: Indian pink, Apple, and Calima 2 [8].
- ✓ Agrarian-forest farms program: the program consists of recovering degraded areas and preserving vegetable and animal species, as well as planting crops [9]. The program has established 17 productive farms and have combine sustainable practices of new crops. The use of green fertilizers and coverage crops has reduced dependence on chemical fertilizers to a minimum. Products derived from this program are as follows: creole lemon and Tahiti-type lime, species of mango,

guava, creole plantain, cassava, rice, corn, home orchards and poultry, in combination with small-scale fishing [8].

- ✓ Integral Management of Solid and Liquid Waste Program (MIRS program): the company adopted an Integral Management of Solid Waste (including hazardous waste) Program. It has been implemented across the life of the mine (exploration, exploitation and closure). Under this program, vegetables are carried to the Sanitary Complex to be used in the production of compost for revegetation of degraded areas. The Recyclable matter is put in white bags and classified by staff, as follows: cardboard, paper, glass, plastic, and scrap and metal. Remaining material goes to the trenches. Each trench has a gas vent, a rainwater drainage system, and geomembrane cover to prevent underground water pollution [8].
- ✓ Reforestation program: The purpose of this project is to recover the soil by supplying vegetable material and fixing essential elements by means of vine species, shrub and legumes, to then establish productive plantations and farms. Some of the species are as follows: Tambor, Melina, Acacia mangium, Samán and other native species [8].
- ✓ Wetland recovery program: Mineros S.A has implemented this program since 2004. This program transforms pits, gravel tailings and hydraulic landfills into friendly places where humans, as well as animals and crops, live in harmony with nature. This program guarantees fishermen's work, pit water quality, better commercial availing of fish, as well as restoration of drainage and landscape of the region [8].
- ✓ Water saving program through awareness campaigns have also been carried out across community member from El Bagre – municipality of the Antioquia [8].
 - *Environmental impacts in the last 5 years.*

In the last 5 years the most important impacts across the life of the mine, are as follows [8]:

- ✓ Loss of natural resources: the stripping of large areas of land leads to the loss of native vegetation important for ecosystem services such as CO₂ and fauna.
- ✓ Air quality: Emissions of ore material caused from deforestation and machinery. These emissions cause health damages such as breathing diseases.

- ✓ Change in the natural dynamic of the river: the operational activity of Mineros S.A is alluvial, therefore this activity modifies the natural dynamic of the Nechi river affecting fish communities, other economic activities and ecosystem themselves.
- ✓ Mercury waste: Mercury pollution is the most notorious hazard caused across the life of the mine.
- *New technologies for air, soil and water quality improvements*

Mineros S.A focuses on improving environmental quality in restoration programs with a focus on natural species (Balso, Tambor, Melina, Acacia mangium, samán) [9]. The CO₂ sequestration is not the same than before deforestation. On the other hand, Mineros S.A uses the manual pruning to avoid emissions from heavy machinery (burning of fossil fuels).

In order to improve the change in the natural dynamic of the river, the company returns the water used in the benefit processes, and other material like “cargueros” in Spanish (gravel, sand, silt, clay and other soil materials).

Finally, in the last year, the company eliminated the use of mercury in the benefit stage. They have optimized this process by gravimetric recuperation. With this method Mineros S.A recovers the 96% of the gold. The other 4% resting is recovered by chemicals processes.

2.3. Codelco

Codelco is a Chilean government-owned enterprise producing copper ore and its by-products. Being a member of ICMM Codelco develops GRI reports as a way to be transparent about their management and sustainable development procedures. Most of the information was obtained from the 2015 GRI report. Codelco uses in-house departments to assess sustainability performance. Codelco is an open pit operation that produces 62,000 tons of fine copper per year. One of the Chilean sites is Chuquicamata [10].

2.3.1. Social.

- ✓ There is a team accountable for maintaining the relationships between Codelco and local communities including indigenous peoples. These team provides [10]:
 - Cultural understanding of the communities of Codelco
 - Effective two-way communication sometimes through “1-to-1”
 - Transparency for both stakeholders (communities and company)

- Continuous assessment of effective communication and local community interests in relation to what can be done to improve the sustainable development of communities.
- ✓ Occupational health and safety programs were updated and a reduction of 37% of “dangerous hazards” occurred since 2014.
- ✓ Due to Codelco’s health and safety program, Codelco celebrates the 1st year of no death workers.
- ✓ Few indigenous communities affected by the mining operations of Codelco are Taira, Ollague and Diego de Almagro Colla.
- *Scenario-building in surrounding communities and contributions to their needs, related policy, practices and behaviour.*

Codelco has set up various teams to work with local communities. These teams not only help at the beginning of a mining project but throughout its life ensuring effective communication and transparency are achieved. The teams also help in developing new ways to disseminate information to the communities in an effective manner. In 2015 an approximate total of \$ 5.67 million was invested in local communities. Such projects include heritage-related educational, and improvement of living conditions projects [10]. Also evidence shows there is an effort to be more connected to and involved with the local communities in which they operate. Codelco has moved beyond to what they refer to as “sustainable, virtuous and inclusive mining” or the traditional social license to operate. However, a true test to find out if Codelco is committed to its projects communities and employees in a sustainable manner is the way it handles the falling of copper prices. According to a report posted to mining.com, the company already had cut jobs but is trying not to cut any more in the copper sector.

Codelco has a plethora of stakeholders in which they continually look for ways to improve communication. Transparency, effective communication and feedback is the goal of stakeholder engagement and Codelco strives to find solutions to concerning issues of stakeholders. Some of the stakeholders identified are indigenous people, local communities, investors, the government, its own employees.

- *Potentials opportunities to improve in Sustainable development.*

In 2015 the company continued the implementation of the standard guide Codelco in relation to native peoples as follows [10]:

- ✓ Updating areas of influence.

- ✓ The rise of the potential environmental conflicts and action plans
 - ✓ 10 tables were set with indigenous communities
 - ✓ Regular visits to communities.
 - ✓ Working plans and participatory community projects
 - ✓ Associative and monitoring commitments to its platform
 - ✓ SECO Community program
 - ✓ Development of indigenous consultation processes
- *Communities and individual groups who are potentially affected by mining operations*

Indigenous communities and other local communities have worked with the company to successfully carry out projects.

2.3.2. Economic

- *Built infrastructure (education, health, housing and roads)*

Codelco achieved a record amount of copper extracted and smelted in the year 2015. It is also the first company with the largest workforce in the mining industry. This has strengthened Chile's economy and the growth in the copper industry. However, Codelco reported losses for 2015 due to the fall of copper prices and might not be able to maintain profitability and the revenues required to sustain the Chilean government. According to an article on mining-technology.com Codelco is raising the money that funds schools and hospitals and basic social needs to grow and develop.

- *Models to provide economic benefits to the community.*

US \$ 5.67 million was invested in the communities. This includes [10]:

- ✓ Training for locals so they have the required skills to secure a job.
- ✓ Heritage-related projects such as the teaching of the Caspana San Lucas Church.
- ✓ Being a state-owned enterprise the revenue raised by Codelco is used to build schools and hospitals, and meet the basis needs of the society to grow and develop.
- ✓ Due to falling copper prices, Codelco cut the jobs of white collar and executive position in order to maintain blue collar workers.
- ✓ Achieving a record amount of copper extracted and smelted in 2015, Codelco has been able to strengthen Chilean's economy [10].

- *Opportunities for improving community needs and environmental quality*

Although there are significant achievements in the areas in terms of water harvesting, further work is needed to reach higher levels, as the total values are large flows used in mining processing.

2.3.3. Environmental Component

- *New technologies for improvements in air quality, soil and water.*

Codelco has set up policies and regulations to ensure the compliance of ICMM principles as well as to ensure emissions, waste and discharge prevention and control. In 2015 US \$295 million was invested in environmental initiatives including water treatment, tailings management, waste and emissions management, and the handling of environmental aspects associated with Codelco's large structural development. A few of the 2015 main components focus on: update of the corporate environmental regulatory instruments, capturing 95% of all emissions in all divisions, and zero-occurrence environmental severe and very severe incidents. A severe incident did occur in 2015, however, the company quickly responded and informed to affected communities and an investigation was conducted to find the cause and solutions to the incident [10].

- *Environmental impacts in the last 5 years.*

Mercury contamination has been reported by communities in Quintero and Puchuncaví [10].

- *Opportunities for improving community needs and environmental quality*

Development of a diagnosis, risk analysis pipeline, gutters and industrial fluids.

2.4. Comparison between companies. Cerro Matoso S.A_Mineros S.A. VS. Codelco Company.

Figure 1, shows the comparison between companies from "relevant" and "very relevant" social, economic and environmental issues.

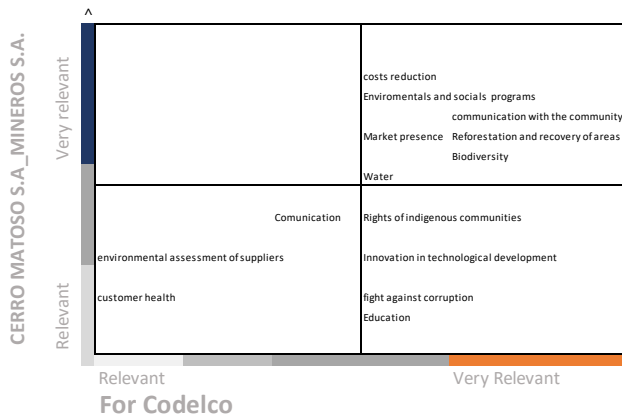


Figure 1. Codelco & Cerro Matoso S.A._ Mineros S.A.

Codelco has a clear understanding of negative impacts on communities. This is an issue of high importance for Codelco, particularly in relation to investment in indigenous and Afro-American communities unlike other companies that although have a high standard in sustainable development strategies, is not as high as CODELCO.

Codelco has focused on the use of new technologies. It is evident in the reduction of pollutants to the environment. Many companies do not focus on research for mitigation and technologies until they have been fined or found accountable for environmental problems.

Both large companies and small businesses have focused in recent years on water treatment and recycling to address enviornmental concerns.

Additionally, all companies are focused on reducing costs in order to carry out clean production processes.

2.5. Women's role in mine companies

This section focuses on the role of women in the companies assessed in relation to education, employment and leadership.

2.5.1. Cerromatoso. South32:

- Education: Regarding the educational component, the report shows the number of people benefited but the percentage of female beneficiaries is not known, as explained by De la Hoz et al., [11].

- Employment: in its 2015 sustainability report, there is a differentiation between direct (permanent and fixed) contractors (fixed and construction) and direct jobs in the area of direct influence of the project. It shows that women represent 7% of the plant personnel [11].

- Leadership: Regarding leadership and participation, strategies for women's participation are shown, but the figures are unknown [11].

2.5.2. Mineros S.A.

Mineros SA published a short report on gender discrimination as evidence of the participation of men or women in the strategies proposed. De la Hoz et al., [11] indicate the low number of women hired in mining operations, which is represented by 8%. Other topics have not been mentioned in the sustainability report.

2.5.3. Codelco

- Education: There are a few educational projects, such as training courses for vulnerable groups from surrounding communities (62 courses) and infrastructure improvements in school facilities (these facilities work with renewable energies). However, the benefits are not represented by gender.

- Employment:

With regards to employment, direct and indirect jobs are divided by gender. In 2017, 9.5% of female participation was reached (out of 17,753 people, 1,595 were women), a figure that exceeds the industry average. However, the executive team consists of men only.

- Leadership: different training programs are developed within the company in order to promote efficiency in each of the positions. In 2017 a total of 7180 training courses were carried out for executives, professionals, operatives and other personnel. The programs benefited 14190 men and 1609 women.

3. CONCLUSIONS

Findings show that:

- In social terms, although Cerro Matoso is a mining company with a strong educational investment (benefiting 7,037 students) it does not have an educational coverage in rural areas. A situation that has become a challenge. Mineros S.A does not have any educational program in terms of infrastructure or training of qualified personnel, however, it shows reasonable investment in the establishment of productive projects. Finally, Codelco has mainly invested (COP \$ 5.67 million) in local communities; such projects included heritage-related projects and education.

- In environmental terms, it is evident that Mineros S.A is one of the strongest companies. This company has different reforestation programs (rubber project, agrarian-forest farms program), Wetland recovery program and Water saving program, among others. Mineros S.A is followed by Codelco Company which in 2015 invested COP \$295 million in environmental initiatives including water treatment, tailings management, waste and emissions management, and the handling of environmental aspects associated with Codelco's large structural development. Cerro Matoso has shown a strong commitment to the

implementation of new technologies for improvements in air quality, soil and water.

- In the economic aspect, Cerro Matoso is one of the companies with major investment in infrastructure for education, health, housing and access roads. Its approach differs from Mineros S.A. The latter has shown less investment in education and roads but has invested in productive programs, where local communities can live and feed themselves. Finally, Codelco, according to an article on mining-technology.com has invested in schools and hospitals and in meeting the basic social needs of the local communities.

With respect to the role of women in mining companies, findings show that there is a stronger component of women empowerment. This is an idea that continues to grow in the coming years. Women inclusion in the sector can be seen as best represented by Codelco followed by Cerromatoso and South32. Mining S.A does not report on the inclusion of women in mining operations.

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