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WOMEN AND THE MINE OF THE FUTURE

A Gendered Analysis of Employment and Skills in the Large-Scale Mining Sector: Peru

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EXECUTIVE SUMMARY

The mining industry, more than many sectors, is highly male-dominated, which raises major issues regarding gender equality. The presence of entrenched bias and traditional prejudices (so-called "machismo" and the perception of gender roles marked by the division of tasks at work and in the home) limit women's participation in the industry. Furthermore, the lack of women in science, technology, engineering, and mathematics courses and the structural characteristics of mining work (shift work) limit the participation and retention of women. However, despite its importance, until now, there has been no study documenting the situation of women in the mining industry in Peru.

This research is the basis and first stage of a large project, "Women and the Mine of the Future" (chiefly medium- and large-scale mining) in the country. The study has two objectives: (1) to provide an overview of the mining labour market in Peru and (2) to perform a descriptive analysis of the data reviewed that identifies gender differences in the labour market in the mining industry. To achieve these objectives, this report undertakes a situational analysis of women in the mining labour market and, using multiple databases (Universities Information Generation and Processing System, National Educational Grants and Loans Program, Integrated Financial Administration System, Ministry Of Energy And Mines, ILOSTAT) and qualitative interviews, it analyzes the composition of employment in mining, emphasizing the principal characteristics of the mining sector and some private practices designed to overcome the barriers faced by women in the industry. It concludes with some recommendations and policy guidelines.

In general, women's labour participation in the Peruvian mining sector has remained relatively constant, around 6% in the period 2010–2019. Women are mainly employed in administrative jobs in the industry. This study emphasizes, firstly, the link between the lack of women in the workforce and the lower number of women graduating from mining-related courses (approximately 30% women vs. 70% men). Secondly, in the same period, there was a notable lack of women in managerial and operational positions. The participation of women in managerial, administrative, and operational positions, as well as staff, averaged 11%, 22%, 5%, and 4%, respectively. Thirdly, the lower participation of women in contracting companies (4% on average) is due to the fact that the majority carry out operational work.

This document makes five recommendations and policy suggestions to increase women's labour participation in the sector: (i) provide clear incentives to increase the inclusion of women in male-dominated courses, (ii) improve selection and recruitment processes, (iii) facilitate labour flexibility, (iv) improve the transparency of information on employment to allow monitoring, and (v) achieve greater articulation between the various agents of civil society, academia, and the public and private sectors. To implement these policies, lastly, it suggests the formulation of specific and defined objectives in terms of gender equality in the sector, which would establish both the feasibility of their achievements and their monitoring. In addition, after this diagnostic report, it is recommended to draw up a research agenda for the study of the sector's principal gender equality challenges

highlighted in this report, and also the elaboration and organization of a database to evaluate the impact of women's participation in the industry.

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1.0 INTRODUCTION

The mining industry, like many other sectors, is a highly male-dominated sector, a fact that raises major challenges for gender equality. In 2020, the female labour force participation (LFP) rate in the mining industry globally was around 7.9%, lower than other industries such as agriculture and livestock (32.6%), manufactured food products (36.3%), and manufactured textiles (39.9%) among others (International Labour Organization [ILO], 2020). In Peru, the LFP is even lower (around 1% of total employment) in sectors and activities related to coal mining and lignite, metals, and other minerals (ILO, 2020). In contrast, the LFP in mining support activities is around 5% (ILO, 2020). Between 2020 and 2019, women's LFP rate in the Peruvian mining sector rose from 5.6% to 6.6% (Ministry Of Energy And Mines [MINEM], 2019, 2020). And in the last 2 years alone, between 2018 and 2019, the women's LFP in large-scale mining rise slightly from 6.5% to 6.87% (0.3 percentage points) (MINEM 2020, 2019).

In Peru, the LFP is heterogeneous within the industrial sector and has remained stable over the last decade (MINEM, 2020).[2] Overall, 53% of its LFP and 38% of its male workers have been employed in the informal mining sector (ILO, 2020). Women are mostly represented in administrative posts (21.9%) and, to a lesser extent, in managerial posts (11.6%) and in operational positions and staff (4% and 3.6%), respectively (MINEM, 2020). As well as the lack of women's representation in the mining sector, there is a gross gender wage gap in the sector (6%), equivalent to PEN 4,053 (approximately USD 1,100 in 2019 MINEM 2020). This gap is bigger if we consider the labour force in specific occupations. For example, in managerial posts (22%), administrative staff (13%), factory personnel (11%), and operators (34%) (MINEM 2020).

Despite its importance, there has not yet been a study documenting the situation of women in the Peruvian mining industry. Our study is part of a larger project called "Women and Mining of the Future," the objective of which is to establish a baseline that describes the existing profile of women employed in large-scale mining and in its supply chain. This global project comprises three phases: (a) the first is intended to provide a descriptive report on the methodology and collection of the necessary data, broken down by gender, within the mining industry; (b) the second seeks to determine the changes in occupational structures and skills required in the mining industry in the current environment, characterized by the presence of new technologies and energy transition; (c) the objective of the third is to provide an integral analysis of women's participation in supply chains, taking into account their changing nature.

This research forms the basis and first stage in the execution of the global scope of the project. This first study seeks to fulfill two specific objectives: (1) provide an overview and mapping of the availability of sources of existing current data (public and private), with a focus on a description of the combined and representative labour market data available in Peru; and (2) provide a descriptive analysis of the reviewed data and, with the aid of

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[2] No information is available before 2010 (MINEM, 2020).

methodological analysis, determine whether gender differences exist in the labour market in the mining industry in Peru.

This document is organized as follows. The second section presents a situational analysis of women, divided into three parts: (i) gender equality in the labour market, (ii) situation of women in the mining context, and (iii) the importance of the analysis in the current COVID-19 pandemic. The third section describes the legislative and regulatory framework in the country and mainly details laws which promote gender equality in industry. The fourth section describes some successful business practices developed to overcome the barriers faced by women in the sector. The fifth section describes the databases, and the sixth section analyses and discusses the results. Finally, the seventh section puts forward a set of recommendations and policy guidelines to improve women's participation in the sector.

2.0 SITUATIONAL ANALYSIS OF WOMEN

2.1 Gender Equality in the Labour Market

Women's participation in the workforce has increased in recent years. Between 2000 and 2014 in Peru, LFP increased from 58% to 68%, one of the highest LFP levels in Latin America.[3] In the educational sphere, more women receive higher education than men, and women are more likely to graduate from higher education institutions (Ryan & Bauman, 2016). According to the Instituto Nacional de Estadística e Informática (INEI) (2015), women's rate of university enrolment is higher than that of men (43% vs 34%); moreover, more women than men graduate from university (33% vs 30%), and more women graduates obtain a professional qualification (49.7% vs. 36.4%). Nevertheless, despite the improvement in gender equality in educational achievements and the country's economic growth in the last two decades, there are still considerable barriers to achieving gender equality in the labour market.

In the first place, there is a lack of women's representation in the highest-paid careers. Women face challenges in progressing in their professional careers and in terms of wage equality. In Peru, only one third of all women graduates from higher education programs graduate in STEM fields. The lack of women's representation in STEM courses has significant consequences for the labour market. ILOSTAT data from 69 countries in 2020 show that only 38% of the labour force working in STEM occupations are women. Analyzing the transition from university to the labour market, Sassler et al. (2017) found that women in STEM courses were less likely to find a STEM job than their male peers (41% vs. 53%). Moreover, these gender differences are exacerbated in specialized STEM fields such as the natural sciences. Unlike men, who do not have differences in the likelihood of being hired in different STEM fields, women who studied engineering are 5.6 more likely to find STEM work than women who studied natural sciences (Sassler et al., 2017). In addition, Glass et al. (2013) found that women in STEM jobs were more likely to leave employment than those not employed in STEM jobs.

Secondly, there is a lack of representation of women in leadership positions or the existence of so-called glass ceilings that prevent women from holding management positions (Smith et al., 2012). This barrier is not unique to Peru—it is one of the most pressing concerns regarding gender equality globally. For example, using data on Danish men and women employees, Smith et al. (2012)—pioneers in drawing attention to this problem—reveal an unexplained gender salary gap among top executives of around 30%. This problem is much more serious in Latin America. In fact, Peru is at the bottom of the list: only 7% of boards of private companies are made up of women and only 17% of managers of medium-sized and large companies are women (Spencer Stuart, 2017).

Thirdly, gender wage gaps are significant. The gender wage gap in 2018 was 25% in high-income countries, 18% in medium-low-income countries and 27% in low-income countries (ILO, 2019a). This led institutions like the Organization for Cooperation and Economic

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[3] Despite this substantial increase, in recent years a slight reduction in LFP has been observed, reaching in 2018 64% of women and 80/7% male labour force participation (INEI, 2019).

Development (OECD), the ILO, and the United Nations Women Office to establish the Equal Pay International Coalition. Although the wage gap has fallen slightly in Latin America (from 27.2% in 2005 to 21.4% in 2015 [ILO, 2019b]), in a recent study, Vaccaro et al. (2022) found that the gross wage gap per hour between men and women in Peru has remained unchanged in the last 20 years, reaching levels of around 25%. The gross wage gap is an important indicator because it measures the average wage difference between men and women. Gender wage differences could be explained by objective factors such as years of education, experience, occupation, years in the company, etc., and invisible factors (skills, negotiating skills, discrimination, etc.) The technical studies seek not only to quantify the size of the gross wage gap but, above all, the unexplained wage gaps. As the term suggests, an unexplained wage gap means a wage difference that cannot be explained by observable factors. Quantifying the size of the gross wage gap, and the unexplained gap, is vital in understanding the existence and/or absence of discriminatory behaviour within the firm. Unfortunately, up to now, there are no public indicators to allow these specific gaps to be quantified in the mining sector in Peru.

As well as the global challenges to achieving gender equality, Peru has other specific major challenges. The Peruvian economy is characterized by its high degree of informality (around 76.8% in 2021 according to Encuesta Nacional de Hogares del Instituto Nacional de Estadística e Informática [National Household Survey] [ENAHO] data). This labour market precarity puts Peruvian women in a particularly vulnerable position. The majority of informal workers are women. According to ENAHO data (2019), 70% of men and almost 76% of women in Peru are employed informally. Moreover, gender differences in the Peruvian labour market are accentuated by major employer biases in hiring female staff. This bias in recruitment could be explained by the presence of *unconscious bias* and a macho mentality in Peruvian society, as well as statistical discrimination.[4] The presence of male bias and prejudice are especially important in male-dominated sectors such as construction, oil, and mining (ILO, 2021). Miró-Quesada and Ñopo (2022) and Vaccaro et al. (2022) show that women have, on average, relatively less experience than their male peers. Usually, in the face of adverse scenarios in the labour sphere, women are more likely to stay away and give up work than men. Using recent data (ENAHO, 2019), the authors emphasize women's lower labour participation rate compared to men (65% vs 81% in the Peruvian economically active population). The lower accumulation of female experience in the Peruvian and/or mining labour market is not an isolated phenomenon. Indeed, Kleven et al. (2019) show (using Danish data) that, on average, women dramatically reduce the hours worked and the percentage of labour participation when they first give birth (some 0.02 percentage points). The qualitative interviews conducted as part of this study showed that this is a factor in the workforce of the mining sector in Peru. Indeed, one of the biggest challenges faced in large-scale mines in Peru is retaining female personnel after childbirth.

The above is further amplified in the context of gender violence. Data from the Encuesta Demográfica y de Salud Familiar del Instituto Nacional de Estadística e Informática (2019)

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[4] Statistical discrimination occurs when economic agents (e.g., employers) draw inferences about their workers' productivity based on imperfect information on the productivity of the group of individuals to which they belong. Under this approach, even if there are no prejudices and the rationality of the agents is guaranteed, inequality in hirings, promotions, and remuneration can be explained by erroneous inferences by the employers about their workers' productivity.

show that 60% of women aged 15 to 49 in a relationship had been raped at least once by that partner. This situation of vulnerability is higher in the poorest sectors. Durán (2019) shows that women in Peru with higher levels of employment and education are more likely to suffer domestic violence, a result that probably captures the dynamics of empowerment and bargaining power between the couple. At the same time, Agüero (2018) provides evidence that levels of violence at home are negatively correlated with levels of health and women's employment. In addition, the pandemic could have doubly penalized women in Peru. Using data from La Linea 100, Agüero (2021) and Hernández et al. (2021) show that domestic against women increased by 19% during the pandemic.[5]

2.2 Situation of Women in the Mining Context

Between 2007 and 2017, Peru recorded a considerable increase in LFP in the real estate sector (13%) and basic supply sectors such as electricity and water (11%) (see Figure 1). However, there are still sectors lagging behind, such as mining and quarrying, where there was an increase in LFP of only 4 percentage points between 2007 and 2017 (Population and Housing Censuses, 2007, 2017). The low participation of women could reinforce the dynamics of a sector that is highly male dominated. Moreover, the presence of structural problems, such as discriminatory biases, machismo, and the perception of gender roles marked by division of tasks at work and in the home, could also apply, particularly regarding women and childbirth (ILO, 2018).

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[5] Línea 100 is a free information, guidance, advice, and emotional support call line operated by the Peruvian Government, whose objective is to help people who have been affected by or involved in incidents of family or sexual violence or abuse.

Figure 1. Female LFP by economic sector (2007 and 2017)

Sector	2017	2007
Construction	5	4
Transport and storage	6	10
Mine exploitation and sites	10	6
Basic supplies	22	12
Agriculture and fisheries	24	20
Manufacturing industries	32	31
Public administration	37	29
Real estate activities	45	32
Finance	52	46
Commerce	54	48
Education	61	58
Cuidado del hogar	97	94

Women's labour force particpation (%)
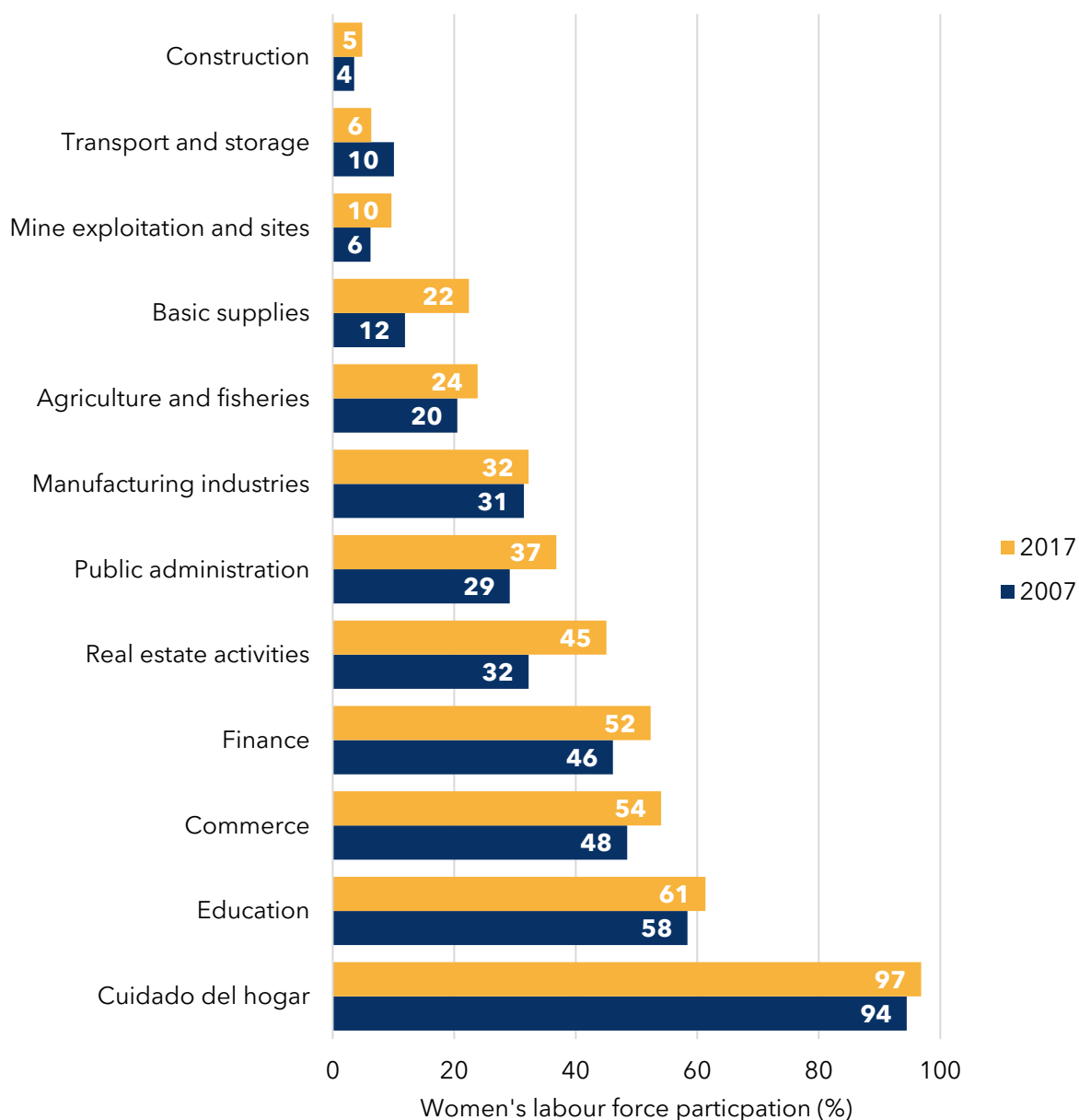
Source: Population and Housing Censuses 2007 and 2017, author elaboration.

The history of women in the mining sector is marked by the perceptions of feminine and masculine roles and identities in mining countries and communities (ILO, 2021). Due to factors associated with the nature of mining work, which takes place mainly underground, mining work has been typified as inherently male (Benya, 2017). In addition, traditional biases and prejudices in the mining sector have conceived the presence of women in mines as unnatural. The presence of women has been associated with disasters and accidents occurring in the mines (Castilhos & Castro, 2006; Perks & Schulz, 2020). Much of the literature has characterized mining work as hypermasculine, not only because of the need for the physical strength and resilience that workers need to extract the mineral, but also the greater participation of the male labour force in the sector. This conception of roles, biases, and prejudices has marked the division of labour in the sector and defined women's career progression in the mining industry.

Traditional stereotypes have excluded the female labour force from underground mining. Indeed, compared with the male labour force, the female labour force in the mining industry has been considered less important to production. However, although the mining sector remains male dominated, a growing number of women are working in the sector. Globally, in 2019, the female LFP in the sector was 11% of all workers, 1 percentage point higher than 9 years ago (ILO, 2020). However, female LFP in the mining sector is concentrated in certain occupations. For example, in the Canadian mining sector in 2018, women were concentrated in administrative assistance jobs (97%), general office support workers (80%), and human resources (65%) (Women in Mining [WIM], 2018). Furthermore, women engineers accounted for 14% of the total, but their representation is minimal in higher supervisory positions and underground work (4% and 2%, respectively) (WIM, 2018). Women remain a minority in management posts. In the 500 biggest mining companies in the world, only 7% of boards are chaired by women, and only 7 CEOs are women (PWC & WIM, 2014). In South Africa, women occupy 20% of management jobs in large-scale mining (Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development [IGF], 2021). Women are more represented in social assistance positions (52%) and trainee positions (40%) and are less represented in machine operator positions (8%) (IGF, 2021). These proportions vary slightly depending on the phase of mining activity. Thus, for example, in the exploration phase, women are more represented in administrative posts (14%), while in the exploitation and construction phase, women hold 33% of machine operator jobs (IGF, 2021).

Studies of the situation of women in the mining industry have focused primarily on cases of women workers in non-managerial jobs. Benya (2016), who analyzes the labour profile of women miners in a mining locality in South Africa, encounters differences in perceptions of gender among workers who work on the surface and underground. Generally, social norms on the mine surface are different from those governing work in the tunnels. The underground labour force–which has been traditionally seen as a productive and extractive labour force needing physical strength, whose workers are risk tolerant and by nature insensitive to concerns and emotions–is usually considered to be male (Benya, 2016). At the same time, Stefoni (2005), who analyzes the role of female supervisors in Chile's El Teniente mine, finds that the male-dominated environment promotes the adoption of three roles that may be adapted depending on the context: (i) the woman in the mine, who is associated with a traditional perception of gender roles in the company, that is, men carry out productive activities while women work in non-productive areas such as administration; (ii) woman daughter–mother–sister in the company, meaning by the role of woman, "boss's favourite daughter," "workmate's sister," or "mother of the workers in her charge"; and, (iii) the intelligent worker, which emphasizes the conduct of the woman using her professional skills to interact with the company. This usually refers to women who succeed based on their own merits. In 2004, the female labour force in the El Teniente mine represented only 0.3% of the total supervisory personnel (8% of workers).

The academic analysis of the situation of women in the sector has been complemented by descriptive analyses of the labour characteristics of women in mining and related sectors. Some years ago, institutions such as the IGF, WIM, ILO, and the United Nations Development Programme implemented a joint international project called Women in the Mine of the Future, which seeks to establish a baseline of women workers in large-scale

mining and its supply chains. The project promotes analysis of the performance of the female labour force in countries where the mining industry is the leading exporter, such as Australia, Brazil, Chile, and South Africa. Other individual studies undertaken by these and other institutions complemented the analysis. For example, IGF (2021) shows that women face major challenges not only in large-scale mining but also in human capital training in engineering and mining-related areas. In addition, the studies analyzed show constant barriers to the study of gender in the mining industry, including lack of access to information and lack of gender-disaggregated data.

There are also other issues that limit the participation of women in the industry workforce. Botha (2106) analyzes how sexual harassment in the workplace can affect the productivity of women workers in South African mines. The author finds that the majority of workers were aware of companies' anti-harassment policies; however, those policies were not explained to the whole workforce and lower-ranked personnel, such as for example, operators, who were the least informed. Moreover, the complaint procedures for sexual harassment were known by the workers, but the women preferred not to report them for fear of losing their jobs. Lastly, on many occasions (such as night work or transport of personnel in lifts), women were shown to be less secure, and there were a greater number of cases of sexual harassment. Recently, in Peru, sexual harassment in the mines was highlighted by CEO Jakob Stausholm of the Rio Tinto Mining Company, which published the results of an external assessment of the workplace culture in the company (Elizabeth Broderick & Co., 2022). According to that study, of 10,300 people interviewed, 1,444 reported having suffered sexual harassment in the last 5 years. In addition, 30% of all the women interviewed reported that they had suffered sexual harassment, with women aged 25 to 34 and those working in the copper mines the most frequently assaulted.

Despite the limited female participation in the mining industry, the presence of women in the sector presents an opportunity for large-scale mining companies. For one, Stefanovic and Avayay (2016) indicate that the presence of women in a mining company generates greater comparative advantages and increases companies' productivity. Additionally, Valencia-Rojas (2018) emphasizes the benefits of women's labour participation in better caring for the company's assets. The authors also emphasize training in mixed teams and women's participation in leadership and decision-making positions in the company. At the XIV International Mining Conference in Santiago, Chile, it was pointed out that a women's labour participation rate of 30% can increase the profitability of the mining company by up to 15%. Furthermore, this percentage can be higher if more women are not included in senior management positions. The benefits of women's LFP in the company are not exclusive to the mining sector. Lagarde (2016) finds that for every extra woman in managerial positions, the firm's return on assets increases by 8 to 13 percentage points. Moreover, companies with a 25% rate of women in management saw annual average profits of 22.8% while companies with over 50% female participation at the management level obtained average annual profits of 28.7% (Dawson et al., 2016).

There are not many studies in Peru that have analyzed the situation of women workers in large-scale mining. The majority of the studies were crosscutting analyses of the effects of mining on women and communities. Moreover, the results of the greater economic empowerment of women and the promotion of substitution of work from men to women were not clear. So far, no studies have analyzed the situation of women within mining companies. Manrique and Sanborn (2021) gathered a collection of studies that analyzed

mining activity in Peru and found that, in general, they centred on the study of local effects on the well-being of village communities. Although there are huge challenges in improving transparency in information regarding the situation of women in the mining sector, the number of gender studies in the sector in Peru has increased drastically since 2000. Before then, there were fewer than 10 annual studies, and from 2010, some 75 gender studies have been recorded. Those studies, however, focused chiefly on areas related to the resolution of local disputes and society (26%), economics and development (18%), the environment, and health (14%).

For that reason, our research seeks to show the profile of woman workers in the large-scale mining sector in Peru and highlight the principal challenges.

2.3 Importance of the Analysis in the Context of COVID-19

The COVID-19 pandemic has not only affected the health of thousands of Peruvians but has also had negative consequences for the country's labour markets. The strict measures adopted in Peru during the first quarter of 2020, such as the suspension of non-essential economic activities and compulsory social isolation implemented to contain the spread of COVID-19 infection, caused an 11.1% contraction in GDP that year. Mining activity in Peru did not escape the economic recession. According to MINEM (2021), during the compulsory quarantine—the first half of 2020 through June 2021—domestic copper production fell significantly, with a year-on-year fall of 26.6% (i.e., from 154,000 fine metric tons in March to 128,000 in May of the same year).

However, the mining sector was a linchpin in the economic recovery in 2021. Between June 2020 and June 2021, employment rose by 46.1% (MINEM, 2021).[6] Achieving a sustained recovery in the sector also requires the establishment of concrete measures to incentivize exploration and development projects for the years ahead (Adrianzén, 2012). The report (2018) emphasizes that to achieve sustained, inclusive, and sustainable economic growth, it is crucial to promote policies designed to develop productive activities and create full employment.

The effects on employment of Peru's lockdown measures due to the COVID-19 pandemic are still not clear. Preliminary studies, such as by Vaccaro and Paredes (2022), find that the quarantine measures have affected women's employment in Peru in different ways. As was expected, essential and remote working hours increased. This increase was led by male work. However, the impact of COVID-19 on female labour participation rates in the sector is not conclusive. Information gathered in some interviews conducted with human resources staff of mining companies in the framework of this study shows that, in some cases, the confinement in the home made male personnel aware of the workload in the home and the care of dependents. Although this perception is qualitative, it could show that the greater time spent in the home could generate a change in mindset regarding gender roles in one of the economic sectors with the greatest limitations in this regard. At the same time, replies obtained in other interviews in the framework of this study suggest that the pandemic and the lockdown measures increased the household burden of

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[6] To date, no gender-disaggregated information has been found.

women workers and have potentially made it more difficult for them to enter and retain employment in the sector.

3.0 LEGISLATIVE AND REGULATORY FRAMEWORK IN THE COUNTRY

One of the greatest challenges in achieving gender equality consists of implementation of institutions and the objective regulatory framework which guarantees it. In this section, we highlight the provisions in the legal framework on gender equality in Peru.

3.1 National Level

The regulatory framework on gender equality in Peru is based on the Political Constitution, in particular, Article 2 para. 2, Article 26, and Article 191. And it has a precedent in Law No. 2898 (Law on Equality of Opportunities between Women and Men).

There are various laws governing gender equality in Peru. In this analysis, we highlight the most important of these and suggest some policies that could complete their implementation, in particular in companies. We organize these laws into four groups: (a) political discrimination, (b) violence and harassment, (c) promotion of women's work as mothers, and (d) discrimination at work.

(a) Political Participation

- Law No. 26859 (Organic Law on Elections, Article 116), Law No. 26864 (Law on Municipal Elections, Article 10), Law No. 27683 (Law on Regional Elections, Article 12), and Law No. 28094 (Law on Political Organizations, Article 26). This set of laws refers to women's political participation and seeks to ensure the presence of at least 30% women and men in lists of candidates for Congress, municipal and regional governments, and internal elections of political organizations. However, this affirmative action seeking to increase equity in the number of public servants does not necessarily guarantee the quality of candidates.

(b) Violence and Harassment

(i) Women:

- Legislative Decree No. 635 approves the Criminal Code (Article 323 – Offence of Discrimination), amended by Legislative Decree No. 1323 and Legislative Decree No. 1410, which incorporates into the Criminal Code the offences of harassment, sexual harassment, sexual blackmail, and dissemination of images, audiovisual material, or audios with sexual content and amends the proceeding for sanction of sexual harassment.

- Preventively, there is Law No. 27942 (Law on Prevention and Sanction of Sexual Harassment) and Law No. 30314 (Law to Prevent and Sanction Sexual Harassment in Public Spaces). Both laws lay down sanctions and preventive measures to tackle sexual harassment in relationships of authority in employment, education, police, the military and other bodies not regulated by labour law. This regulation is particularly important in the mining context (Elizabeth Broderick & Co, 2022).

To complement these regulations, it is suggested to undertake regular exhaustive analyses to review the problems within the mines and regular supervision of implementation of specific policies to avoid sexual harassment and violence, both underground and on the mine surface.

(ii) Boys, Girls, and Adolescents:

- Legislative Decree No. 1408, Legislative Decree to strengthen the prevention of violence in families, amended by Legislative Decree No. 1443 and Law No. 30364 (Law to Prevent, Sanction and Eradicate Violence Against Women and Family Members). This law provides sanctions for violence against women, especially girls and adult women in the public and private spheres. This law seeks to ensure that the interests and needs of household members are considered in making equitable decisions. To enhance the impact of this regulation in the mining labour sphere, training on violence and sexual aggression—and the mechanisms to report it—could be implemented.

- Other laws have been passed in the field of education, such as Law No. 29944 (Law on Educational Reform and Regulations), which regulates administrative disciplinary processes against educational staff reported for sexual violence against students. Supreme Decree No. 004-2018-MINEDU (Guidelines on Management of School Life, Prevention of and Action Against Violence Against Boys, Girls and Adolescents), and Law 30403, which prohibits the use of physical and humiliating punishment against boys, girls, and adolescents. Both laws establish guidelines to tackle violence against students and support their full development. In addition, Ministerial Resolution No. 428-2018-MINEDU was issued, approving the technical regulation "Provisions on Prevention, Tackling and Sanctioning of Sexual Harassment in Technical and Productive Training Centres and Higher Education Institutes and Schools." This law mainly provides sanctions for sexual harassment in higher education centres.

(c) Promotion of LFP of Mothers

- Law No. 29896 establishes the implementation of nurseries in public and private sector institutions and promotes breastfeeding. This law makes the presence of nurseries compulsory in all public and private sector institutions where 20 or more women of child-bearing age work. This action is essential to increasing the productivity of women after giving birth, but it is suggested to complement it with other services, such as kindergartens or outpatient medical assistance, to promote female labour participation of mothers of small children. In addition, it is important to make mothers and working women in the sector aware of the use of these services.

- Law No. 30367 protects working mothers against arbitrary dismissal and extends their period of leave. This law protects women who are dismissed on the grounds of pregnancy and childbirth and its consequences. In addition, maternal leave is extended to up to 49 days before and after the birth. Although the extension of maternity leave could have positive effects on child development (Chaparro et al., 2020), its adverse effects on the accumulation of human capital are also

remarkable (Kleven et al., 2019). Some companies in the sector in Peru add to the maternity leave (usually 3 months) a period of leave with pay of up to 6 months.

- Law No. 30807 Law (which amends Law No. 29409), grants paternity leave to workers in public and private activities. This law establishes paternity leave of at least 10 consecutive calendar days. Some companies in the sector currently provide increases in paternity leave, and others are discussing increasing paternity leave (to 1 month) so that fathers can also involve themselves in the care of children and employers are aware of absence for reasons of paternity (according to interviews conducted with personnel in mining companies). Similar policies could be implemented in other companies. In addition, these could be complemented, where possible, with the implementation of telework for male personnel to ensure greater participation and awareness by fathers of the childcare tasks at home.

- Supreme Decree No. 002-2007-MIMDES provides for the implementation and functioning of daycare services through Cunas or Wawa-Wasi Institucional in public administration entities. This law decrees the implementation and functioning of daycare services in public establishments (Ley Ni 27444 – Law on General Administrative Procedures) where more than 50 women of child-bearing age work and/or provide services where the workers require a daycare service for their children, for not fewer than 16 boys and/or girls from the age of 3 months. This measure could reinforce the implementation of additional parental benefits by the company, which would subsidize the contracting of alternative services for childcare so as to incentivize the retention of staff after the maternity or paternity period.

(d) Discrimination at Work

- Law No. 26772 provides that offers of employment and access to educational training measures must not contain discriminatory requirements, nor cancellation or alteration of equality of opportunities or treatment. This law provides sanctions for differentiated treatment relating to race, sex, religion, opinions, origin, social, economic condition, marital status, age, or any other kind. This action could be complemented by the implementation of objective recruitment processes such as the requirement for "blind CVs," which conceal the gender or race of the applicant.

- Law No. 30709, Law which prohibits wage discrimination between men and women. The objective of this law is to guarantee equal pay in all identical work for women and men. Despite progress in the regulatory framework on pay issues, it is still difficult to identify and guarantee the reduction in gender pay gaps. It is suggested that objective policies (such as *Logib.ch*) should be implemented that clearly identify the size of the wage gaps unexplained by objective factors.[7]

Lastly, Peru has signed international conventions to promote gender equality between men and women. These are summarized in Table 1.

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[7] https://www.ebg.admin.ch/ebg/en/home/services/logib-triage.html

Table 1. International conventions signed by Peru on gender equality

Year	Convention
1951	Convention No. 100 of the ILO, Convention Concerning Equal Remuneration for Men and Women Workers for Work of Equal Value
1952	Convention on the Political Rights of Women
1958	Convention No. 111 of the ILO, Convention Concerning Discrimination in Respect of Employment and Occupation or Discrimination (Employment and Occupation)
1967	Declaration on Elimination of Discrimination against Women
1979	Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW)
1994	Inter-American Convention on the Prevention, Punishment, and Eradication of Violence Against Women (Convention of Belém do Pará)
1995	Beijing Declaration and Platform for Action, Fourth World Conference of Women
2007	Quito Consensus. Tenth Regional Conference of Women in Latin America and the Caribbean
2010	Eleventh Regional Conference of Women in Latin America and the Caribbean
2016	Montevideo Strategy for Implementation of the Regional Gender Agenda within the Sustainable Development Framework by 2030
2022	Convention Concerning the Elimination of Violence and Harassment in the World of Work of the General Conference of the ILO 2019

Source: Plataforma virtual of the Congress of the Republic of Peru and current legislation. Author's elaboration.

3.2 Mining Sector

Despite the many challenges to achieving gender equality in large-scale mining, government regulations specific to the sector are limited. There are five principal institutions that currently promote gender equality in the sector in Peru: (a) MINEM, (b) WIM Perú, (c) Women's Auxiliary to the American Institute of Mining and Metallurgical Engineers Perú (WAAIME**)**, (d) the Mining Technology Centre (CETEMIN), and (e) the Institute of Mining Engineers of Peru (IIMP).

(a) MINEM

One of the institutions that seek to promote gender equality in the mining labour market is the Committee for Gender Equality in MINEM, created by ministerial decision RM No. 394-2017-MEM/DM and amended by RM 020-2019-MEM/OGPP-OPPIC. Its purpose is the adaptation and implementation of actions related to Supreme Decree DS N 005-2017-MIMP ("Creation of a Mechanisms for Gender Equality in National and Regional Government Entities") and DS N 008-2019-MIMP ("National Gender Equality Policy"). The

principal actions implemented since 2019 are the following: (i) approval of the Rules of Procedure of the Committee for Gender Equality in MINEM, (ii) presentation of the results of the institutional gender diagnostic of the mining and energy sector, (iii) formulation of a gender equality policy in MINEM, (iv) elaboration of a guide for the use of inclusive language, and (v) development of a new Directive against Sexual Harassment.

In addition, in 2018, the Programme of Emerging Women Leaders in the Mining and Energy Sector was created. This program seeks to raise the profile and develop the leadership skills of women in the mining sector and open up areas of collaboration with other public and private entities. To that end, MINEM conducted two activities: (1) Training in two modules lasting a total of 6 months, with the participation of 29 women from public and private entities connected with the extractive sectors. Fulfillment of the objectives of the first imitative led to the continuity of the program and a second course. (2) Implementation pf training courses between October 2019 and September 2020: these training courses included three modules on themes related to the development of values and purpose, self-knowledge, situational and team leadership, individual coaching, high-impact communication, resilience, and confidence.

During 2019, MINEM also promoted the Proyecto Piloto Mujeres Mágicas ("Magic Women Pilot Project") in a community of Cusco to empower women who live in zones affected by mining. The project continued in 2020 in communities in Moquegua, Áncash, Apurímac, Arequipa, Cajamarca, and La Libertad. The implementation of these interventions promoted the incorporation of more women not necessarily connected to the large-scale mining sector but the mining sector in general.

(b) WIM Perú

WIM Perú was created in September 2016 and is currently the organization leading the promotion of gender equality in the Peruvian mining sector. It is now present in 11 regions of Peru and has 1,500 members at the national level. WIM Perú seeks "to highlight the participation of women in the Peruvian mining sector, promoting their personal professional growth and generating greater participation in various areas of mining at all levels" (WIM Perú, 2022, p. 1). According to the WIM Perú General Plan (2022), its principal actions are: (i) seeking increased women's participation through activities that encourage the attraction and retention of female talent (Action Plan 2030 and WIM Perú Seal, implementation of the KALLPA WARMI (Living-Language-Land) Programme–WIM Perú scholarship program, active engagement with the Jobs and Training Centre to eliminate unconscious bias), (ii) closing educational gaps by implementing specialized technical work groups, student chapters of which promote spaces for the personal and professional growth of women students in mining-related courses, implementation of pilot STEM programs in schools, awarding of WIM scholarships and national and international academic partnerships, and (iii) improving the visibility, leadership and capacity building of women in the sector through programs such as "Women miners of the Bicentenary," "WIM Perú Community–Connecting together," women's campaign for economic reactivation, and list of women executives. In addition, it promotes good corporate practices on diversity and inclusion in companies in the sector and the interest and involvement of men in these activities ("He for She" alliances," awareness-raising programs against harassment, participation in international congresses, etc.).

(c) WAAIME Peru

WAAIME Perú seeks to be a community of women with the objective of promoting inclusive leadership in the mining sector. For that purpose, it mainly provides scholarships to students to undertake studies in coaching, social skills, fieldwork, specialized courses, and languages. It finances specific careers such as mining engineering, metallurgical engineering, geological engineering, oil and gas engineering, electrical engineering, and environmental engineering.

(d) CETEMIN

CETEMIN has launched the Talento Mujer Minera ("Mining Woman Talent") programs aimed at empowering women in work by offering access to quality technical education. The program seeks to increase women's labour participation in areas of heavy equipment maintenance, electrical and instrumentation maintenance, mine exploitation, geology and exploration, metallurgical and chemical processes, and other operational works.

(e) IIMP

The IIMP is committed to gender equality in the mining sector. Among its actions are: (i) the 2020 establishment of the Committee Against Sexual Harassment, (ii) signing of the WIM Perú Charter to promote the participation and development of women in the mining sector, (iii) promotion of spaces like *Jueves Mineros* to raise the awareness of the importance of women in mining, and (iv) promotion of competitions like the *Onza de Plata* (ounce of silver) and *Onza de Oro* (ounce of gold) for students who have demonstrated an inclusive and responsible perspective on mining in Peru.

4.0 GOOD PRACTICES IN THE PRIVATE SECTOR TO OVERCOME BARRIERS FACED BY WOMEN

At the international level, various mining companies have acted to promote gender equality in the sector. Table 2 shows some business practices in 11 companies. In general, the majority of the companies have gender equality committees or areas that prioritize equality of opportunities between different groups in the same company. The business objectives in the area of gender equality have been aimed at raising the awareness of workers in the sector of the presence of discriminatory bias through training courses or workshops, presentations, and so on. Other business initiatives have pursued the empowerment of minority groups (such as women workers) to increase the supply and retention of labour. In addition, some companies have begun to implement recruitment which includes processes such as blind CVs and gender quotas to minimize unconscious and discriminatory bias, which excludes certain human groups. Finally, extension and social development programs have been implemented through training of women in areas affected by mining to recruit them for operational work. The companies have prioritized reducing gender discrimination and guaranteeing the labour rights of any worker.

Table 2. Activities of mining companies to promote gender equality

Company	Objective	Case
AngloGold Ashanti Limited	To establish a gender equality policy	In 2015, a policy was elaborated to promote gender equality strategies in recruitment processes, wages and salaries, friendly practices, communication, and monitoring and evaluation. Source: AngloGold Ashanti (n.d.).
BHP Group Limited	To achieve gender equality in employment by 2025	In 2016, female labour participation reached 16%. In light of this, it was proposed to increase women's employment by 3% per year. Source: BHP Group Limited (n.d.).
CODELCO and Antofagasta PLC	To reduce barriers faced by women in the labour field	In 2017 and 2018, a diagnostic of the barriers that women face in mining was carried out. Strategies to reduce the barriers previously identified were then promoted. Source: Antofagasta (n.d.).
Companhia Vale do Rio Doce (Vale)	To raise awareness of personnel about inclusion and diversity	Two campaigns were carried out in 2016. The first lasted 9 weeks and covered issues of racism, gender, disability, sexual orientation, and nationality. The second campaign sought to promote applications by disabled persons. Source: Vale (n.d.).

Company	Objective	Case
Antamina Mining Company S.A.	To promote gender equality strategies	In 2020, Antamina was the first mining company in Peru to be considered a "safe company, free of violence and discrimination against women," according to the Ministry of Women and Vulnerable Populations. Other measures include establishing a diversity and inclusion committee, blind CVs, and training programs for rural women. Source: Antamina (n.d.).
Chilean National Copper Corporation (CODELCO)	To promote gender equality strategies	In 2015, the Corporate Gender Diversity Department, Leaders of Gender Diversity, and implementation of Gender Panels were created in operations centres. Source: CODELCO (n.d.).
Evraz PLC	To protect vulnerable populations	Grants benefits to vulnerable personnel such as fathers or single mothers and people whose partner is retired, among others. Source: Evraz (n.d.).
Fortescue Metals Group	To establish a policy against family and domestic violence	From 2018, greater flexibility has been allowed to employees to give them more time for personal security, family matters, or attend court, police station, or similar. Source: Fortescue (n.d.).
Gold Fields La Cima	To establish actions in favour of women	The most notable actions include (i) flexible working time and special benefits for families, (ii) a leadership and mentoring program for women, (iii) training in disruptive innovation techniques, (iv) workshop on unconscious bias such as the campaign #RompamosSegos to eradicate stereotypes, and (v) a scholarship program for our communities. Source: Gold Fields (n.d.).
Newmont Mining Corporation	To promote gender equality strategies	In 2013, it launched the "Inclusion and Diversity Journey" strategy, which involves a set of actions to tackle gender equality from various perspectives and achieve gender parity in senior management posts by 2030 or implement quantitative measures to measure inclusion "Paradigm for Parity." Source: Newmont (n.d.).
Orano S. A.	To promote gender equality strategies	In 2019, actions toward gender equality began to be carried out, such as greater flexibility for pregnant women and persons who had a child. In addition, with regard to equality of incomes on retirement, pensions are granted at the same level to women who request leave or fathers who work part-time as employees without children. Source: Orano S. A. (n.d.).

Source: Responsible Mining Index, 2020 and the official pages of the companies. Author's elaboration.

5.0 DATABASES

This section uses databases mainly from MINEM and provides a preliminary analysis of the data. It describes the workforce composition of the sector and, in particular, analyzes the profile of women workers in the large-scale mining industry in Peru. The databases used have been divided into two main groups:

5.1 Publicly Accessible Databases

This report presents information collected from five publicly accessible databases:

5.1.1   Universities Information Generation and Processing System for the biennial universities report (SIBE) of the National Superintendence of Higher University Education (SUNEDU): SIBE is a virtual platform that chiefly contains information on universities and technical institutions. In particular, it contains information on leavers, graduates, entrants, and applicants according to specialty and degree. This information can be broken down by type of management, educational institution, classification of programs, and gender of persons. This database is accessible to the public. https://www.sunedu.gob.pe/sibe/

5.1.2   National Educational Grants and Loans Program (PRONABEC): PRONABEC is the government entity responsible for the promotion of education by granting scholarships and education loans to persons with limited economic resources. It contains information on the people who have received grants and age, gender, type of grant, and area of study. This database can be accessed on request to MINEDU. https://www.gob.pe/pronabec

5.1.3   Integrated Financial Administration System (SIAF) of the Ministry of Economy and Finance (MEF): SIAF is a virtual platform that compiles information on the budgets of public entities such as ministries, universities, and institutes, among others. These institutions are required to report their expenditure in each fiscal year. The information has been available every month since 1999. It is possible to search by investment project and activities, the source of financing, and the percentage of use of public spending in each fiscal year. This database is accessible to the public. https://apps5.mineco.gob.pe/transparencia/Navegador/default.aspx

5.1.4   Employment reports of MINEM: Since 2019, MINEM reports have been published annually, showing the characteristics of employees in the Peruvian mining sector. It contains information on employment by place of origin, work function, age ranges, size of mining entity, and type of employer. It also has a section that allows analysis of the work characteristics of the men and women. https://www.minem.gob.pe/_publicaSector.php?idSector=1

5.1.5   ILOSTAT of the ILO: This is a virtual platform that contains information on the labour market of a large number of companies at various periods of time. In general, it uses information from national household surveys; for example, the ENAHO is used in Peru. https://ilostat.ilo.org/es/data/

These databases do not provide individual information on the workers, but they do provide aggregated longitudinal information at the national level. The information from these databases has allowed us to construct 6 of the 24 indicators described in Annex A of TdR-PNUD-IC-728-2021: (i) list of courses associated with the large-scale mining sector broken down by universities, public and/or private institutes, (ii) provision of postgraduate courses in Section (i), (iii) number of men and women students in the courses mentioned in Section (i), (iv) number of men and women students who enter and leave the courses mentioned in Section (i), (v) public expenditure on grants, and (vi) public expenditure on research and development (R&D). These indicators provide important information to calculate the supply of students and leavers from universities and technical institutions, and public expenditure on education and R&D.

However, due to the aggregation of the administrative information available for large-scale mining in MINEM, it has not been possible to construct labour market indicators by labour force characteristics (occupation, economic sub-activity, and wages) nor by indicators broken down by type of mineral.

5.2 Privately Accessible Databases

This second group of information uses two important sources of data: (i) The Monthly Statistical Declaration (ESTAMIN) of MINEM[8] and (ii) information provided by the mining companies.

The MINEM data are important because they collect information from all the large-scale mining entities. However, the available information only breaks down at the company level and does not allow individual analysis of the workers.

5.2.1   Monthly Statistical Declaration (ESTAMIN): This is compiled by the Directorate General of Mining of MINEM and is also addressed to Mining Activity Owners, such as the Consolidated Annual Declaration (DAC). The information provided by MINEM includes basic information on owners and mining concessionaires, number of workers and employees, mining production (quantity and grades), minerals, geographical location where the minerals are extracted, destination of the mining resources, information on safety, incidents or accidents, disability due to incidents and accidents, professional and occupational diseases, and unemployment indicators. This source of information has been acquired through an express request to MINEM in the framework of this study.

As indicated above, to complement the analysis, this study planned to collect of private information from within the mining companies.

5.2.2   Databases provided by mining companies (EM). Due to the limitations on provision of quantitative information, it has not been possible to analyze it. Instead, the information gathered has been compiled and appended to this document in digital form so that it can be complemented and analyzed in future studies. The qualitative information collected in the interviews has been incorporated

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[8] MINEM has other sources of information such as the DAC, which has a greater wealth of information than the ESTAMIN; however, the legal framework does not allow the use of the data.

throughout this report but has been anonymized to ensure the confidentiality of the replies. Details of the interviews conducted and their organization are attached in the Confidential Annex.

6.0 ANALYSIS OF DATA AND RESULTS

This section presents the data broken down by gender according to the profile of the workers in large-scale mining, paying special attention to the relationship between the principal labour market variables and the profile of women in mining. It is worth mentioning that the calculation broken down by gender and job categories has made in-depth use of the databases provided (see Appendix 1). Despite many efforts to obtain information broken down for medium- and large-scale mining in Peru, we were not able to obtain individual information on the workers; consequently, the information presented considers only aggregate information for the sector.

The results presented below have been grouped into three main categories: (1) indicators of educational provision, (2) indicators of employment situation, (3) indicators of government policies and expenditure on R&D. Due to the lack of availability of data, it has not been possible to include information on skill levels, age, type of contract, and mining operation. Finally, given that the MEF budget classification of expenditures does not consider a specific item for STEM careers and occupations, no information on this type of expenditure is reported. To estimate this, indicators of government expenditure on R&D have been used.

To complement the quantitative analysis, the document has incorporated information gathered in five semi-structured interviews with representatives of Human Resources and Diversity and Inclusion Offices (Confidential Annex). In addition, conversations were held with women representatives of management departments in large-scale mining companies to learn the experiences of women business leaders and trace their entry into the mining companies, as well as the various obstacles and opportunities that they found. The analysis of their qualitative information has been incorporated in the description of the legal framework and business practices described in Sections 3 and 4 and has been used for the design of the recommendations and policy guidelines.

6.1 Indicators of Education Provision

According to the IGF (2012b), university courses related to the large-scale mining sector ("mining courses") in Peru are pure sciences, physics and chemistry, sanitary construction and architecture, systems and telecommunications engineering, industrial and production engineering, industrial and construction engineering, and other engineering. Table 3 shows the total percentage of enrolled, the ratio of entrants to applicants, and graduates from the above courses in Peru, broken down by gender. The information reported is broken down by educational level (postgraduate and first degree) and type of educational institution (public and private). It is important to emphasize that, although the ratio of entrants over applicants to these courses is similar for men and women irrespective of educational level and institution, only 30% of those enrolled and graduates in these mining careers are women. Moreover, this proportion is maintained at the first degree level and is independent of the type of educational institution.

Table 3. Students on university courses in the large-scale mining sector in Peru, 2016

Level	Enrolled		Entrant/applicant		Graduate	
	Women	Men	Women	Men	Women	Men
Postgraduate						
Public	30%	70%	96%	96%	30%	70%
Private	31%	69%	89%	86%	36%	64%
First degree						
Public	26%	74%	18%	18%	28%	72%
Private	30%	70%	73%	80%	32%	68%

Note: Only considers physics and chemistry sciences, sanitary construction and architecture, systems and telecommunications engineering, industrial and production engineering, industrial and construction engineering, and other engineering.

Source: SIBE SUNEDU. Author's elaboration.

6.2 Indicators of Job Situation in the Large-Scale Mining Sector

6.2.1 Mining in General

FLP in the Peruvian mining sector (in general) has remained relatively constant at around 6% in the period 2010–2019 (see Figure 2). At the same time, female participation by position in the hierarchy of the sector has not changed much. Women employed in managerial, administrative, and operational positions as well as staff have shown average participation of 11%, 22%, 5%, and 4% respectively.

Alternatively, and complementary to this, Figure 3 shows women's labour participation in the Peruvian mining sector by occupation in 2019. In general, women have an LFP of less than 25%, except for occupations in services, where all the workers are women. According to ILOSTAT data (2020), women are most present in this sector because it includes workers in occupations such as sales, kitchens, hotels, shops, care, and protection.
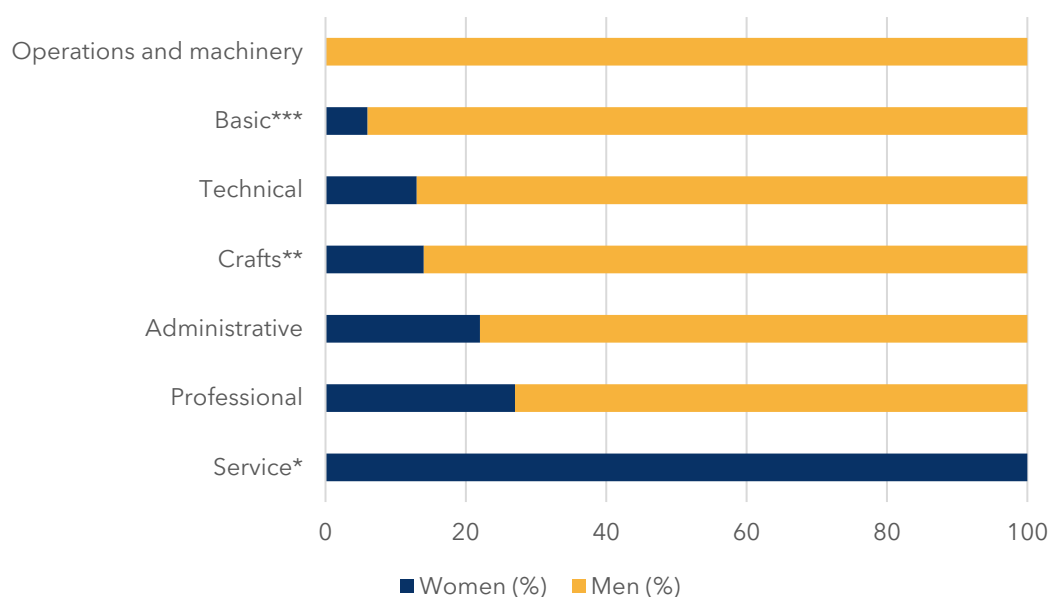
Figure 2. Percentage labour participation of women and men by occupation

Percentage of women

Percentage of men
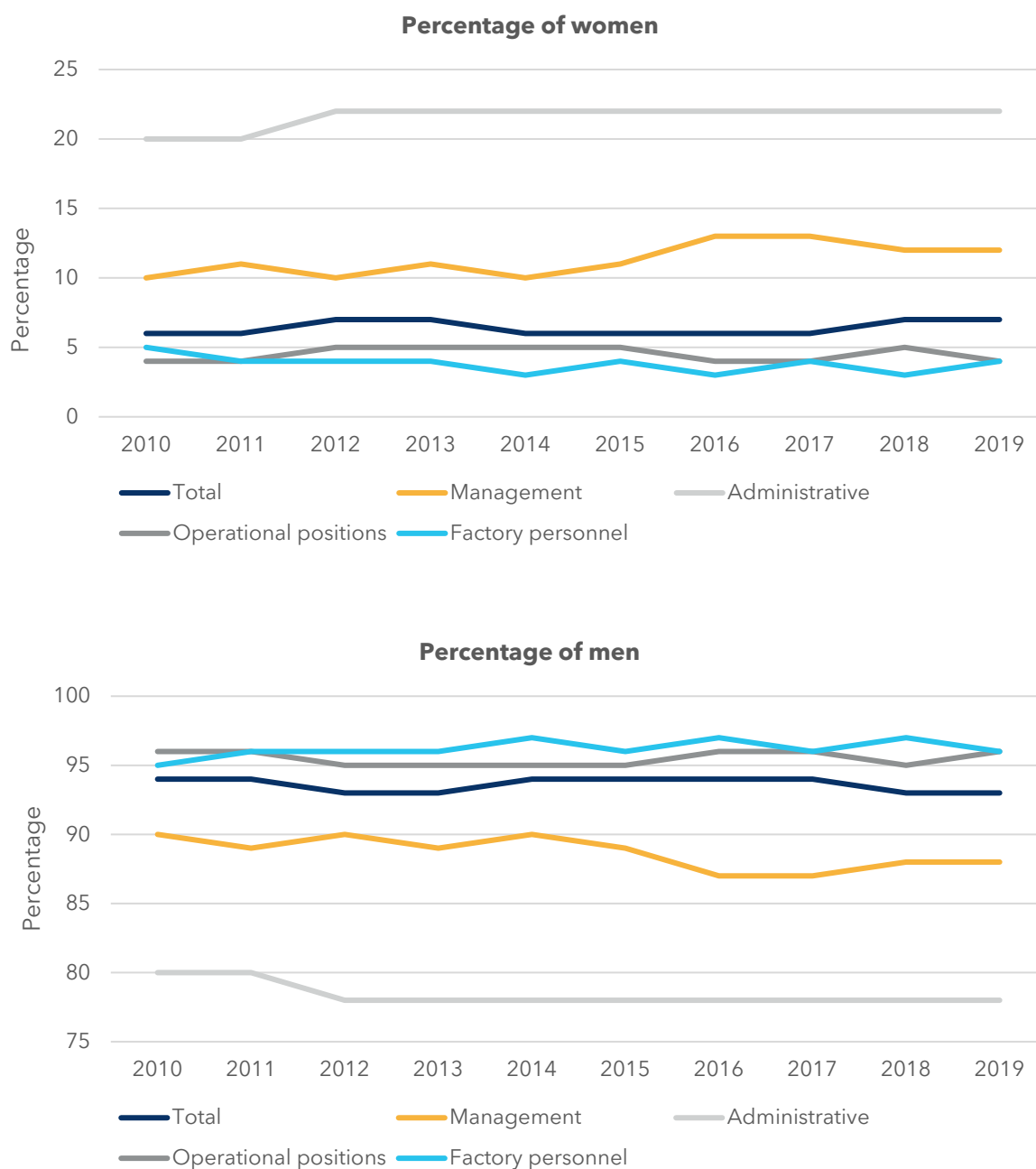
Source: MINEM Reports. Author's elaboration. Refers to the Peruvian mining sector.

Figure 3. Distribution of employees by occupation, 2019

Legend: Women (%), Men (%)

Categories (top to bottom): Operations and machinery, Basic***, Technical, Crafts**, Administrative, Professional, Service*

*Sales, kitchen, hotels, shops, care and protection.
**Construction painting, electricity, food processing and similar.
***Cleaning, agriculture, and food preparations. Refers to the Peruvian mining sector.
Source: ILOSTAT, ILO (2020). Author's elaboration.

In terms of age, according to ILOSTAT (ILO, 2020), in 2019 approximately 50% (46,754) of men in the mining sector were aged 25 to 34, while 60% (14,584) of the women were aged 25 to 44 (see Figure 4).

Figure 4. Distribution of employees by age group, year 2019
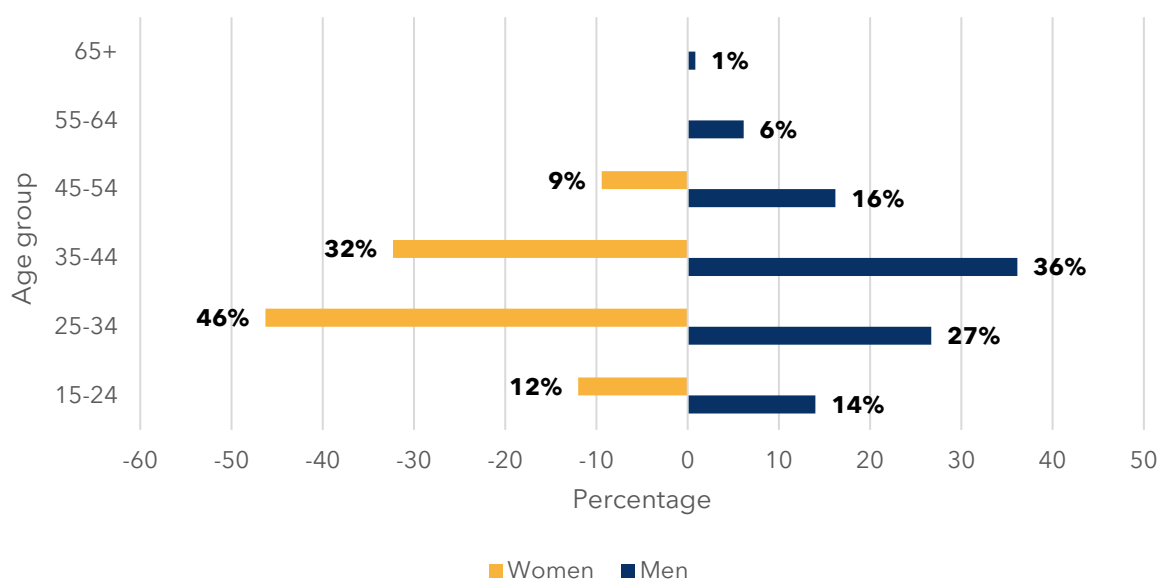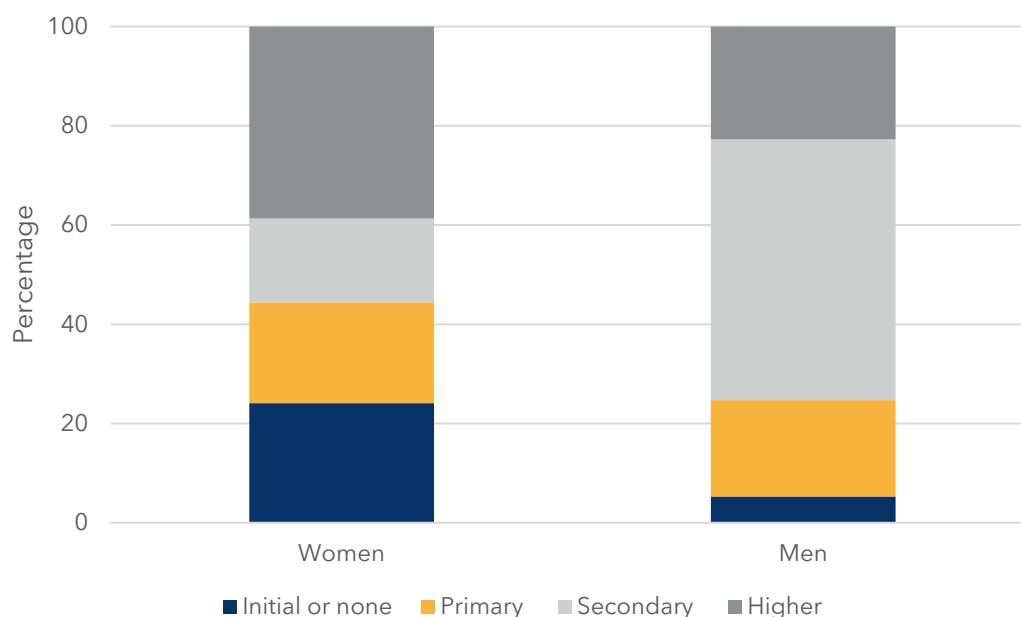

Source: ILOSTAT, ILO (2020). Author's elaboration. Refers to the Peruvian mining sector. The percentages were calculated such that some of the age percentages equal 100% of the men in the various age groups. The same applies to the women.

Using 2019 data, Figure 5 shows the distribution of men and women workers by educational level. It shows that the largest proportion of men in the Peruvian mining sector have secondary education (53%). Women have more heterogeneous levels of education. Around one third (39%, 7,560) have higher education. In addition, more than 40% of them have primary (24%, 4,711) and secondary education (17% or 3,309). Very few men have only primary education (5% or 9,246), and the majority of them have secondary education (53% or 91,992) (see Figure 5).

**Figure 5. Distribution of employees by level of education, 2019**

Source: ILOSTAT. Author's elaboration. Refers to the Peruvian mining sector. The total number of men in the various levels of education is 100%, and similarly for the women.

Unlike labour participation, the gender wage gap for the Peruvian mining sector varied considerably between the years 2018 and 2019, reaching aggregate levels of 18% and 6%, respectively (see Figure 6 and Table 4). This variation has been greater in operational positions, where there was a fall in the wage gap from 47% to 34% in 2019. In other occupations, such as managerial, administrative, and factory personnel, the wage gaps have remained on average at 24%, 12%, and 11%, respectively. However, caution is advised concerning the inferences drawn from this information because it could be biased due to the number of wage observations reported.

Figure 6. Gross gender wage gap by position, 2018 and 2019
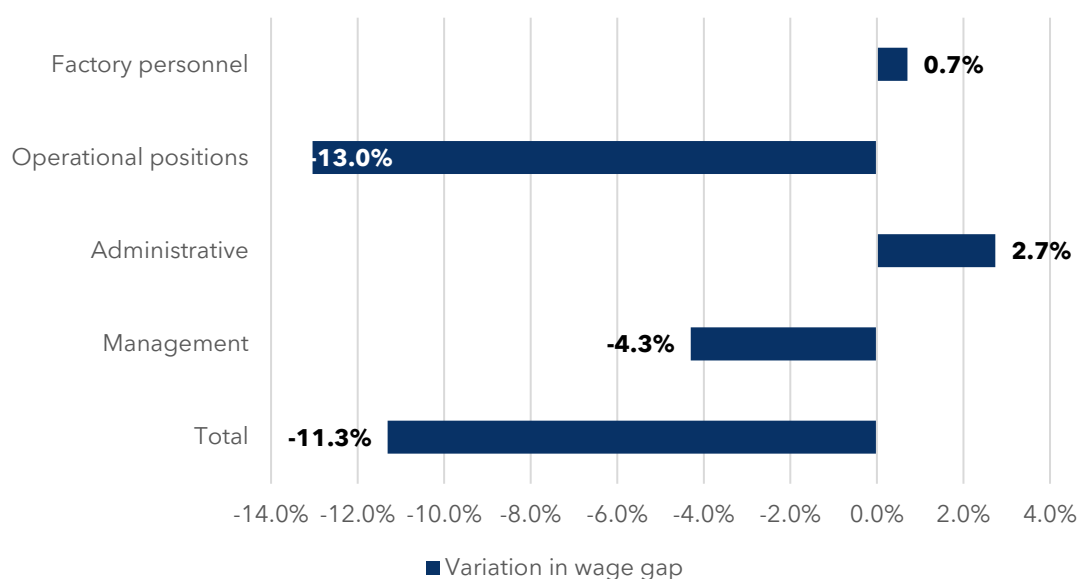
Source: MINEM. Reports. Author's elaboration. Refers to the Peruvian mining sector.

Table 4. Average wage, difference, and wage gap

Position		Average wage (PEN)		Difference	Gap
		Women	Men		
Total	2018	46,500	56,500	10,000	17,7%
	2019	59,358	63,411	4,053	6,4%
Management	2018	199,087	270,083	70,996	26,3%
	2019	228,514	292,914	64,400	22,0%
Administrative	2018	57,995	64,776	6,781	10,5%
	2019	67,497	77,767	10,270	13,2%
General operations	2018	24,632	46,911	22,279	47,5%
	2019	33,709	51,425	17,716	34,5%
Plant personnel	2018	55,408	61,953	6,545	11,3%
	2019	61,339	69,131	7,792	10,6%

Source: MINEM. Reports. Author's elaboration. Refers to the Peruvian mining sector.

6.2.2 Large-Scale Mining

Table 5 and Figure 7 show women's labour participation in total employment in large-scale mining between March 2020 and December 2021. On average, 6% are women. This proportion has remained constant since the start of government policies to tackle the COVID-19 pandemic from March 2020 onward. The absolute values show a reduction in employment in April and May 2020, which is consistent with the dynamic of employment

at the national level in the mining sector (INEI, 2022). In addition, at the end of 2020, employment began to stabilize, consistent with current employment trends in other sectors, such as construction and fisheries from September 2020 onward. The employed population in the mining sector in 2021 shows a drop of 3.4% compared with 2019 but increased considerably by 34.5% in 2020 (INEI, 2022).

Table 5. Level and percentage of labour participation of men and women in total employment in large-scale mining

| Month	Total*	Women		Men	
		N	%	N	%
Mar-20	111,659	6,431	6%	105,228	94%
Apr-20	79,199	5,754	7%	73,445	93%
May-20	82,500	5,772	7%	76,728	93%
Jun-20	127,616	7,714	6%	119,902	94%
Jul-20	125,836	8,888	7%	116,948	93%
Aug-20	133,470	7,657	6%	125,813	94%
Sept-20	131,271	8,888	7%	122,383	93%
Oct-20	139,177	8,925	6%	130,252	94%
Nov-20	148,102	8,925	6%	139,177	94%
Dec-20	153,228	9,742	6%	143,486	94%
Jan-21	155,158	9,687	6%	145,471	94%
Feb-21	153,887	9,575	6%	144,312	94%
Mar-21	143,869	7,954	6%	135,915	94%
Apr-21	156,944	9,014	6%	147,930	94%
May-21	142,735	8,021	6%	134,714	94%
Jun-21	160,874	9,274	6%	151,600	94%
Jul-21	176,903	11,139	6%	165,764	94%
Aug-21	159,949	9,702	6%	150,247	94%
Set-21	186,607	12,090	7%	174,517	94%
Oct-21	193,518	12,874	7%	180,644	93%
Nov-21	209,717	13,682	7%	196,035	93%
Dec-21	204,608	13,531	7%	191,077	93%

*From 2009, the categories of medium- and large-scale mining are combined and classified under the General Regime. The total incudes companies that belong to the General Regime, that is, medium- and large-scale mining. In addition, no distinction is drawn between owners and those

connected.
Source: ESTAMIN, MINEM. Author's elaboration.

Figure 7. Evolution of female and male labour participation in total employment in large-scale mining
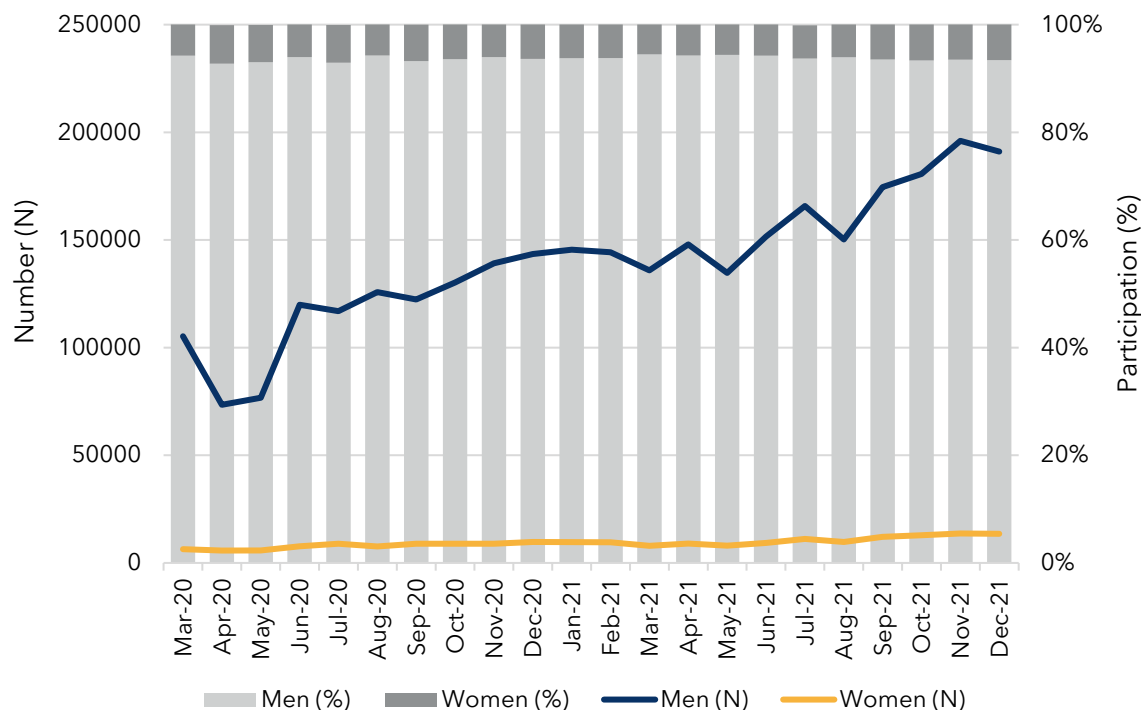

Note: Figure produced from data reported in Table 5.
Source: ESTAMIN, MINEM. Author's elaboration.

Figure 8 shows women's labour participation by stage of mining activity. In general, it shows greater participation in the exploration stage (10% on average) and less participation in the exploitation stage (6% on average). In contrast, it shows a growing trend in the closure stage, from 5% at the start of 2020 to reach 11% in 2021. Despite not having statistical data which explains the greater LFP at the closure stage, interviews with experts in the sector suggest that this trend is due to the greater presence of female staff in careers related to environmental engineering, who work mainly on evaluating the impact of mining activity on communities following mining activity.

Figure 8. Women's labour participation in large-scale mining by stage of mining activity
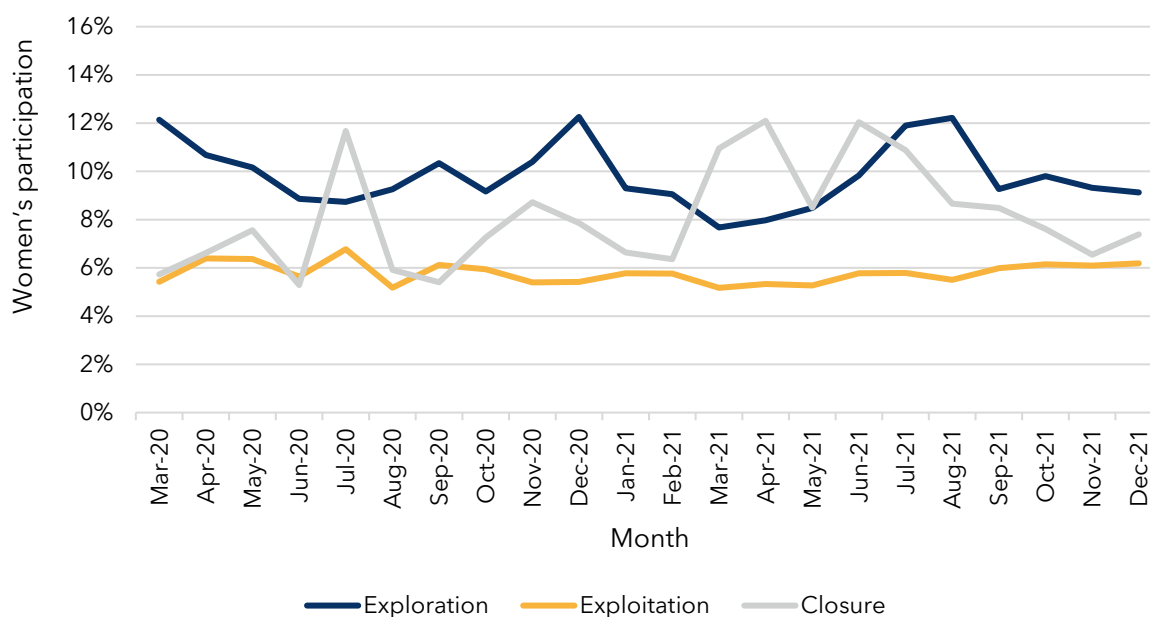
Source: ESTAMIN, MINEM. Author's elaboration.

Table 6 shows women's labour participation by stage of mining activity and their origin, using average values for 2020 and 2021. The female staff is concentrated in the exploitation and exploration stage. The proportion of women varies depending on their origin: (i) *local*, when the woman is in the district of the mining entity, (ii) *regional* (not local) if the woman worker comes from the region of the mining entity, but not the same district, (iii) from *another region* when the woman worker comes from a region other than the mining entity, and (iv) *foreign*, when the women is from another country.

In the exploration stage, 5 out of 10 women come from another region, while in the closure stage, 9 out of 10 women come from another region. The greater proportion of local women in the exploitation stage can be explained by the characteristics of the work and human capital requirements in the local female labour force at that stage. The exploitation stage mainly employs the workforce for operational work that does not require professional technical knowledge and that can be provided by the local labour force living close to the mining sites. The concentration of a female labour force from another region in the closure stage could be explained due to the fact that this stage concentrates mainly professionals related to the protection of the environment. Professional courses of this type are usually followed in universities and institutes located in urban areas and not necessarily close to the mining sites.

Table 6. Distribution of women (levels and percentages) in large-scale mining by stage of mining activity and origin.

| Stage		Total		Local		Region not local		Other region		Foreign	
		N	%	N	%	N	%	N	%	N	%
Exploration	2020	1688	100%	223	13%	534	32%	919	54%	12	1%
	2021	2089	100%	276	13%	610	29%	1190	57%	14	1%
Exploitation	2020	6146	100%	1705	28%	1642	27%	2730	44%	70	1%
	2021	8787	100%	2096	24%	2381	27%	4218	48%	92	1%
Closure	2020	36	100%	1	2%	4	12%	30	85%	1	1%
	2021	58	100%	2	3%	4	8%	51	88%	1	1%

Note: It should be emphasized that the exploration stage also involves search and prospecting, and the exploitation stage also involves processing, general labour, mine transport, and marketing. N refers to the total number of women workers in the year between the months of March and December. It does not consider the months of January and February, as the information reported in ESTAMIN contains inconsistencies. The monthly percentage (%) was calculated as the total sum of workers between March and December.
Source: ESTAMIN MINEM. Author's elaboration.

Although not requested in the ToR, Figure 9 has been included to show women's labour participation by three types of company: (i) related, (ii) contractor, and (iii) owner. The first refers to non-mining activities not related to mining, such as transport, while the second can carry out mining and non-mining activities. Owner companies had LFP percentages similar to related companies, approximately 7% in March 2020 and January 2022. The lowest participation is found in contracting companies, around 4% in the same period. This lower LFP could be explained by the fact that contracting companies generally carry out construction projects, where women have lower labour participation.

Figure 9. Women's labour participation in large-scale mining by type of company
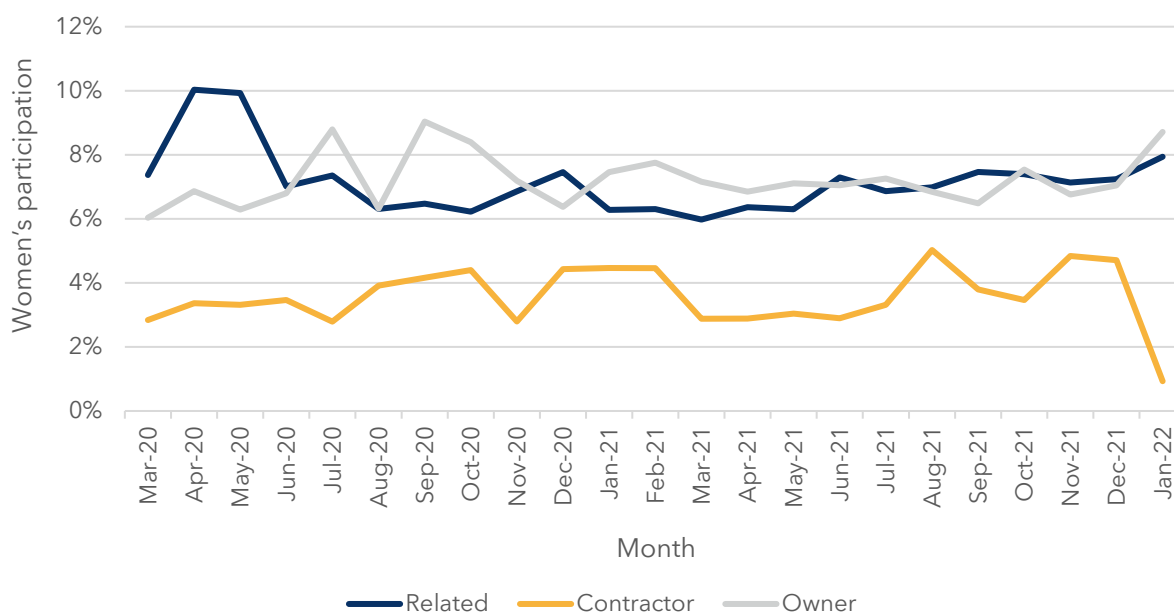
Note: Supreme Decree N 024-2016-EM mentions that related activities are civil construction, mechanical and electrical installations, related or complementary installations, storage tanks, piping in general, electric generators, transport systems which are not concessions, use of machinery, equipment and accessories, mechanical, electrical maintenance, restaurants, hotels, camps, medical services, surveillance, construction, and other types of service provision. Contracting companies may be (i) a mining contracting company, and (ii) a contracting company for related activities. The first refers to "any legal person who, by contract, executes a work or provides a service to the owners of mining activities, in exploration, development, exploitation and/or processing activities, and which is qualified as such by the Directorate General of Mining of the MINEM." The second means any natural or legal person who carries out activities auxiliary or complementary to the mining activity on behalf of the owner of the mining activity.
Source: ESTAMIN MINEM. Author's elaboration.

## 6.3 Indicators of Government Policies and Expenditure on R&D Education

Figure 10 shows the number of scholarships awarded by the Peruvian state, broken down by gender. Panel A shows the number of scholarships in STEM courses, while Panel B shows the number of scholarships in "mining courses." It can be observed that the number of scholarships in STEM courses has increased greatly since 2018, averaging 1,169 men and 922 women in 2012–2018 and 6,092 men and 4,033 women in 2019–2021. To a lesser extent, scholarships in courses related to mining were, on average, 818 men and 571 women in 2012–2018 and 4,099 men and 2,243 women in 2019–2021. The difference in these time periods could be attributed mainly to the creation of the Study Continuity Scholarship in 2020, the objective of which was to support students whose studies were affected by the pandemic. On average, between 2021 and 2021, of 10 scholarships in STEM courses or "mining courses," four were granted to women. It should be noted that there are no gender quotas for the scholarships shown in Figure 10. Exceptionally, MINEDU implemented the Undergraduate Scholarship for Women in
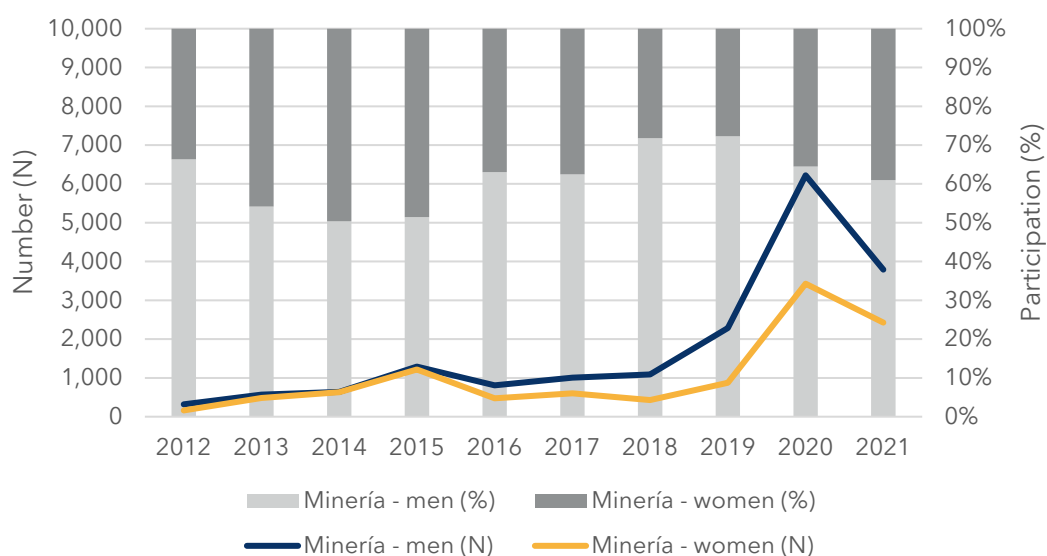
Science in 2021, which seeks to promote entry and retention of more women in STEM courses.

Figure 10. Scholarships provided by the Peruvian state

Panel A: STEM courses

STEM - men (%)　　STEM - women (%)
STEM - men (N)　　STEM - women (N)
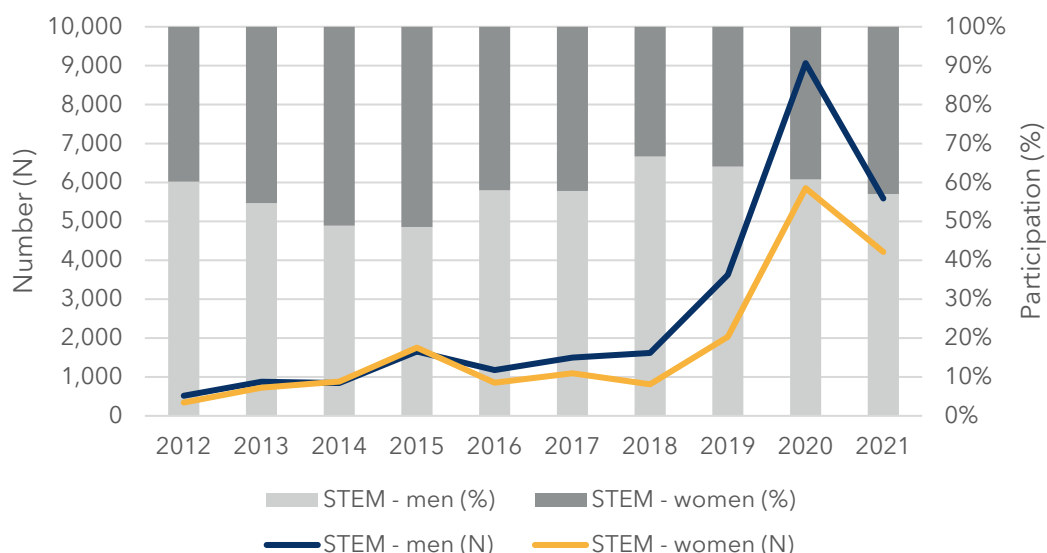
Panel B: Mining-related courses

Minería - men (%)　　Minería - women (%)
Minería - men (N)　　Minería - women (N)

Note: Includes Scholarship 18, Continuity of Studies Scholarship, Travel Scholarship, Academic Excellence Scholarship for teachers' children, Bicentenary Generation Scholarship, Undergraduate Scholarship for in Science, Permanence scholarship, Scholastic Talent Scholarship.
Source: PRONABEC MINEDU. Author elaboration.

In 2016, government expenditure on R&D was PEN 159,000,000, which rose in 2019 to PEN 325,631,777. Due to policies to tackle the pandemic, for 2019, the public budget was reduced by 5% (PEN 308,249,031) in 2020, and 67% (PEN 106,424,615) in 2021. The presidency of the Council of Ministers is the government body which is responsible for

most of the expenditure on scientific R&D (see Figure 11). After that, the sectors which assign the most expenditure to R&D are the production and education sectors. The Energy and Mines sector has a low level of expenditure (PEN 9,614,661 on average 2016–2021), which represents only 3% of the total spending on R&D.

Figure 11. Total government expenditure on scientific R&D, by sector
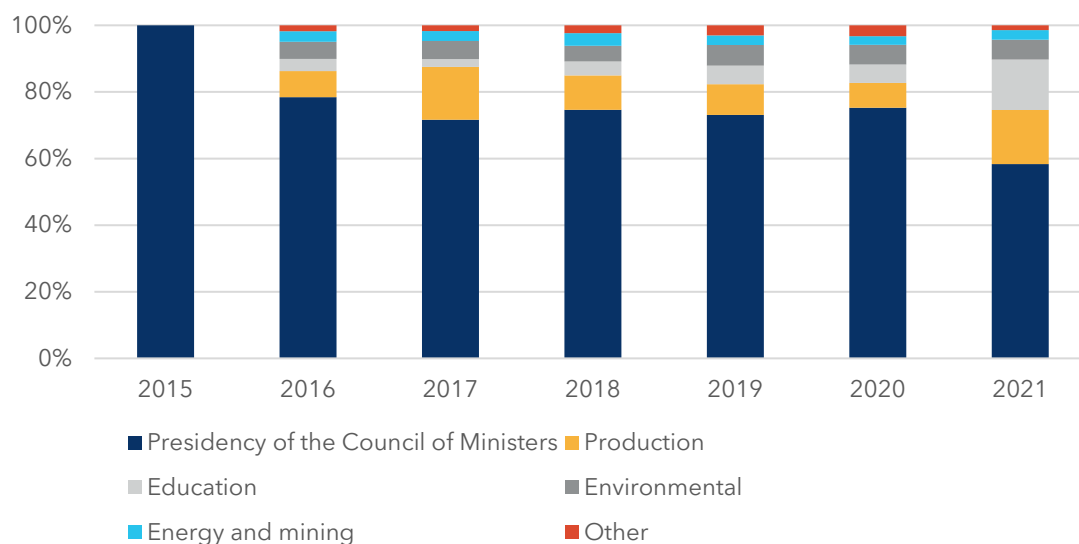
Note: Real values at 2021 prices. Others refer to the agriculture and irrigation, defence, and health sectors.
Source: SIAF MEF. Author's elaboration.

7.0 PROPOSED RECOMMENDATIONS AND POLICY GUIDELINES TO IMPROVE WOMEN'S PARTICIPATION IN THE MINING SECTOR

Having analyzed the situation of women in the economy in the mining sector in Peru and the publicly available information and qualitative information gathered in interviews, we present recommendations and policy guidelines to increase female labour participation in the sector.

7.1 Providing Clear Incentives to Increase Inclusion of Women in Male-Dominated Courses

The limited LFP in the mining sector is associated with the smaller number of women in university and technical courses related to mining and to the lack of incentives to attract women into STEM fields. It is, therefore, essential to continue offering incentives to start and continue studies in these areas, such as those organized by CETEMIN or WAAIME Peru, and/or implementing private programs that attract more women into professions important to the sector.

Although the recruitment of women in the science and technology sectors is not easy, neither is their retention. Lagesen et al. (2021) discuss one of the results of a far-reaching Norwegian project (Proyecto Ada). This project seeks to increase the incorporation and retention of women in science and engineering programs, such as mathematics, information technology, cybernetics and robotics, electronic design and innovation, computer technology, and communications technology in the most important universities in Norway. The results of this study show that to achieve inclusion and retention of women in this type of program, education programs need to make substantial and sustained efforts over time.

7.2 Improve Selection and Recruitment Processes

The information collected in some interviews with human resources staff of the companies in the sector suggests the implementation of the recruitment processes in different stages. The first stage would consist of increasing the scope of recruitment selection calls and more applications from candidates qualified for different positions. The second phase could consist of assigning gender quotas to recruitment processes so as to always include the selection of gender pairs (at least one man and one woman) in each shortlist.

At the same time, it is necessary to take into account the dilemmas that could arise with the adoption of gender quotas. The empirical literature presents mixed evidence on the results of including gender quotas in the selection of personnel. On the one hand, studies have shown the advantages of diversity in the composition of the personnel and the inclusion of women in the sector. In addition, the incorporation of quotas could incentivize more women to work in male-dominated industries (Bertrand et al., 2019). However, at the same time, the inclusion of gender quotas could undermine the recruitment of

qualified personnel and stigmatize as incompetent the work of qualified women (ILO, 2021).

7.3 Provide More Labour Flexibility and Support for Both Mothers and Fathers in the Sector

One of the main problems in the mining sector in terms of gender equality consists of the difficulty of retaining female talent when they give birth. Although this problem is not unique to mining–Kleven et al. (2019) have shown a considerable reduction in working hours of female personnel with the arrival of the first child–the difficulties in retaining female staff in the mining sector seem to be even more pressing. Both the nature of the work and the rotating shifts at the mining camp could be important factors associated with the reduction in labour participation of mothers in the sector, but also the macho mentality and gender roles of a highly male-dominated sector could permanently demotivate the return of female staff to the mine after giving birth.

The potential bias against hiring female staff of child-bearing age is present in various economic sectors, as is the perception of the generation of additional costs in hiring female personnel (instead of male) of maternal age. From this point of view, the company will have to pay paternity leave and also incur losses associated with the lack of employability of skills learned in training programs learned by the mothers who go on maternity leave. At the same time, the fathers–men–do not suffer this bias because they do not have the right to be absent before and/or after birth.

Peruvian legislation recognizes these potential biases in the hiring of women by companies and makes an effort to sanction bad practices by, for example, prohibiting gender-discriminatory conduct and dismissals for pregnancy-related reasons. In the mining sector, there are specific challenges, most of which relate to the characteristics of workplaces, which are very often far away from the basic services that a mother or baby requires. Reducing these discriminatory biases and increasing the hiring of mothers of child-bearing age requires the development of an integral plan before, during, and after the pregnancy. In the first place, it is necessary to eliminate prejudices and discrimination against the hiring of women of childbearing age. The absence of paternity leave could create perverse incentives to reduce the hiring of female staff of child-bearing age.

It is proposed to equate paternity and maternity leave and/or implement shared parental leave. Several countries in the world already apply extended paternity leave.[9] Secondly, during pregnancy, it is important to establish facilities for women to continue to work. Successful examples and testimonies from Goldfields (2022) suggest that it has been possible for some mothers to do fieldwork during pregnancy thanks to comprehensive help from the company. Thirdly, after pregnancy, it is recommended to develop

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[9] See, for example the case of the following countries: Finland–equality in the granting of paternal leave irrespective of whether it is the father or mother (Finnish Ministry of Social Affairs and Health, 2020); Sweden–fathers have a right to 90 days paternity leave (The Newbie Guide to Sweden, n.d.); Iceland–parents can share up to 12 months parental leave after the birth of the child (Nordic Cooperation, n.d.); Norway–parents can take up to 10 weeks of parental leave depending on the salary of the spouse (European Commission, n.d.); Germany–both parents can take paternity leave of up to 14 months provided that the responsibility is shared between the father and the mother (Handbook Germany, n.d.). However, despite the increase in paternity leave, uptake has been slow (OECD, 2016).

incentives for women to return to work ensuring that their children grow up properly. Thus, for example, for work not carried out in the mining camps, nurseries could be established close to workplaces and/or allocation of benefits or incentives to contract childcare services.

7.4 Improve Transparency of Information to Enhance Monitoring that Guarantees Gender Equality in the Sector

MINEM collects information from mining companies through ESTAMIN and the DAC to monitor employment in the mining sector. Unlike other sectors, these data-collection tools represent significant steps and collect important information on employment in the sector. However, differences in the periodicity of the information reported, as well as the different legal requirements and obligations for reporting and access, present important challenges for the analysis of the information, which is particularly relevant for gender studies.

On the one hand, ESTAMIN is a voluntary monthly declaration made by mining companies to MINEM on aggerated information about the company. Lack of mandatory reporting dates and lack of oversight of the information reported can give rise to three problems: (i) companies can declare information months after they have been requested to supply it, which makes analysis of the data difficult, (ii) generation of inconsistencies in the information reported, and (iii) difficulties in implementing the analysis broken down by gender before 2020. To reduce these problems and improve the analysis of this information, it is recommended to promote the importance of ESTAMIN in the mining companies to increase the number of declarations and automate the reporting of information to minimize administrative costs.[10]

In addition, the DAC, unlike ESTAMIN, consists of a compulsory annual sworn declaration that must be made by owners of the mining companies. The DAC contains quite detailed information that is not reported in ESTAMIN (i.e., workers' wages, occupation at work, level of education, and age, among others). However, the Peruvian legal framework prohibits its access and reproduction, and thus it is not possible to review these data. To improve analysis of this information, it is recommended that anonymous access to it be granted so that it is possible to review the data while ensuring the privacy of the information of the company and its employees. Additionally, access to the information could be facilitated through the provision of representative samples.

Finally, it is proposed to strengthen the reporting of individual information within mining companies. Usually, human resources records contain the work characteristics of the employees. It is proposed to carry out periodic labour analyses which allow the monitoring and reduction of gender gaps and monitoring and analysis of female labour participation and wage equity within companies. In addition, detailed analysis of mining

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[10] Although there is information broken down by gender in ESTAMIN within MINEM, the regulations and legal basis have limited access for analysis for the purpose of this report.

company workers would allow for impact analysis of gender equality programs implemented within the mines and subsidiary companies.

7.5 Achieving Greater Cooperation Between Civil Society Agents, Academia, and Public and Private Sectors

Promoting gender equality requires articulation and commitment of various actors. To drive women's participation in large- and medium-scale mining, it is necessary to undertake comprehensive actions that include civil society, academia, and the public and private sectors. Below, we present some final reflections suggesting how they can be integrated.

7.5.1 Promote Specific Gender Equality Laws for the Mining Sector

Peruvian legislation requires gender equality in general but has no specifications applying particularly to the mining sector. Due to the specific characteristics of the sector and its particular labour dynamics, it is necessary to develop alternative policies that address sector-specific challenges. In addition, it is necessary to contextualize regulations by type of work (surface vs. underground work) and take into account the differences in worker characteristics at different stages of operations.

7.5.2 Create Guidelines for Companies on Gender Equality

It is recommended that objective guidelines be developed with detailed conditions that help companies to direct their efforts and expand opportunities for women in the mining sector. For example, some companies have aimed to reduce the marked difference between female labour participation, achieving 28% LFP compared with the Peruvian mining sector (6.6%). At the same time, other companies have sought to position themselves as progressive in terms of gender equality and have been recognized by the MIMP as companies free of violence against women. Both objectives reveal companies' interest in promoting gender equality in the sector as well as the design of clear objectives to achieve it. To improve gender equality in the sector in Peru, two specific strategies are suggested. The first is to identify model examples of mining companies in Peru that have achieved major successes in terms of gender equality. Secondly, to establish clear objectives and standard guidelines for all mining companies in the sector (e.g., define specific guidelines on recruitment and wage structure, including recruitment of new personnel). According to the information reported in the interviews, this would make it possible to counteract stereotypes and/or prejudices during the personnel selection process.

7.5.3 Strengthen Efforts to Combat Sexual Assault and Harassment

Sexual assault and harassment are structural problems present in various contexts in Peruvian society and in the mining context. A first step toward reducing them was the

creation of the Committee for Gender Equality. However, increased efforts to eradicate them are necessary. It is suggested, for example, to create monitoring and oversight offices to actively report on types of violence that exist. This would be supplemented by protection for complainants and the establishment of legal and psychosocial assistance for victims of violence so that they can continue to work in the workplace.

In this context, the relationship between related companies and contractors requires special consideration. Contracts concluded by mining companies with contractors do not always include the promotion of gender equality. Contactors and related companies are employed to perform specific work, but their alignment with gender objectives is not clear. However, it is relevant to design joint actions that ensure gender equality and involve all workers in the sector. At the same time, it is suggested to avoid undermining the contract but expand awareness-raising training and provide advice in cases of violence, discrimination, and workplace abuse for all workers. Finally, it is suggested to establish strict policies that provide sanctions for sexual abuse and harassment by mine and contract workers.

7.5.4 Strengthen the Integration of the Mining Entity in Local Communities

Mining entities are mostly located in places close to rural population centres. The introduction of large-scale mining in these environments usually results in distortions in the lifestyle of the local community. To generate more jobs and incorporate women into the workforce, it is proposed to emphasize the training and recruitment of women to perform technical tasks. As well as increasing labour participation, this could promote the empowerment of local women. Information gathered in the interviews with personnel of mining companies shows that these initiatives are increasingly frequent in mining companies, seeking to increase the well-being of the mining and local community.

7.5.5 Articulate the Efforts Made, Disseminate the Results, and Establish Future Lines of Action

Finally, it is proposed to promote the communication and dissemination of this report. Knowledge and understanding of the analysis presented in this study will be vital tools for agents in the sector and civil society. To better align what has been documented in this report with the design of a future line of action to increase gender equality in the industry and ensure its follow-up, it is recommended to develop a research agenda focused on the main challenges of the sector highlighted in this report. In addition, it is recommended to design and build a database to collect company information that allows evaluation of the impact of women's participation in the industry.

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APPENDIX 1. STRUCTURE OF THE AVAILABLE DATABASES AND RELEVANT INDICATORS

Area	Indicator		Source	Note
	Name	Definition		
1. Mapping of mining operations in the large-scale mining sector	Enrolled	Proportion of women and men enrolled out of the total enrolled	SIBE SUNEDU (2016)	Only considers university courses related to mining according to the international literature
	Entrant/ applicant	Ratio of entrants to applicants our of the total graduates	SIBE SUNEDU (2016)	
	Graduate	Proportion of women and men graduates compared to the total graduates	SIBE SUNEDU (2016)	
2. Employment situation in the large-scale mining sector	Labour participation in the Peruvian mining sector	Proportion of women and men compared with the total workers in the Peruvian mining sector by occupation	MINEM reports (2010–2019)	Administrative information
		Proportion of women and men compared with the total workers in the Peruvian mining sector by age group	ILOSTAT (2019)	Estimates used in the National Household Survey
	Gender gap in the Peruvian mining sector	Gender gap in the Peruvian mining sector by occupation	MINEM reports (2010–2019)	Administrative information
	Labour participation	Proportion of women and men compared to the total workers in the general regime	ESTAMIN MINEM (2020–2021)	From 2009, the categories medium- and large-scale mining are combined and classified under the General Regime.
	Labour participation by stage of mining activity	Proportion of women and men compared with total workers in the general regime in the exploration, exploitation, and closure stage	ESTAMIN MINEM (2020–2021)	The exploration stage also involves search and prospection, the exploitation stage also involves processing, general labour, mine transport, and marketing.

Area	Indicator		Source	Note
	Name	Definition		
	Labour participation by stage of mining activity and origin	Proportion of women and men compared with total workers in the general regime by stage of mining activity (exploration, exploitation, and closure) and origin (local, region, and other country)	ESTAMIN MINEM (2020–2021)	Local refers to workers who live in areas neighbouring the mine, while regional means workers who live in another region than the mine location.
	Labour participation by type of company	Proportion of women and men compared with total workers in the general regime in a related company, contractor, or owner	ESTAMIN MINEM (2020–2021)	Related companies refers to non-mining activities related to mining such as transport, while contracting companies can carry out mining and non-mining activities.
3. Education and skills of the mining workforce	STEM scholarships	Proportion of women and men scholarships on STEM courses compared to total scholarships	PRONABEC MINEDU (2012–2021)	Scholarship 18, Continuity of Studies Scholarship, Travel Scholarship, Academic Excellence Scholarship for teachers' children, Bicentenary Generation Scholarship, Undergraduate Scholarship for Women in Science, Permanence scholarship, Scholastic Talent Scholarship
	Mining scholarships	Proportion of women and men scholarships on STEM courses compared to total scholarships	PRONABEC MINEDU (2012–2021)	
	Expenditure on R&D	Proportion of government R&D expenditure by sector	SIAF MEF (2015–2021)	Real values at 2021 prices