The formal Large-Scale Mining (LSM) – informal Artisanal-Scale Mining (ASM) interface in Peru: exploring a key policy “bottleneck” through Qualitative Comparative Analysis (QCA)

by

Alvaro Cano Roncagliolo

MSc, University of Oxford, 2013

B.A., University of California, Los Angeles (UCLA), 2008

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF APPLIED SCIENCE

in

THE FACULTY OF GRADUATE AND POSTDOCTORAL STUDIES

(Mining Engineering)

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

April 2020

© Alvaro Cano, 2020
The following individuals certify that they have read, and recommend to the Faculty of Graduate and Postdoctoral Studies for acceptance, the thesis entitled:

The formal Large-Scale Mining (LSM) – informal Artisanal-Scale Mining (ASM) interface in Peru: exploring a key policy “bottleneck” through Qualitative Comparative Analysis (QCA)

submitted in partial fulfilment of the requirements
by Alvaro Cano for
the degree of Master of Applied Science in Mining Engineering

Examinig Committee:

Nadja Kunz, Mining Engineering
Supervisor
Marcello Veiga, Mining Engineering
Supervisory Committee Member
Bern Klein, Mining Engineering
Supervisory Committee Member
Abstract

Approximately 20% of the world's gold is produced by the Artisanal and Small-Scale Mining (ASSM) sector and over 150 million people depend on the activity to sustain their livelihoods. Between 2002 and 2012, the international price of gold caused an explosion of informal ASM activities in Peru, modifying, in key “mining corridors”, the relationships between formal mining (mostly Large-Scale Mining or LSM and Medium-Scale Mining (MSM) and informal mining (mostly Artisanal-Scale Mining or ASM). It is estimated that there are between 300,000 and 500,000 artisanal miners in Peru and a further 1 million people linked to the activity, which produces 20% of Peruvian gold. Only 60,000 are registered in the State’s formalization process but to complete the formalization process, at least 64% of these cases require an “Exploitation Contract (EC)”, granted by the formal concession holder. This instrument has been the main “bottleneck” in the Peruvian formalization process and at the interface between these types of mining since 2012.

This study applies a Qualitative Comparative Analysis (QCA) methodology to explore the influence that 5 theorized conditions may have played in bringing about an Exploitation Contract between formal-LSM and informal-ASM scales. The absence or presence of these 5 conditions are arranged in a binary “Truth Table” for an intermediate “N” of 20 cases of the interface, representing diversity in terms of positive and negative outcomes. The results indicate that arriving at an EC in Peru, due to the lack of state presence in mining regions, is an issue to be solved mainly among private parties. Accordingly, the QCA application indicates that there are two necessary conditions to arrive at an EC: (1) a strong willingness to formalize a mining business on behalf of ASSM producers and, (2) a strong corporate incentive or “business case” for LSM companies to support ASM formalization within their concessions. In addition, the participation of a third actor or State’s active role, and a corporate culture appropriate to engage ASM producers, while not necessary conditions to bring about the EC, are consistently present in the “pathways” or “solution formulas” that arrive at an EC.
Lay Summary

This study addresses the "overlap" of formal Large-Scale Mining (LSM) projects and informal Artisanal and Small-Scale Mining (ASSM) activities in Peru. It explores a specific legal instrument that has been designed by the Peruvian State to solve the conflict between the sectors: the Exploitation Contract (EC). After studying 20 cases of interface and the outcomes with regards to an EC, the research concludes that the EC occurs only when: (1) ASM producers want to formalize a business, and (2) LSM companies have a tangible benefit that can be obtained through supporting ASM activities.
Preface

This dissertation is an original intellectual product of the author, Alvaro Cano Roncagliolo. The maps presented in this study have been developed with the kind assistance of Mr. Edwin Loaiza. The maps can be developed at the website of the Peruvian Geological, Mining, and Metallurgical Institute (INGEMMET): https://geocatmin.ingemmet.gob.pe/geocatmin/
# Table of Contents

Abstract .................................................................................................................................................. iii
Lay Summary ........................................................................................................................................ iv
Preface .................................................................................................................................................. v
Table of Contents ................................................................................................................................. vi
List of Tables ......................................................................................................................................... viii
List of Figures ....................................................................................................................................... ix
List of Abbreviations .......................................................................................................................... x
Acknowledgements ............................................................................................................................. xii

1. Introduction ..................................................................................................................................... 1
  1.1 Study’s key concepts and Peruvian mining sector’s stratification .............................................. 1
  1.2 Problem significance and relevance of the question .................................................................. 6
  1.3 Thesis Outline ............................................................................................................................ 8

2. Literature review .............................................................................................................................. 9
  2.1 Global Context ........................................................................................................................... 9
    2.1.1 Artisanal and Small-Scale Mining (ASSM) as a “Wicked Problem” ................................. 9
    2.1.2 IGOS, NGOs and Development Agencies ........................................................................ 11
    2.1.3 LSM companies and International Codes ........................................................................... 14
    2.1.4 ASM, the “Resource Curse” and “Resource Nationalism” .............................................. 16
    2.1.5 Trends .................................................................................................................................. 18
  2.2 The Peruvian Context .................................................................................................................. 20
    2.2.1 Evolution of ASM and LSM policy in Peru ................................................................. 20
    2.2.2 The Policy “Bottleneck” at the LSM and ASM interface: the Exploitation Contract (EC) 28

3. Methods .......................................................................................................................................... 33
  3.1 National and sample’s interface description .............................................................................. 33
    3.1.1 The interface at the national level .................................................................................... 33
    3.1.2 The interface at the sample level .................................................................................... 39
    3.1.3 Description of sample by mining regions ......................................................................... 40
  3.2 Qualitative Comparative Analysis (QCA): ............................................................................... 44
    3.2.1 Research approach, key concepts and main processes .................................................. 44
    3.2.2 Outcome and conditions: theoretical and empirical “grounding” and justification 48
    3.2.3 Case selection criteria and final sample .......................................................................... 54
  3.3 Data Collection and Analysis ...................................................................................................... 57
4. Findings and discussion........................................................................................................59
   4.1 Conditions for Arriving at an Exploitation Contract ..................................................62
   4.2 Analysis of Necessary Conditions for an EC ..............................................................66
   4.3 Conditions that prevent establishing an Exploitation Contract (EC) .........................68
   4.4 Discussion of QCA findings: implications for stakeholders and policymakers ..........72
5. Conclusion ..........................................................................................................................82
6. Contributions and Limitations .........................................................................................87
   6.1 Academic, applied and methodological contribution ....................................................87
   6.2 Limitations and future applications of the method ........................................................89
Bibliography ..........................................................................................................................91
Appendices ............................................................................................................................101
   Appendix A: Methodology and data supply .................................................................101
   Appendix B: List of consulted experts and actors ..........................................................107
   Appendix C: Number of REINFO registrations in MSM and LSM concession ............108
   Appendix D: Descriptive Sheets ..................................................................................111
   Compañía Minera Poderosa ..........................................................................................111
   Minera Barrick Misquichilca S.A. ................................................................................116
   Consorcio Minero Horizonte .........................................................................................120
   Summa Gold Corporation S.A. .....................................................................................125
   Minera Auífera RETAMAS S.A ....................................................................................128
   Consorcio Minero ATE ...............................................................................................132
   Minera Leona de Oro S.A.C. .........................................................................................135
   Rio Blanco S.A. .............................................................................................................138
   Shahuindo S.A.C. ...........................................................................................................141
   Oban S.A.C. ..................................................................................................................145
   Minera Vicuíña S.A.C. ....................................................................................................149
   Minera Yanaquihua .......................................................................................................152
   Compañía Minera Ares S.A.C. .......................................................................................156
   Inca One Gold Corp. .....................................................................................................160
   Compañía Minera Caravelí ............................................................................................163
   IED Mining S.A.C. .........................................................................................................168
   Compañía Minera Zafranal S.A.C. ................................................................................171
   Minera Las Bambas S.A.C. ............................................................................................174
   Empresa Anabi S.A.C. ...................................................................................................179
   Southern Peru Copper Corporation ..............................................................................182
List of Tables

Table 1.1. Stratification of Mining in Peru ................................................................. 3
Table 2.1. Periodization of ASM policy evolution in Peru ........................................... 27
Table 3.1. Investment amount and number of LSM projects by region .......................... 36
Table 3.2. Top 11 formal LSM companies with registered ASM miners operating in concessions considered for this study .................................................. 38
Table 3.3. Final Sample (20 cases) .............................................................................. 39
Table 3.4. High mining-geological potential areas (geophysical and geochemical anomalies). ........................................................................................................ 40
Table 3.5. Cases ........................................................................................................... 56
Table 4.1. Truth Table ............................................................................................... 59
Table 4.2. Outcomes, combinations and number of cases ........................................... 59
Table 4.3. Outcome, combinations of conditions and cases ........................................ 60
Table 4.4. Outcomes and solution formulas ............................................................... 61
Table 4.5. Solution Formulas, Consistency and Coverage for positive outcome .......... 62
Table 4.6. Solution formulas and cases with agreement .............................................. 63
Table 4.7. Analysis of Necessary Condition for the EC .............................................. 66
Table 4.8. Solution Formulas, Consistency and Coverage for negative outcome ......... 68
Table 4.9. Solution formulas and cases without agreement ......................................... 69
Table 4.10. Estimation of the participation of ASM in the Population Economically Active (PEA) in the main gold mining areas of artisanal mining in Peru ................................. 73
Table 4.11. Status of mining concessions in Arequipa (November 2018) .................... 76
Table 4.12. Status of mining concessions in Apurímac ............................................. 77
Table A.0.1. Data matrix of cases ................................................................................ 101
Table A.0.2. Truth Table with cases .......................................................................... 102
Table A.0.3. Subset/Superset Analysis: Including Logical Remainders (positive outcome) 104
Table A.0.4. Interfaces type, outcome and solution formulas for cases ......................... 106
List of Figures

Figure 2.1. Polygons for ASM exploitation within a formal (LSM) exploration project ........ 29
Figure 3.1. Different Deposit Types in Peru................................................................. 33
Figure 3.2. Number of ASM producers registered in REINFO by location ...................... 34
Figure 3.3. Spatial distribution of ASM producers registered in REINFO by location ........ 35
Figure 3.4. Basic typology of LSM-ASM interfaces......................................................... 51
Figure 4.1. Arequipa's surface under concession........................................................... 76
Figure 4.2. Apurímac's surface under concession............................................................ 77
Figure A.0.1. Truth table graph with parsimonious solution .......................................... 103
# List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>APEC</td>
<td>Asia-Pacific Economic Cooperation Forum</td>
</tr>
<tr>
<td>ASGM</td>
<td>Artisanal Scale Gold Mining</td>
</tr>
<tr>
<td>ASM</td>
<td>Artisanal Scale Mining</td>
</tr>
<tr>
<td>ASSM</td>
<td>Artisanal and Small Scale Mining</td>
</tr>
<tr>
<td>CSR</td>
<td>Corporate Social Responsibility</td>
</tr>
<tr>
<td>DGFM</td>
<td>General Direction of Formalization</td>
</tr>
<tr>
<td>DREMS</td>
<td>Regional Direction of Energy and Mines</td>
</tr>
<tr>
<td>EC</td>
<td>Exploitation Contract</td>
</tr>
<tr>
<td>ECLAC</td>
<td>United Nations Economic Commission for Latin America</td>
</tr>
<tr>
<td>EITI</td>
<td>Extractive Industries Transparency Initiative</td>
</tr>
<tr>
<td>FA</td>
<td>Framework Agreement</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
</tr>
<tr>
<td>FMT</td>
<td>Fine Metric Tons</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GEOCATMIN</td>
<td>Mining Geological and Cadastral Information System</td>
</tr>
<tr>
<td>GRFA</td>
<td>Revolutionary Government of the Armed Forces</td>
</tr>
<tr>
<td>GRI</td>
<td>Global Reporting Initiative</td>
</tr>
<tr>
<td>ICMM</td>
<td>International Council on Mining and Metals</td>
</tr>
<tr>
<td>IFC</td>
<td>International Finance Corporation</td>
</tr>
<tr>
<td>IGF</td>
<td>Intergovernmental Forum on Mining</td>
</tr>
<tr>
<td>IGOs</td>
<td>International Government Organizations</td>
</tr>
<tr>
<td>IIED</td>
<td>International Institute for Environment and Development</td>
</tr>
<tr>
<td>ILO</td>
<td>International Labour Organization</td>
</tr>
<tr>
<td>INGEMMET</td>
<td>Geological, Mining, and Metallurgical Institute</td>
</tr>
<tr>
<td>LSM</td>
<td>Large-Scale Mining</td>
</tr>
<tr>
<td>MAPE</td>
<td>Artisanal and Small-Scale Mining (in Spanish)</td>
</tr>
<tr>
<td>MINAM</td>
<td>Ministry of the Environment</td>
</tr>
<tr>
<td>MINEM</td>
<td>Ministry of Energy and Mines</td>
</tr>
<tr>
<td>MMMSD</td>
<td>Mining, Minerals and Sustainable Development</td>
</tr>
<tr>
<td>MNEs</td>
<td>Multinational Enterprises</td>
</tr>
<tr>
<td>MSM</td>
<td>Medium-Scale Mining</td>
</tr>
<tr>
<td>MT</td>
<td>Metric Ton</td>
</tr>
<tr>
<td>MYSAC</td>
<td>Minera Yanaquihu S.A.C.</td>
</tr>
</tbody>
</table>
NGO : Non-governmental organization
OECD : Organization for Economic Cooperation and Development
OEFA : Environmental Assessment and Inspection Body
OSINERGMIN : Supervisory Agency for Energy Investment
PEA : Economically Active Population
QCA : Qualitative Comparative Analysis
REINFO : Integral Registry of Mining Formalization
SDGs : Sustainable Development Goals
SLO : Social License to Operate
SONAMIPE : National Society for Small Scale Mining
SPDA : Peruvian Society of Environmental Law
SSM : Small Scale Mining
TT : Truth Table
UN : United Nations
UNDP : United Nations Development Programme
UNITAR : United Nations Institute for Training and Research
WB : World Bank
WBCSD : World Business Council for Sustainable Development
Acknowledgements

Aarón Quiñón and Christian Alcántara: thank you for your patience instructing me how to handle all aspects of Tosmana software for developing and reading the QCA Truth Tables results.

Dr. Nadja Kunz: thank you for challenging me to apply the QCA approach for this topic, for your insights on applying it correctly and for your support since the beginning of this project.

Dr. Bern Klein and Dr. Marcello Veiga: thank you for all your valuable comments and insights to previous versions of this document.

Mr. Edwin Loaiza, Director of the Program of ASSM at INGEMMET: thank you and your team for your time and patience discussing the spatial distribution of the interface and for developing the main overlap maps of this study’s cases.

Olinda Orozco from Red Social and Manuel Reinoso from SONAMIPE: thank you for sharing your immense knowledge and insights with me since 2014.

Thank you to the Direction of Formalization - DGFM at the Ministry of Energy and Mines (MINEM) in Peru, for facilitating information and for your feedback on this study’s research plan in December 2019.
1. Introduction

1.1 Study’s key concepts and Peruvian mining sector’s stratification

According to the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF), 20% of the world's gold is produced by the Artisanal and Small-Scale Mining (ASSM) sector, 40 million people in the world are directly employed by the activity and 150 million people in the global south depend on it (IGF, 2018). For this reason, in different mining jurisdictions in the developing world there is tension between Large-Scale Mining (LSM) and Artisanal and Small-Scale Mining (ASM). This tension can be expressed as a competition for land, water and government recognition, so the relationship is generally described as one of mutual distrust, conflict and power imbalances.

Peru is the 6th producer of gold at the global level, but informal and illegal gold production generally ranks third or second at the national level (DGFM, 2019; MINEM, 2019). Current estimates indicate that there are between 300,000 and 500,000 artisanal gold miners throughout the country and that 1 million people – in a country of 30 million (3%) - are directly or indirectly linked to the activity (MINAM, 2017). The Peruvian ASM sector is synonymous of both informal and illegal mining, since in the areas of greatest artisanal gold production at the national level, at least 90% of miners are either informal or illegal (SPDA, 2014, MINEM, 2019, Valencia, 2014a; 2014b).

Moreover; between 2002 and 2012, the price of gold in the international metal market caused a worldwide explosion of informal ASM activities, modifying, in some areas of Peru, the relationships between formal LSM, Medium-Scale-Mining (MSM) and Small-Scale-Mining (SSM) operations, on one hand, and ASM operations, which are mostly informal and illegal, on the other. Since 2002, in regions such as Piura, La Libertad, Apurímac, Cuzco and Arequipa, tensions and challenges of coexistence between ASM and LSM, or between formal and informal mining, have increased steadily (Defensoria del Pueblo, 2013; Valdés, Basombrio & Vera, 2019; Wiener, 2019).

Nevertheless, before embarking on a comprehensive analysis of interactions between formal and informal mining, it is necessary to attempt to clarify the full definition of “informal” and “illegal” mining, as they have been used interchangeably through time by the State’s legislation and the literature, and they will be used frequently throughout the study. The same applies for the stratification of the Peruvian mining sector.
Stratification of the Peruvian Mining Sector

In Peru, the “General Regime” includes both Large-Scale Mining (LSM) and Medium-Scale Mining (MSM). On the other hand, the “Small-Scale Regime” includes both the Artisanal-Scale and the Small-Scale. In Spanish, the two sectors are usually referred together as “MAPE”, or “ASSM” in English. In both languages, the terms ASM and SSM are used very loosely together as one sector, ASSM, even though in practice they are significantly different. While ASM is scattered, seasonal and rudimentary, a formal SSM operation is much more like an LSM operation, in terms of facilities and processes. For instance, a formal SSM operation this study explores, MYSAC, while integrates ASM production (stockpiling their mineral for grade assessment and processing), does not exploit the veins in rudimentary, non-technical fashion. It still exploits epithermal-superficial veins, but the operational set-up is significantly different from what a strictly artisanal operation would look like.

The main features of these strata’s definitions are:

- Artisanal- Scale Miners (ASM) miners can legally hold up to 1,000 hectares combining all types of mining rights at all stages (acknowledged before MINEM, requested and granted). ASM miners have a productive capacity limit of 25TM / day.
- Small-Scale Miners (SSM) can legally hold up to 2,000 hectares combining all types of mining rights at all stages (acknowledged before MINEM, requested and granted). SSM has a productive capacity limit of 350TM / day.
Table 1.1. Stratification of Mining in Peru

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Small-Scale and Artisanal Mining Regime</th>
<th>General Regime</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Artisanal (Law 27651)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Small-Scale (Law 27651)</td>
<td>Medium-Scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large-Scale</td>
</tr>
<tr>
<td>Installed Capacity for Production</td>
<td>Up to 25 MT/day</td>
<td>From 350 up to 5,000 MT/day</td>
</tr>
<tr>
<td></td>
<td>Up to 200 m³/day*</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Up to 3,000 m³/day**</td>
<td>-</td>
</tr>
<tr>
<td>Extension of denouncement, petitions and/or mining concessions</td>
<td>Up to 1,000 hectares</td>
<td>More than 2,000 hectares</td>
</tr>
<tr>
<td>Minimum Annual Production</td>
<td>US$ 25 per year per hectare</td>
<td>US$ 100 per year per hectare</td>
</tr>
<tr>
<td></td>
<td>5% UIT per year per hectare for any substance</td>
<td>Metallic Substance: 10% UIT per year per hectare</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Non-metallic Substance: 5% UIT per year per hectare</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-metallic Substance: 10% UIT per year per hectare</td>
</tr>
<tr>
<td>Mining Right Validity Fee</td>
<td>US$ 0.50 per year per hectare</td>
<td>US$ 1.00 per year per hectare</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US$ 3.00 per year per hectare</td>
</tr>
<tr>
<td>Entities in charge of the promotion, regulation and oversight</td>
<td>* MINEM</td>
<td>* MINEM</td>
</tr>
<tr>
<td></td>
<td>* Regional Governments</td>
<td>* INGEMMET</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* OEEFA</td>
</tr>
</tbody>
</table>

*For gold alluvial substances/sandbanks type of deposits or beds
**Producers of gold gravel sandbanks
Source: SPDA (2014)
Informal and Illegal Mining

The distinction between 'informal' and 'illegal' mining are diverse and sometimes confusing and unclear, even within State legislation. For example, prior to 2002, when the first piece of legislation to formalize the ASM sector in Peru was passed, informal mining in Peru was referred to as “formally informal”, since it registered production at the Ministry of Mines under the alluvial and “lavaderos” category, and this differentiated ASM miners from the few formal companies that exported gold (Torres, 2014). Thus, at this time, formality corresponded with the scale of production. Nevertheless, by 2010, at the peak of the Gold Rush in the Amazon region of Madre de Dios, the concepts of “informal” and “illegal” mining were already being used interchangeably. In that year, the media coverage in this region emphasized the serious environmental damage of artisanal miners in this Amazon region. At the same time, the Peruvian State issued an Emergency decree that identified this type of mine as ‘illegal’ in this region. This concept was used jointly and interchangeably with the word “informal” until 2012, when a series of Legislative Decrees incorporated the term illegal mining into the Peruvian Penal Code for the first time, identifying it as an outright criminal activity.

According to Legislative Decree No. 1105 -2012, which establishes Provisions for the Process of Formalization of Small Mining Activities, Illegal Mining is an activity carried out by a person or company:

- in areas where mining is prohibited, such as Natural Protected Areas or bodies of water (Cano, 2017b),
- using machinery and equipment that does not correspond to the characteristics of an ASM producer,
- operating in a manner that does not meet administrative, technical, social and environmental requirements
- working in areas prohibited by law,
- who does not having a “Declaration of Commitment to Formalize”¹ and is, therefore, subject to interdiction (police can destroy all machinery and take individuals on site to prison).
- Also: illegal miners cannot be formalized.

¹ This is the first step in the Formalization Process before the Peruvian State.
In addition, according to this same Legislative Decree No. 1105 -2012, the main difference between an illegal and an “informal” miner is that the latter is a person or group of people organized to exercise the activity, but that have started a process of formalization before the Peruvian State and do not operate in areas not prohibited for mining.

The similarities, however, are striking with illegal miners in that, as the Law acknowledges, informal mining still:

- uses heavy machinery that does not respect the characteristics of the mining activity that legally declared to develop as a “small” mining producer or artisanal mining producer
- does not comply the requirements and administrative, technical, social and environmental standards governing such activities.

Besides, there are several conditions that an informal miner, already registered in the process, must meet or turnaround, in order to become a formal producer. Among these are:

- Absence of mining title.
- Lack of titles and permits for the surface.
- Overlap with other rights.
- Lack of recognition of small mining producer.
- Action without an environmental instrument.
- No payment of taxes.
- Breach of labor rights and of security.

If an ASM meets these established requirements, he/she can become formal\(^2\), but this framework produced only 112 formalized miners between 2011 and 2016 (DGFM, 2019). For these reasons, even though these concepts have important formal and legal differences, these are, in practical terms, ultimately irrelevant, since both illegal mining and informal mining work outside of the law and do not meet the requirements or standards to operate (MINEM, 2015; MINAM, 2017). This ambiguity between what is informal and illegal in the ASM sector is still traceable until today, since MINEM’s Peru Mining Vision towards 2030 final document, prepared in late 2019, still reflects how ASM is still lumped together, by the Government, with illegal mining (Columbia University, 2019; MINEM, 2019).

The informality and/or illegality in the ASM sector in Peru must take into account that Peru has a fundamentally informal economy and informal employment. The National Statistics Institute (INEI, in Spanish) acknowledges that even those productive sectors considered by definition “formal” also host informal jobs, and that Peruvian informality in the labor market reached 72% in 2019 (INEI, 2019).\(^3\) ASM informality/illegality is, therefore, a reflection of Peru’s economic structure. The sheer number of people involved in the activity is remarkable and explains the political leverage—in electoral contexts—that this sector has been able to build over the last decade.

For this reason, when 150,000 miners were left out of the formalization process when it closed in 2018, and became or remained “illegal” (DGFM, 2019), the State had no other option but to reopen the REINFO in the end of 2019 until the end of 2021. And it is expected by most parties that the process will reopen again after 2022, since the formalization process, as it is designed, cannot absorb the high levels of informal employment that this activity provides at the local level in key mining regions. For this reason, most informal and illegal miners argue that it is the State’s regulations what pushes them into informality, since these do not capture the real dimension—and the blurry lines—of the problem of illegality and informality. Since this study deals with a key instrument of the formalization policy framework, it will refer to these sometimes jointly, and sometimes separately, according to the definitions above (MINAM, 2017).

1.2 Problem significance and relevance of the question

As indicated, the DGFM of MINEM states there are at least 55,000 miners registered in the Integral Formalization Process Registry (REINFO) within Peru, while other 150,000 ASM producers, at least, are not registered in it, which turns them automatically into illegal miners (DGFM, 2019). That means that, according to those conservative estimates of a universe of 200,000 ASM producers in Peru (DGFM, 2019), only 27.5% of them are registered in the process, while the remaining 72.5% are illegal.

---

In addition:

- 9% of ASM registered are legal title holders ("titulares de concesión minera")
- 27% of those registered operate over "Extinct Mining Rights", that is, areas that will be removed from the National Mining Cadastre because legal title holders have not paid their annual fees (the amount owed to the State for those concessions may be owed by the miners themselves in some cases)
- 64% of ASM producers registered in the current "Integral Formalization Process Registry (REINFO)" work on mining concessions which they do not legally hold (MINEM, 2019).
- 16% of ASM producers registered operate in concessions owned by large and medium-sized mining companies

For this reason, some documents and officials indicate that, in fact, close to 90% of ASM producers are still in concessions that need clearance. Furthermore, it is expected that the overlap with the formal sector, in all its scales, will increase, since current estimates only consider data within the REINFO and because many concessions currently under individual title holders (i.e. those who fall under the above 64% category) would be transferred to larger formal companies if they were to develop.

Nevertheless, to complete the formalization process, all these cases require an "Exploitation Contract (EC)", granted by the legal concession holder, allowing the informal artisanal miner to operate. However, without a clear incentive – a "business case" - to grant such a contract, and in the context of limited state capacity to guarantee oversight of miners’ production processes and value-chain traceability (OECD, 2015), few concession holders have supported the formalization process of artisanal miners operating in their concessions. On the contrary, those who have done so have encountered more challenges than solutions or benefits later. It is not surprising, therefore, that this overlapping of mining types and scales is the main "bottleneck" of the ASM formalization policy designed in 2012 (MINAM, 2017; MINEM, 2019). For this reason, this study main research question explores the most determining conditions - or combinations of the most determining factors- to reach an EC between these types and/or scales of mining.
1.3 Thesis Outline

The next Chapter (2) presents a literature review on ASM, first at a global level and then at a national level, exploring literature specifically focused on how ASM/LSM policy evolution has shaped the current interface for the Peruvian context. Chapter 3 presents, first, a general description of the areas studied through the 20 interface cases selected and, second, explains all the methodological components utilized in the application of the Qualitative Comparative Analysis (QCA) strategy to these 20 cases. Chapter 4 presents and discusses the main findings of the QCA application, in terms of the necessary conditions, first, for the positive outcomes (cases with an EC), and then for the negative outcomes (cases with no EC). The study finishes elaborating a conclusion and reflecting on its main contributions and limitations.
2. Literature review

The literature review is organized into two broad sections. The first one presents the interface main issues as discussed at a global or international level. The second section explores the specific issues at the interface for the Peruvian context.

2.1 Global Context

2.1.1 Artisanal and Small-Scale Mining (ASSM) as a “Wicked Problem”

In 1973, Rittel and Webber advanced an innovative depiction of “that class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision-makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing” (Rittel & Webber, 1973). They called these systemic or structural problems “wicked problems”, as opposed to “tame problems”, because they seem to have no definitive formulation, no causal explanation and, most importantly, no test for solution. This type of social problems challenge policy makers’ rationalistic design and planning, ultimately proving that government is unable to manage issues that are visibly embedded in chaos and complexity. By 2017, this paper was the most cited in the Policy Sciences Journal, and authors added other adjectives to describe this type of problems in the fields of environmental policy analysis and natural resource management and governance. Since then, a wide array of complex issues, as global poverty, climate change, education, homelessness, ecological sustainability, to name but a few, have been called “messy”, “intractable”, “unstructured”, “contested”, “recalcitrant”, “undisciplined”, “uncontrollable” and “unmanageable” (Crowley et al., 2017).

To justify why the ASM sector, both globally and in Peru, can be defined as a wicked problem, it is useful to review the 10 Propositions advanced by Rittel and Webber (1973). This sector has received as many definitions as actors involved (IFC, 2011; UNITAR, 2018a; IGF, 2018), and, therefore, the solutions advanced have been greatly shaped by each actor’s bias or assumptions with regards to the cause of the issue. In Peru, the evolution of public policies to deal with this “wicked problem” has been erratic, contradictory and extremely contested by all actors involved (Cuadros, 2013; Wiener, 2019).
Wicked Problems Defined – Rittel and Webber (1973)

- P1: There is no definitive formulation of a wicked problem
- P2: Wicked problems have no stopping rule
- P3: Solutions to wicked problems are not true-false, but good-or-bad.
- P4: There is no immediate and no ultimate test of a solution to a wicked problem.
- P5: Every solution to a wicked problem is a "one-shot operation" because there is no opportunity to learn by trial and error, every attempt counts significantly.
- P6: Wicked problems do not have an enumerable (or exhaustively desirable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan.
- P7: Every wicked problem is essentially unique.
- P8: Every wicked problem can be considered a symptom of another problem.
- P9: The existence of a discrepancy representing a wicked problem can be explained in numerous ways:
  
  The choice of explanation determines the nature of the problem’s resolution.

- P10: The planner has no right to be wrong.

In examining what is at the source of these “Wicked Problems”, Dent (1999) introduced a notion – within the wider “science of complexity”- that would become core in understanding the essence of a wicked problem: “conflicting worldviews”. Considering wicked problems lack consensus on either the causes of the problem nor the information of the issue at hand (Hudson & Kuhner, 2013), and that the policy responses to this issue have been greatly shaped by these “conflicting world views”, these worldviews are a useful way to organize the literature review. As Rittel and Webber’s P9 indicates: “The choice of explanation determines the nature of the problem’s resolution”. The varied approaches or theoretical points of entry to this topic is greatly shaped by the actors’ “worldview”, and an outline of these will unveil the issue’s causal complexity.

In order to tackle the issue’s causal complexity, this study resorts to Qualitative Comparative Analysis (QCA), a method that was conceived in the comparative political science field to try to unravel and explain specific outcomes in the political sphere that were caused by multiple conditions simultaneously, such as the success of social protests or the fall of democratic/authoritarian regimes (Halperin, 2012). As Chapter 3 will explain with greater

---

4 Although the introduction of QCA applied into public environmental and social policy analysis is relatively recent (Ragin, 2008; Rihoux & Ragin 2009), recent reviews and developments (Schneider & Wageman, 2010) indicate that the growth in the number of empirical applications and the vitality of
detail, QCA is particularly useful to deal with complex issues as ASM, for it allows to visualize – and thus “unpack”- the multiple dimensions of a problem and, most importantly, how these dimensions interact and affect each other to produce a specific outcome (Hudson et al., 2013).

As a “wicked problem”, ASM has challenged Peruvian and global policy makers alike for decades, with failed policy interventions being replaced by new policy solutions that open unintended consequences which sometimes even contradicts existing legislation (Cano 2017a; Cano 2017b). ASM policy making has been erratic and it has been approached differently depending on the actor involved.

2.1.2 IGOS, NGOs and Development Agencies

The role of International Government Organizations (IGOs), Non-Governmental Organizations (NGOs), Development Agencies, Embassies, and Multilateral Organizations have a key role to play in the ASM sector. In developing contexts, especially in Africa, but also visibly in Latin America and Peru, these interventions may be very influential in shaping policy for the mining business (Doh & Teegen, 2002). These wide arrays of organizations obtain their funding from multiple governments and spend it on different type of projects in various countries. These projects entail “local capacity building” efforts, research dissemination efforts, development interventions, among other type of actions geared at (mineral) policy making according to internationally agreed standards.

In the ASM sector in general, and specifically at the ASM/LSM interface, the World Bank is arguably the institution that has been more involved in research and dissemination efforts, and has been particularly important in promoting “synergies”, “collaborative governance mechanisms” and “partnerships for development” between the sectors (Hilson, Owen & Sauerwein, 2020; Davidson, 2007). Since the early 1990s, it summoned the most influential Round Tables on the international development space (World Bank, 1995), although several other UN institutions had already started paying close attention to what the ASM sector had turned into, after the 1990s structural adjustments reforms (Wise, 2010). The International Labor Office (ILO, 1999) called the attention of the global sphere about social and labor issues in small-scale mines.
The end of the 1990s was important for the ASM sector in Peru, during which time the World Business Council for Sustainable Development (WBCSD) commissioned the International Institute for Environment and Development (IIED) in London to undertake a two-year process of participatory analysis to consider the role of the mining sector in the transition to sustainable development (MMSD, 2002). The MMSD project produced what is arguably the first national diagnosis of the ASM sector in Peru, in terms of Sustainable Development challenges (Kuramoto, 2001). This report was already heavily calling the attention into how “informal” the ASM sector had become, and how a new law and policy framework was needed. The MMSD project produced a parallel Global Reporting on ASSM (Hruschka, Hentschel & Priester 2002), and a year later, paying much closer attention to the contentious political aspects of ASM, the Secretariat at the World Bank commissioned a Review of the Organization Process of the Artisanal Miners in Peru (2000-2002) (Hruschka, 2003). By then, the Swiss Embassy had already started its GAMA Project- aimed at reducing mercury use in ASM in Peru (Bobadilla & Tarazona, 2008; Medina, 2015) and began producing data on the socio-economic and social impact of artisanal and small-scale mining in Peru (Seeling, 2002), something that was already an interest of academics as well (Hilson, 2003).

One of the World Bank’s most influential document on the ASM/LSM interface (Hilson et al., 2020) was published in 2009. “Mining Together: Large Scale Mining Meets Artisanal Mining” is a document specifically designed to assist the Senior Executives of LSM companies to manage relationships with individuals engaging in ASM within their concessions. Published in a global context of intensification of clashes between the sectors, this document defines ASM as “low-tech, labor intensive mineral extraction and processing”, and it also provides a “Tentative List of Actions” on how LSM companies can “start on the right foot” by applying principles to navigate ASM engagement (CASM, 2009). These actions were related to sustainability reporting sustainability reporting platforms, such as GRI and Responsible Mining Index (RMI), or OECD due diligence, or helping ASM get organized instead of embarking in “live and let live” or “gun show” strategies. This crucial report was carried out alongside the ASM working group at the International Council for Mining and Metals (ICMM) and began to recommend to institutionalize the ASM issue by naming a “champion” or a special division of formalization within the company. Additionally, it linked the ASM CSR policy/strategy/initiatives designed to state policies aiming at Sustainable Development outcomes (MMSD, 2002; CASM, 2005, CCSI, 2016).

---

All materials can be accessed at: [https://www.iied.org/mining-minerals-sustainable-development-mmsd](https://www.iied.org/mining-minerals-sustainable-development-mmsd)
Nevertheless, the explosive growth of the ASM sector in Latin America, Asia and Africa had occurred in largely informal and illegal contexts, where the use of mercury turned the ASSM sector into the largest source of human-caused mercury emissions in the planet. Literature concerned about the social, economic and environmental impacts of ASM in developing countries began to appear (Hilson, 2003), and United Nations agencies responded to the ASGM mining boom by publishing since then a wide array of protocols for environmental and health assessment of mercury released by artisanal and small-scale gold miners (Veiga & Baker, 2004; Telmer & Veiga, 2009). Many years later, after hundreds of failed interventions all over the developing world, the use of mercury in Artisanal-Scale Gold Mining still demands global governance and regulatory mechanisms, which brought about ultimately the Minamata Convention. The Global Environmental Facility, as well as the Global Mercury Partnership have published several tools to diagnose the ASM sector, in order to design the National Action Plans to achieve the reduction or elimination of mercury use (UNITAR, 2018a).

Besides the use of mercury, which dominates a vast amount of literature on ASM, another significant topic is that of formalization of the ASSM sector. Considering efforts to formalize began in some countries in early 2000’s (as in Peru), a push to formalize the ASM sector was more visible in the early decades of 2010. As a result, by 2012 onwards, there are considerable assessments – and criticisms- on these formalization policies’ real progress.

Within these later comparative studies is that the ASM/LSM interface begins to appear as a “cross cutting issue in ASGM formalization”. This focus helped providing a typology of miners according to the spectrum or degree of formalization or legality in which they operate, and recommendations based on case studies and experiences began to emerge with regards to the courses of legal action, as well as recommendations to enhance ASM formalization in LSM spaces, in the form of “Best Practices” (Kemp & Owen, 2019a; Thomas, Veiga, Marshall & Dunbar, 2019; UNEP, 2012; UNITAR 2018a, 2018b; Veiga & Marshall., 2019).

The mining sector was searching for innovations for inclusivity, to achieve a responsible global gold market. A strongly advanced strategy proposed by these agencies, both to reduce the use of mercury and to make real progress in formalization has been the adoption of market-based mechanisms as “sustainable gold certifications” (Buxton, 2013; OECD, 2015, 2019). These certifications propose mineral traceability and due diligence mechanisms to ensure a sustainable, inclusive and responsible supply chain in ASGM. Nevertheless, it’s been widely acknowledged that even those initiatives expected to create a formalization system, they have not achieved significant impact in the ASM sector (Veiga & Fadina, 2020). The main issue with all certifications schemes is still to this day how to scale these interventions up (Buxton, 2015).
2.1.3 LSM companies and International Codes

On the Large-Scale Mining (LSM) front, the literature suggests an evolution in the way in which Multinational Enterprises (MNEs) have approached ASM over the years. The ASM “engagement” and focus on “relationships” are incorporations of broader issues being confronted by corporations in the increasingly globalized — and pluralistic — social, political and economic system. Freeman (1984) advanced the main tenets of *Strategic management: A stakeholder approach*, which developed a robust business strategy perspective: the stakeholder theory (Friedman & Miles, 2002), which would later be used also in policy making processes.

Initial literature *specifically focused on the interface* describes this relationship and interaction as one of conflict and competition, which completely overwhelms both strategies designed by corporate executives and policies of formalization designed by bureaucrats. The interface required developing relationships with the Artisanal Mining Sector, and the World Bank-through its Communities and Artisanal Scale Mining CASM program-offered guidance for Large-Scale Mining Companies (Wardell, 2007). “Case – Studies” began to emerge, such as the Abosso Goldfields experience in Ghana (Aubyn, 2006), which exemplifies the “pragmatic approach” which Abosso Goldfields Limited (AGL), one of the country's major large-scale operators, adopted to accommodate ASM operators on its concession. Though innovative in its “solution” at the beginning, the results were later subject to further questions in terms of how *sustainable* this “coexistence” could be in the long run (Aubyn, 2009).

Over time, more cases and more analysis allowed for further strategizing on the LSM side, further developing a more straightforward “business case” for LSM companies to “engage” in ASM interactions. The business case or the advantages could arrive in the form of “risk and conflict management” or “maintaining/obtaining Social License to Operate (SLO), as well as the advantages of “Participatory Planning”, “Participatory Monitoring” and in general the advantages of a more open and accountable management of extractive resources (Parker, 2007). As one of the CASM projects main consultants indicates, the conclusion was that: “*there is potential for ASGM to have tangible benefits for the mining company, such as making it a more desirable partner for developing other deposits, both locally and nationally* (Estelle Levin, 2010).”

This aligned perfectly well with corporate business strategies developed throughout the 1980’s during the crisis of capitalism. Porter (1987) published a key text “From Competitive Advantage to Corporate Strategy”, which suggests that societal demands deserve a corporate policy if and only if it was beneficial for the corporation’s “core business”. From here, the idea
of “Creating Shared Value” (Porter & Kramer, 2011) gained huge traction in the corporate world, but it still is significantly influential in the mining world and in how mining can contribute with Sustainable Development outcomes (CCSI, 2016). Also, in 2011, the International Finance Corporation published another key document on the interface, now specifically displaying the “business case” for LSM companies to engage with ASM producers. It also offers typologies of ASM producers in terms of traditional (customary), seasonal (secondary means of livelihood in peasant contexts), permanent co-habitation (when ASSM is part of the local community), shock (arrive with commodity price increases) and influx producers (who arrive with discoveries of new deposits) (IFC, 2011).

Considering the ASM legal framework varies greatly from country to country, the World Bank, the IFC, the ICMM and several other institutions have developed “standards” or International Codes that can assist executives navigating these complex and uncertain territories. There are several international codes, regulations and voluntary initiatives, as well as industry specific commitments to integrate social and environmental concerns in their business models. Documents as the early CASM report (2009) or the current IGF review on ASM global trends (2018), indicate that international guidelines for LSM companies, or MultiNational Enterprises (MNE) that are relevant for the ASM sector are:

- UN Voluntary Principles on Security and Human Rights
- UN Global Compact
- Kimberley Process (for Diamonds)
- Global Reporting Initiative (GRI)
- Equator Principles
- Extractive Industries Transparency Initiative (EITI)
- OECD Guidelines for Multinational Enterprises
- ILO Declaration on Principles and Rights at Work
- International Council on Mining and Metals (ICMM) Sustainable Development Principles and Performance Expectations
- Sustainable Development Goals (SDGs)

Since the turn of 2010, there has been an increase in “practitioner literature”, that is, literature that has been developed mostly in “case-study” / “lessons-learned” format (Teschner, 2013). Emphasis on “How an LSM start matters”, and comparing cases within one company and across companies (and continents) began to appear with notions of “good practice” and “development of standards”, “corporate policy” and “reporting practice” tied to the ASM presence in formal concessions.
Examples of this are DeBeers “Best Practice Principles” (2013)\(^6\), Goldfields (2016), AngloGold (2016) having developed their own “new performance standards” and corporate policies on ASM engagement. Depending on the company’s policy, ASM engagement may provide a business opportunity to implement Shared Value business models, Corporate Social Responsibility (CSR) strategies (which improve “Comparative Advantage”), and/or institutionalize mechanisms to maximize their contributions towards achieving the Sustainable Development Goals (SDGs) (CCSI, 2016; Kemp & Owen, 2019b; Schoneveld et al., 2018; MINEM, 2019).

2.1.4 ASM, the “Resource Curse” and “Resource Nationalism”

Nevertheless, for more neutral actors, the main issues surrounding ASM development are related to environmental impacts, low levels of social and human development, and high levels of social conflict. In this view, ASM may be argued to represent another face of the “natural resource curse”. This notion has been widely utilized since coined by Richard Auty in 1993, to describe, “how countries rich in mineral resources were unable to use that wealth to boost their economies and how, counter-intuitively, these countries had lower economic growth than countries without an abundance of natural resources (Auty; 1993, p.8)”. The Peruvian case is often used as an example of the “natural resource curse”, because: history reveals a pattern of national institutions and economic elites being unable to translate periods of economic growth driven by extractive boom into works of infrastructure, access to basic services, better education and health rates, and incorporation of national labor into the formal sector of the economy (Thorpe, Orihuela, Balistelli, Ghichaoua & Paredes 2014, p.175).

These extractive fevers and their concomitant cycles of export economic boom do not connect productively heterogeneous sectors (Bulmer, 2000), and do not produce sustainable levels of economic growth and political stability for development. For the ASM/LSM interface, the consequence was clear: “The growth in Foreign Direct Investment (FDI) in mining in emerging markets has been criticized for contributing to rising inequality and marginalization of communities that historically rely on artisanal, small-scale mining, posing a distinctive, sustainable development challenge” (Aubyn, 2009). Indeed; the very high levels of “civil strife” and persistently high levels of corruption (Quiroz, 2014) that accompanies both LSM and ASM in Peru would demonstrate that as a society not even the problem of violence—or democratic

and peaceful access to resources—has been solved through mining (Thorpe, 2013; Arellano, 2011; Perla, 2010; Laws, 2012).

ASM/LSM interaction in Africa and Latin America have also focused on the role of institutions and development strategies in developing countries, where formal public institutions show chronic weakness, ultimately eroding their impact on the well-being and processes of political, social and economic inclusion of citizens (Schoneveld et al., 2018; Bebbington, Humphreys Bebbington & Sanborn, 2018; Bebbington, 2012). Where there are weak key public institutions, regulations and government agencies, policy not only “shapes” the national development strategy, but also determines “the delivery of basic services and social protection, the promotion of job-creating forms of growth, the governance of resources and the extension of the recognition to marginal people and places” (Hickey et al., 2014, p.3). In the Peruvian case, it shapes different “trajectories for inclusive development”, in the sense that regions with higher levels of institutional development, and stronger political consensus with regards to mining, have been able to deliver better development outcomes than those in which social conflict is prevalent (Arellano, 2011; Barrantes, 2012; Bebbington, 2013, 2015 and 2018; Sanborn, 2018).

Due to this chronic failure to deliver better development outcomes, the Peruvian ASM sector in the formalization process demands addressing issues that stem from the “colonial heritage”, that is, those internal relations of domination that originate in the dependent relationship of the colony with the centers of power (Cotler, 2005). This dependent development strategy continues through the “large-scale bias” of developing states (Hilson et al., 2020), that is, a competitive legal framework designed to facilitate foreign Direct Investment (FDI) in resource extraction. Hence, the claim for ASM formalization appeals to a language of citizenship that allows artisanal miners to argue “that they have the right to make very specific claims on the subsoil and the revenues that might derive from it” (Bebbington, 2013). For this reason, in most countries with ASM presence, there is also a strong “resource nationalism” political agenda, which demands financial and technical assistance, and sometimes even basic services, to carry out businesses. Certainly, the “civil strife” and undemocratic forms of governing resources (Bryceson, 2014) is behind the political mobilization of ASM producers in Peru.
As one of its most representative leaders, from Apurímac (a critical LSM region with informal ASM copper producers in every single province) declared:

“Artisanal miners from all over the country demand economic and labor inclusion because we are Peruvians and homeowners. Protected by customary law, we ask for priority in the use of our resources. Transnational mining will not eat meat in our historically forgotten towns, while we community members, the true owners of the house, sit and wait that one day, if there is a will, they will throw a miserable bone in the name of “social programs” (Programa Juntos, Pension 65, mining CSR “projects”, etcetera). Because we already know that not even the bone will arrive. Here the tenants will not boss around just because, manipulating the political power, they elaborated “their law”. Peru was an artisanal miner from the pre-Incas, extracting only what was necessary, and combining this activity with livestock and agriculture. Large-scale mining, criminal in every way, is the enemy of life and social harmony. Large-scale mining expels the commoner from his land. Artisanal mining makes him a microentrepreneur” (De la Cruz, 2012).

2.1.5 Trends

In terms of the methods found and the research gaps, Buxton (2012) indicates that the 10 year review on the MMSD Platform constituted in 2002 (MMSD, 2002) clearly identified ASM knowledge as a major gap in the mining sector, at a country and global levels. Reports by IGF, IFC, World Bank, UNITAR and grey literature from international institutions focuses on positive cases and does not consider the factors that lead to success or failure. These studies are presented in a highly summarized manner in wider national or continental reports and therefore lack “empirical intimacy” with cases. Some cases give the impression to have been “cherry-picked” to prove just how one dimension—or a specific intervention—achieved its objectives. The absence of intermediate “n” or large “n” studies is clear. It was particularly interesting to find an evident lack of research on the ASM / LSM interface in Latin America, compared to that of Africa’s presence in indexed journals. In general, the antagonistic relations between MNEs and fringe stakeholders competing for the use of resources remains unexplored: “There is lack of empirical evidence and theory to help understand the forces that can drive the cooperation and participation of the MNEs in social upgrading of informal rivals.” (Yakovieva & Vasquez, 2018, p.56).
Along these lines, IGF (2018) presents global trends, key numbers and issues for the ASM sector and indicates significant research gaps in GIS for ASM. While Bebbington, Cuba and Rogan (2014) georeferenced overlaps between LSM mining concessions and river basins for Peru, Patel, Rogan, Cuba and Bebbington (2016) evaluation of social conflict surrounding mineral extraction in Ghana is the only study found that maps the spatial overlaps between large and small-scale miners using Landsat-7 and -8 imagery. More recently, Kemp & Owen (2019a, 2019b) have characterized the interface between large and small-scale mining, through a typology that depicts the different scenarios, depending on the mineral and deposit targeted, and the space in which these actors need to operate. Even though these reports highlight the drivers of “interactional outcomes” (governance and regulation, physical environment, commodity markets, socio-economic systems, international actors, organizational factors), dilemmas in the different configurations of cohabitation and displacement, as well as a summary of standards, no analysis of these interactions is provided through specific cases.

There is clear consensus in the literature that LSM was at the core of the economic restructuring of most developing countries during the 1990’s, since they provided much needed capital for economies in crisis. These reforms partly explain land allocation and institutional issues in “an era of resurgent nationalism” (Pedersen, 2019), where ASM has increased political leverage, supported by the millions or hundreds of thousands that can affect electoral politics. The future of artisanal miners, from a large-scale perspective, thus oscillates between “valued pathfinders and disposable illegals” (Chachage, 1995; Luning, 2014). This Large-Scale “bias” supports the case for autonomous coexistence (of both sectors, independently from the other), instead of “friendly cohabitation” (Hilson et al., 2020). Regardless of the specific description, the interaction will still range “from confrontation to cooperation” (Yakovleva & Vasquez, 2018).

The linkages among the informal economy, inequality, and poverty are well established by development economists, who emphasized the responsibility of formal actors to engage in the social upgrading of informal economy actors (Ostrom, 2008, 2010). There is consensus in that LSM has a role in supporting ASM formalization, through notions of “shared challenges” (water and communities permitting), “responsible”, “inclusive” and “sustainable” mining sector (MMSD, 2002; Buxton, 2015). Though the specific role may vary case by case, “the industry acknowledges there are sustainable development opportunities within corporate social responsibility practices from LSM to ASM in the gold mining sector (Ribeiro et al., 2017)".
There is also a consensus in that ASM formalization and Sustainable Development achievement are inextricably linked (ILO 2017). The World Bank began linking ASM to the Millennium Development Goals (CASM, 2005) and currently does so to the Sustainable Development Goals (SDGs). The SDGs are State commitments, but considering the issue’s complexity, models like Africa’s Mining Vision associate ASM to the SDGs through collaborative governance “Partnerships for Action” (Pedersen, 2019; Hilson, 2019; CCSI, 2016). The “wickedness” and failure of “command and control” environmental policy solutions, has opened a space for a discourse on “collaborative” or “networked” approaches, where more inclusive stakeholder management might be the solution (Yakovleva & Vasquez, 2018). Institutional diversity, institutional design, polycentric and decentralized resource governance regimes have been demanded for the sustainable development of both sectors (Clement, 2010; Koontz, 2006, Buxton, 2012, 2013; IGF, 2018).

2.2 The Peruvian Context

2.2.1 Evolution of ASM and LSM policy in Peru

In order to reveal the multiple points of interface between these sectors throughout time, this section explains the evolution of public policy towards ASM in Peru, linking it to major policy developments in the LSM sector. This policy outline reveals why the Exploitation Contract (EC) deserves to be the main focus of the study, since it is the main current “policy bottleneck” of the formalization process, and a legal instrument that may reconfigure the relationships between the sectors in the country.

Beginnings of a state-led governance model (1920-1990)

Peru began the 20th century (1920 onwards) undergoing a profound process of denationalization of the mining sector (Thorpe, 1998). The Great Depression, World War II, and the end of the Korean War (1951-1953) reduced the international demand for natural resources and it also caused the withdrawal of international capital, opening “a window of opportunity” for national capitalists. In this way, “local capital quickly became interested in gold mining and within the climate of nationalism that followed in early 1931, all the gold deposits that had not yet been given in concession, would be reserved for the State and access to these deposits would be preferably granted to Peruvians (Thorpe, 2013, p.199).”
In this sense, the conjuncture of the emergence of ASM in Peru converges with a moment of withdrawal of foreign capital and fluctuations in the international price of gold in international trade. Additionally, the State's interest in promoting small-scale mining occurs when development strategies advanced by United Nations Economic Commission for Latin America—ECLAC (1940-1970) were influential. Even under the conservative military governments of Sánchez Cerro and Benavides (1930-1939) mining workers were supported in small-scale gold projects funded with national capital.

In 1940, the discovery of gold in the Amazon woke up several migratory waves from the Andes to the Amazon. President Prado established in 1941 a Mining Development Bank ("Banco Minero") to development mining in Peru: "This development bank had among its functions to give credit to local small miners and to operate special concentrators for the processing of minerals from small and medium-sized mines, for which it had to establish offices and agencies for the purchase of minerals in different provinces of the country (Thorp, 2013, p.203)". Although the 1950 Mining Code marks a new ideological turn towards attracting foreign capital and large-scale mining, the military government of Manuel Odria (1948-1956) did not obstruct support for small-scale mining, but rather connected it to his efforts of "Colonizing" a series of "unproductive" territories in the Amazon, training small miners even in commercialization tasks. Between 1964 and 1965, the Mining Bank carried out prospecting studies, promoted migration, granted concession grids, facilitated exploitation contracts, and purchased all the gold produced in Peru.

The coup by the Armed Forces in 1968 initiated a cycle of "top-down" economic policies. This did not affect ASM, as the nationalizing drive favored national miners to access concessions. For example, Minero Perú (created in 1970 together with the Ministry of Energy and Mines - MINEM), granted artisanal miners some concessions that had been under the large-scale exploitation regime in Ananea (Puno) and other areas. But a closer interplay between the two mining scales begins to take shape during the GRFA (1968-1980), when some foreign capitalists distrust the State's proposal to set up "mixed" -state and privately owned- mining companies to exploit the deposits and abandon their mines (Malpica, 2014 ). With this, they open the opportunity for former local miners to start exploiting veins that were not attractive for large-scale mining since the 1970's (Hruschka, 2003; Medina, 2015; Mosquera, 2006).

Subsequently, this type of miners also concentrated on concessions for medium-sized mining projects that had been abandoned during the years of extreme political violence (1980-1995). But after having defeated terrorism, these concessions could now be exploited without title or authorization (Hruschka, 2003). In addition, with the neoliberal reforms, former mining projects
are privatized, whose dismissed mining employees, who lived in neighboring areas, return to the concessions and begin to do informal artisanal mining on them (Reinoso, 2009). Thus, ASM was a “simultaneous” way out of the agrarian crisis, political violence, the crisis of the mining industry and the consequences of massive layoffs in state companies (Mosquera, Chávez, Pachas & Moschella, 2009). When the title holders returned in 1996 and large-scale mining took off, however, these miners were “officially” informal, as they held third-party concessions.

The mining institutional network became more active; for example, the World Bank identified deposits and, between 1972 and 1985, kept the activity organized, showing high levels of formal ownership and even resolving conflicts between miners. This initiative is what allows the “formation of the socio-productive fabric” of the ASM (Valencia, 2014a). Even in the second phase of the GRFA, which is more conservative, the acute economic crisis forces the Government to obtain gold reserves internally, to generate confidence in the international market, and therefor issues incentives to extract gold from the coast, mountains and Peruvian Amazon until 1993.

Unfortunately, the National Mining Bank's mining projects were not entirely profitable without state subsidies and constant debt. The economic crisis forced the State to reform, particularly, the mining sector. One of the first reforms was the New General Mining Law D.L. 109 of 1981, which broke the state monopoly on the mineral trade. Although in formal terms the state support to the sector is not withdrawn (Mosquera, 2006), in practice there is a progressive erosion (and embezzlement) of credit institutions for its development and regulation (Hruschka, 2003). “Until 1988 there were fifteen banking entities in Madre de Dios that had facilitated by credits an active process of mechanization of the ASM. All of them disappeared as a consequence of hyperinflation in the late 1980's” (Mosquera, 2006, p.100). Since the price of gold would have a significant rise towards the end of the decade (1988), the sector would continue to expand, but already with broad overtones of informality and disorder.

_Crisis of state-led governance: the beginning of a market-led governance model (1990-2002)_

Alberto Fujimori's victory in 1990 and the application of the “Washington Consensus” political and economic recipes marked the end of state intervention in the economy and opened the door to private investment and foreign capital. The strategy based on free market and deregulation, trade liberalization and the privatization of strategic state companies (Wise,
2010), applied to the popular reality of widespread poverty, established the political economy of “popular capitalism” and structural informality (De Soto, 1986; Durand, 2007, Toche, 2013).

The impacts of the structural reforms were important for the artisanal sector, even though Fujimori never legislated on it. In 1991, a Law with incentives for foreign capital was promulgated, in order to Promote Investments in the Mining Sector on a large scale, and also the Single Ordered Text for Mining of 1992, which modified the 1981 General Law, but did not mention or formulate legislation on artisanal mining (Medina, 2015). In fact, the problem is exacerbated when the Law for the Promotion of Investments in (Large) Mining (1991) allowed companies with capital to make considerable claims and “hoard” concessions. If from 1930 to 1990 medium and large companies were engaged in mining base metals and small companies precious metals, from 1990 “we see a division by type of deposit: medium and large companies exploit mega-deposits and the MAPE small deposits with simple techniques” (Mosquera, 2006, p.76). The State abandons the promotional role of small-scale mining and the new General Mining Law eliminated practically all its special provisions: While the free-market development strategy guided the large-scale extractive sector towards self-regulation (De Echave et al., 2009), the ASM sector was not included in the formal sector of the economy, directing it towards deregulation and informal practice. As Kuramoto indicates: “Public policy in mining has always revolved around the formal sector and with a fundamental preference to encourage investment in large mining projects. The reason is that mining is mainly perceived as a foreign exchange generating activity and, therefore, as operations are larger they will be able to contribute more to this end” (Kuramoto 2001, p.37). And in terms of laws and regulatory policies: “The General Mining Law conceives the whole of mining activity according to the glass with which it views large-scale mining, with extensive areas of exploitation, large investments, high technology and high levels of production” (Torres, 2007, p.132).

During these years, the influence of the Rio de Janeiro Conference in 1992 and the international pressure for “Sustainable Development” would open support interventions created by multilateral cooperation organizations. Thus, the Swiss Cooperation—COSUDE and its MAPEM project in 1996, which would continue with the World Bank and the CASM program in 1998, try to develop “small-scale economies” through MAPE (Hruschka, 2003). However, the position of the neoliberal State towards ASM also had nuances of ambiguity. DL 851 and 868 (1996) show the State’s intention to reduce the productive areas and capacities that small miners could exploit, in order to free space for LSM concessions. This first backlash converges with the political context of the upsurge in terrorism, which forces the State to confiscate explosives in the territory. In the absence of a legal framework for their sale and
purchase, the MAs were accused of terrorism and were subject to extortion by the police. (Hruschka, 2003).

The market-led governance model (2002-2012)

After 60 years of existence, a legal framework specifically designed to formalize and promote small-scale mining and artisanal mining is enacted through the Law of 2002, “Law of Formalization of Small-Scale mining and Artisanal mining”. Although the narrative promoted by the World Bank depicted the ASSM sector as a “development hub”, this potential was never well framed by an adequate institutional and regulatory framework. Worse still, in the face of the terrible environmental impacts and the emergence of perverse economies linked to the activity, caused by the deregulation of ASM, the State inadequately addressed the problem and began to criminalize the informal miner (Pachas, 2012).

However, until 2006 it still seemed that informal ASM and formal LSM had grown without further conflict. For example, (Mosquera et al., 2009, p.76) stated that: “notwithstanding the fears underlying the denial of the legal existence of ASM, its real presence and expansion do not hinder the success of the policy of attracting foreign investment mining. Furthermore, the country’s greatest achievements are in the same product exploited by ASM: gold. This is explained by the fact that the large mining investors and the ASM work in different fields. Similarly, in 2007, Torres stated that informal MA, "has been developed without unfair competition with large-scale mining. This is because it operates in mining areas that have been abandoned by conventional mining, or that do not attract the economic interest of large and medium-scale mining (Torres, 2007, p.66)."

By 2010, however, these limits were already blurred, and some specialists announced the increasing—but officially unknown—level of overlap between informal and formal mining. Contrasting their field work with the online mining cadaster for the Andes, they found that, for example, “in La Libertad, 97.6% of the Informal Mining Production Units were in third-party mining concessions; in Pasco the overlap reached 97.4% and in Moquegua 82.6%” (Torero Kuramoto, Díaz & Solís, 2010, p.16). Protests of the ASM miners led to the elaboration in 2010 of a “National Plan for the Formalization of Artisanal Mining (2011-2016)” and the creation of new institutions for the containment and eradication of illegal mining, such as the High Commissioner for Formalization of Mining, Illegal Mining Interdiction and Environmental Remediation. Unfortunately, the Formalization Plan remained a “paper policy, full of generalities and few concrete measures” (Kuramoto, 2011).
Facing the significant environmental impacts in the Amazon, and the emergence of perverse economies linked to the activity during the “gold rush”, the State was forced to redesign the problem through the formalization and criminalization of the informal miner, particularly in the Amazon. International pressure to produce “Green Gold” and reduce environmental impacts led to modifications in the policies of formalization of the ASM. Thus, in 2012, the Law 27651 (DS 005-2009-EM) used the term “illegal” for the first time to refer to ASM activities. Furthermore, in 2012, Legislative Decrees DL 1100, 1102 and 1105 were enacted and the criminalization of illegal mining in the Penal Code was applied. These decrees distinguished, as indicated at the beginning of this study, that the informal miner had begun a formalization process and the illegal one operates in areas prohibited for mining and does not respect technical, administrative, social and environmental requirements.

Crisis of a market-led governance model: (2012-2020)

In fact, when these 2012 decrees were enacted, illegal miners themselves stated they had provided President Humala himself 17 kilos of gold in gratitude for his commitment to support the formalization and, most importantly, stop eradication and machinery destruction during the campaign.\(^7\) As explained at length in the introduction, these decrees differentiated the informal miner from the illegal, but most of the operating conditions remained the same, as the technical, administrative, social and environmental requirements are never met by informal miners.

The explosion of illegal economies linked to ASM and to the strong pressure of environmental groups - supported by the context of the COP20 carried out in Lima in 2014 and the signing of the Minamata agreement in 2013- strengthened a view towards a “Top-Down” policy solution: eradication of illegal mining in the Amazon overshadowed formalization efforts. Thus, at the end of the Ollanta Humala government (2016), after four years of the process, only 112 ASM producers had completed it. Given this, future candidate Pedro Pablo Kuczynski would base part of his campaign on promises in relation to ASM.

The incoming Government in view of the meager results of 100 miners formalized in four years and proposed a different legal framework. In 2016 issued Legislative Decrees No. 1244, 1293, 1336 and 1351, which applied a (new) series of reforms to the process, in order to simplify the guidelines established in 2012 by the previous Government, but in continuation of the actions

---

\(^7\) [https://canalin.pe/actualidad/victor-chanduvi-mineros-ilegales-entregaron-oro-humala-n156624](https://canalin.pe/actualidad/victor-chanduvi-mineros-ilegales-entregaron-oro-humala-n156624)
began by “Law 27561 or Law of Formalization and Promotion of Small Mining and Artisanal Mining”. The main pieces issued by this government were:

- Legislative Decree No. 1293 (12/30/2016): declares of “national interest” the restructuring of the formalization process of the ASM activities referred to in Legislative Decree No. 1105 (2012).
- The Integral Mining Formalization Process (PFMI) is created for a period of 36 months (counted from August 1, 2017).
- The PFMI is delegated to the Regional Governments (GORES), through the Regional Directorates of Energy and Mines (DREM).
- Legislative Decree No. 1336 (06/01/2017): establishes provisions to coordinate, simplify and make the PFMI applicable at the national level.
- Creates the Integral Registry of Mining Formalization (REINFO), in charge of the General Directorate of Mining Formalization (DGFM) of the Ministry of Energy and Mines (MINEM).

These and the complimentary decrees caused intense debate and controversy. Former environmental authorities stated that the regulations “do not cover in the least” the needs to coherently address the problem or the expectations that Kuczynski’s proposals had generated. The main criticisms of the former officials were the minimal participation of MINAM, the extension of the term to register in the formalization process, the lack of technical support and the ambiguities in each of the DLs; amnesty for the crime of illegal mining, the dangers of overlap, etc. In 2018, the Peruvian Miners’ Federations have requested the Congress that the State, once and for all, recognize that its policies have failed and demand that the State turn this extraordinary process of formalization, into the ordinary and permanent process.

This same year, with Vizcarra as new President, the government ensured that the State could expand the “crackdown” on illegal mining through opening legal processes against the people who finance and organize these miners and destroying machinery in armed interventions. In 2019, the government collected proposals for new modifications on regulations, as well as for reopening the REINFO once again (for which it was heavily criticized). Peru currently debates a new General Mining Law, but both Presidents Kuczynksi and Vizcarra have continued supporting MINEM as the leader of the ASM sector (with Humala it was the Minister of Environment). This is a political gesture that has improved relationships with decentralized agencies in the regions (the DREMS, or Regional Directions of Mining), as well as with the most important ASM organizations in the country (Cano, 2018; MINEM, 2019).
Government representatives in this sector point out that these decrees have allowed to galvanize a new formalization strategy, with greater participation and dialogue with mining unions at the local level. MINEM organized miners in 9 mining “conglomerates, to identify the specific problems that must be resolved, according to more specific geographic, productive and social realities. This administration has made an objective of turning MINEM into a “Promoter” instead of a more punitive or eradicator approach.

Nevertheless, according to informal and illegal miners, State policy still does not promote ASM through a permanent formalization process. They argue that, although they are quite different extractive activities, the formalization legislation has derived from the large mining legislation and thus it is the national mining policy that puts barriers to formality. Even though these are quite distinct economic activities, they are regulated by similar standards in the eyes of the State, and this is the main reason behind the gaps in the formalization process (Cano, 2015a, 2015b, 2017a, Reinoso, 2009, Mesa Técnica, 2018).

Table 2.1. Periodization of ASM policy evolution in Peru

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Market</td>
<td>Domestic.</td>
<td>Foreign (USA, Europe).</td>
<td>Global</td>
<td>Global</td>
</tr>
<tr>
<td>Capital</td>
<td>Local capitalists.</td>
<td>Domestic and foreign capitalists.</td>
<td>Domestic and foreign capitalists.</td>
<td>Domestic and foreign capitalists.</td>
</tr>
<tr>
<td></td>
<td>Nationalisms (1930-1950)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Return to orthodoxy (1948-1968)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heterodox Interventional Experiments (1968-1980)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Orthodox Stabilization with Populist Dyes (1980-1990)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.2.2 The Policy “Bottleneck” at the LSM and ASM interface: the Exploitation Contract (EC)

In order to achieve the formalization of the “Mining Operator” (an informal miner) in overlap cases, and under the provisions of Law No. 27651 of 2012, its amendment, Legislative Decree No. 1040, the Supreme Decree No. 013-2002-EM, the Legislative Decree No. 1105 (2012) and other relevant regulations, the applicant needs to produce an EC from the title holder, authorizing the applicant to operate in those concessions. The EC, as a legal instrument especially designed by policy makers to break the deadlock and bring about agreements, is the outcome we are studying because it points at the core of the issue being analyzed: incentives, interactions and negotiations between illegal, informal and formal mining projects.

What are, then, the legal alternatives at hand for a formal operation engaging with informal producers? UNITAR (2018b), IGF (2018) and other resources summarize what most legal frameworks deem as viable in 4 different alternatives.

1. Take no legal action and tolerate the presence of informal ASGM activity provided it does not encroach on or affect their operations.

2. Take legal action by suing the informal miners, calling in public or private security forces to try to disperse them and filing a legal process until sanction and clearance of the territory is obtained.

3. Take legal action and try to formally and legally buy out ASGM operations (by buying mine pits/shafts and or employing some of the miners) and dissolve the need to engage in a long-term relationship of assistance and oversight.

4. Take legal action to develop an Exploitation Contract and a sustainable business model, aiming at building a long-term relationship with ASM actors in the area.
As a legal instrument, the ECs have a template – provided within the main legislative pieces issued by the Government - on which to base the main aspects or components that these contracts should have, at a minimum. The parties then must add specific clauses as they esteem needed.

The main features are organized into the following clauses:

- First.- identification of the concessions (mining rights/titles)
- Second.- object of the contract and authorized area (polygons for ASM operations within formal LSM concessions, as in Figure 2.1).

**Figure 2.1. Polygons for ASM exploitation within a formal (LSM) exploration project**
Third. - Timeline of contract
Fourth. - Cost or Payment for the EC
Fifth. - Conditions to obtain authorization for the Area
Sixth. - Conditions for buying/selling mineral
Seventh. - Environmental responsibility
Eighth. - Causes of contract resolution, such as:
  - Carrying out mining activities of any kind outside the work area defined in the second clause (coordinates and levels).
  - Mineral mobilization outside the concessions without the LSM company’s control.
  - Not allowing inspection or access to LSM companies’ representatives to any area of mining or surface work.

Other clauses include the inspection of the work area, resource information, work conditions (child labor prohibitions for instance), and consequences in case of the contract’s termination, among others.

The formal sector demands a “Rule of Law” or “Law enforcement” perspective and highlights the inherent contradiction of an EC from a legal standpoint. As experts consulted indicate, the LSM formal sector believes that an EC destroys the notion of Rule of Law and protects illegality (Cuadros, 2013; MINAM, 2017). After all: how can the State force a legal title holder to enter in a negotiation with someone that has supposedly8 “invaded” its title, especially when the legal title holder has incurred in costs to obtain this right, by paying that same State, the cost to maintain the legal status? This is preposterous and abusive from a legal standpoint and may reflect the key reason as to why the State has not really moved beyond a “facilitator” role in the Negotiating Tables or Platforms carried out for this purpose (Valdés et al., 2019; Wiener, 2019).

Moreover, and most importantly, the EC is a double-edge sword for formal companies, since they consider the whole formalization process as a “permit”, in the sense that the process, though official and legally binding, in practice does not guarantee a reduction in conflict nor a real commitment to formalize on behalf of ASM miners. This non-compliance is a serious liability for formal companies, who feel that, on the contrary, the EC protects illegality and

---

8 I use the term ‘supposedly’ because in some cases, artisanal miners may have been active (but informal) in the area of a mineral title holder before such title was granted by the State.
provides state’s permission and protection for informal and illegal miners to keep carrying out their activities as usual.

As Valdés et al. (2019) indicate:

“There are no incentives whatsoever for legal title holders to enter these EC with informal ASM producers. On the contrary, the process’ inertia turns them into victims of illegal and informal invasion of their legally obtained areas. In some cases; they will allow them to work, but without an EC, in abusive and illegal terms, with no authority able to intervene (Valdés et al.; 2019, p.26).”

On their front, the ASM producers have been demanding the State’s intervention in order to obligate both communities and formal title holders alike to grant permissions to operate in those concessions or land surfaces. ASM producers have been particularly critical of the EC as an instrument to obtain formalization, since it places all the control and power on the formal side, giving them always the “upper hand” in the negotiation. After all, not signing an EC means the miners will not be able to finish the process. The full intensity of this conflict becomes most evident when an ASSM producer is obliged to produce the EC, signed by the mining right holder, as the main prerequisite to formalize. A former Minister indicates in his book, regarding the EC: “This is barely ever obtained, except for mining rights whose holder is an individual or a small company, with neither plans nor capacity to exploit the deposit. Therefore, these companies behave speculatively, or establish conditions for exploitation that are abusive towards ASSM producers. There is no statistical information with regards to this abusive mode of exploitation, which is very expanded, especially in extreme poverty areas” (Valdés et al., 2019).

The role of the State at the interface is not straight-forward. Recalling the decentralization of the ASSM sector outlined lines above, LSM is regulated by MINEM/OEFA and OSINERGMIN, while the ASM sector is regulated by MINEM, although through the decentralized regional units, the DREMS. Even though these functions are formally and clearly delineated, the governance dimension in the practice is largely deficient (Cuadros, 2013; Wiener, 2019). DREMS are a decentralized government entity with significantly fewer human and logistical resources than MINEM. These entities are permanently requesting the DGFM to cover the

---

9 It is important to point out, nevertheless, that both globally and in Peru, in most cases, it is the artisanal miners who discover the deposits “first”, but with no mineral title. As the periodization indicated, a combination of political and economic crisis throughout history also constructed a situation in which they were “invaders” after the 1990’s mining reforms, but in fact they had been there before the LSM arrival.
technical capabilities and information they lack to effectively manage and oversee the sector’s development on the field (Cano, 2018).

For these reasons, at the interface and the negotiations needed to bring about an EC between the two parties, the State is at a crossroads with very limited space to maneuver. While legal title holders point out the inherent contradiction of requiring legal title holders to sign contracts with illegal and informal miners, the ASM informal sector demands the State’s intervention to break the deadlock. And even then; they are not always completely satisfied with the deals they are getting from the other side of the table.

Thus far, MINEM and the DGFM have facilitated a series of “Mesas de Negociación” or “Roundtables for Negotiation” between the parties. It is understood that the DGFM has been facilitating these roundtables only when these were requested by both parties, and the nature of the participation was, consequently, significantly limited. This study’s cases of state’s intervention suggest that participation of MINEM at these roundtables seemed to interest the parties only to “rubber-stamp” or certify the agreements, but not to provide direct assistance in developing the terms of the EC, let al.lone initiating a negotiation.

Unfortunately, there is neither a database nor statistical information about all these Roundtables that is readily available in the public domain. This information was formally requested from the DGFM during the course of this research study, in order to access the full amount of cases where the DGFM has participated and, most importantly, to facilitate identification of success cases in either certifying or mediating at these interface cases. However, the DGFM responded indicating they did not manage this information and/or they could not produce it at the point in time in which it was requested (see Appendices for full information requirements to this government agency). It is somewhat clear for experts and ASM associations, however, that these Roundtables have not been successful in a significant proportion.

For the above reasons, the main question of this study approaches twenty cases of LSM-ASM interface in the key mining regions of the country, and asks: what are the most determining conditions -or combinations of the most determining factors- to reach an EC between these types and/or scales of mining? Considering the interconnectedness of social, political, economic, environmental, strategic and policy issues in the sector, the study’s objective is to carry out a preliminary assessment of the necessary conditions -or the most determining factors- to arrive at what the study denominates a “positive outcome”, that is, an EC between miners in the formalization process and a formal mining company or project.
3. Methods

3.1 National and sample's interface description

3.1.1 The interface at the national level

In order to better understand the geological dimension of the overlap, it is necessary to display the different type of mineralization and deposits in Peru, according to INGEMMET (INGEMMET, 2020). As Figure 3.1 shows, there are 23 metallogenetic stripes, which provide for several types of deposits and polymetallic opportunities. It must be noted the strong presence of epithermal veins and intrusive deposits throughout the metallogenetic variety, since these are ideal for ASSM operations.

Figure 3.1. Different Deposit Types in Peru

Source: INGEMMET (2020)

---

10 This map was presented by INGEMMET at the 2020 Prospectors and Developers Association of Canada (PDAC) and this study’s author has received permission to publish it in this study.
As indicated, the Peruvian state has only been managing estimates of the total production and number of people directly practicing ASM. In terms of its spatial distribution, the scattered nature of the activity is challenging, and enquiries to government authorities at all levels acknowledged that there is a lack of updated information.

However, the REINFO database provides evidence that both illegal and informal ASSM mining exist in all 25 political regions of the country (Valdés et al.; 2019). One of the main sources of official and public information is the DGFM of the MINEM, which has made public a “heat map” of informal miners registered in the formalization process. Figure 3.2 and Figure 3.3 produced by this agency, provides the most accurate and updated snapshot of informal ASSM’s spatial distribution in Peru.

**Figure 3.2. Number of ASM producers registered in REINFO by location**

<table>
<thead>
<tr>
<th>Location</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arequipa</td>
<td>11,717</td>
</tr>
<tr>
<td>Ayacucho</td>
<td>6,553</td>
</tr>
<tr>
<td>Puno</td>
<td>5,892</td>
</tr>
<tr>
<td>Apurimac</td>
<td>5,500</td>
</tr>
<tr>
<td>La Libertad</td>
<td>4,787</td>
</tr>
<tr>
<td>Madre de Dios</td>
<td>4,469</td>
</tr>
<tr>
<td>Ancash</td>
<td>3,026</td>
</tr>
<tr>
<td>Cusco</td>
<td>2,270</td>
</tr>
<tr>
<td>Lima</td>
<td>2,132</td>
</tr>
<tr>
<td>Ica</td>
<td>1,976</td>
</tr>
<tr>
<td>Piura</td>
<td>1,373</td>
</tr>
<tr>
<td>Huancavelica</td>
<td>920</td>
</tr>
<tr>
<td>Junín</td>
<td>886</td>
</tr>
<tr>
<td>Pasco</td>
<td>880</td>
</tr>
<tr>
<td>Cajamarca</td>
<td>666</td>
</tr>
</tbody>
</table>

Source: MINEM (2019)

---

11 This map was shared and authorized for publication by the DGFM after the student was invited to present the research plan in a work meeting summoned by the DGFM at the Ministry of Mines in December, 2019.
Figure 3.3. Spatial distribution of ASM producers registered in REINFO by location

Registrations in the REINFO until August 2019

<table>
<thead>
<tr>
<th>Regions</th>
<th>Number of registrations in REINFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arequipa</td>
<td>11717</td>
</tr>
<tr>
<td>Ayacucho</td>
<td>6553</td>
</tr>
<tr>
<td>Puno</td>
<td>5892</td>
</tr>
<tr>
<td>Apurímac</td>
<td>5000</td>
</tr>
<tr>
<td>La Libertad</td>
<td>4787</td>
</tr>
</tbody>
</table>

Source: MINEM (2019)
*The translation of the legend is: Nula = null, Muy baja = very low, Baja = low, Media = intermediate, Alta = high, Muy alta= Very high.
Peru has three very distinct geographic regions: the Amazon, the largest portion of the territory on the East, the Andes in the center, were most LSM and MSM takes place, and the western side of the country, which is an Andean (South) and desertic strip from the center to the north limits of the country. If we cross information of the ASM informal heat map with projected LSM investments, as MINEMs “Peru 2030 Mining Vision” indicates (Table 3.1) (MINEM, 2019), it is noticeable that there is no LSM investment in the Amazon (although mining operations may take place in the “Andean Amazon”, that is, the eastern slope of the Andes).

**Table 3.1. Investment amount and number of LSM projects by region**

<table>
<thead>
<tr>
<th>Region</th>
<th>Investment amount (USD Billions)</th>
<th>No. projects</th>
<th>% national</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cajamarca</td>
<td>18.2</td>
<td>6</td>
<td>31.5%</td>
</tr>
<tr>
<td>Piura</td>
<td>3.8</td>
<td>4</td>
<td>6.6%</td>
</tr>
<tr>
<td>Lambayeque</td>
<td>1.4</td>
<td>1</td>
<td>2.8%</td>
</tr>
<tr>
<td>La Libertad</td>
<td>0.1</td>
<td>1</td>
<td>0.2%</td>
</tr>
<tr>
<td>Áncash</td>
<td>2.2</td>
<td>5</td>
<td>3.8%</td>
</tr>
<tr>
<td>Ica</td>
<td>1.8</td>
<td>1</td>
<td>2.8%</td>
</tr>
<tr>
<td>Arequipa</td>
<td>5.4</td>
<td>4</td>
<td>9.3%</td>
</tr>
<tr>
<td>Huancavelica</td>
<td>0.7</td>
<td>1</td>
<td>1.2%</td>
</tr>
<tr>
<td>Amazonas</td>
<td>0.2</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Huánuco</td>
<td>0.2</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Pasco</td>
<td>0.7</td>
<td>1</td>
<td>1.1%</td>
</tr>
<tr>
<td>Junín</td>
<td>2.4</td>
<td>4</td>
<td>4.2%</td>
</tr>
<tr>
<td>Apurímac</td>
<td>10.3</td>
<td>6</td>
<td>17.0%</td>
</tr>
<tr>
<td>Cusco</td>
<td>2.2</td>
<td>3</td>
<td>3.9%</td>
</tr>
<tr>
<td>Puno</td>
<td>1.8</td>
<td>4</td>
<td>3.0%</td>
</tr>
<tr>
<td>Ayacucho</td>
<td>1.2</td>
<td>1</td>
<td>0.2%</td>
</tr>
<tr>
<td>Moquegua</td>
<td>6.4</td>
<td>3</td>
<td>11.1%</td>
</tr>
</tbody>
</table>

Source: Cartera de proyectos mineros 2019 – MINEM (2019)

On the contrary, a significant amount of overlap was expected and confirmed for the most mineralized regions of the country. As Figure 3.3 indicates, the north of the country has an important number of ASM gold producers within Piura, La Libertad, and, to a lesser degree, in Cajamarca. In the center, miners are registered within Ancash and the highlands of Lima. The “Southern Mining Corridor” —or “Corredor Minero del Sur”— encompassing the regions of Ica and Arequipa (where the processing plants are located), and the region that connects with Ayacucho and Apurímac, have the highest number of miners registered in the formalization process. Moreover; since in Arequipa and Apurímac some form of informal ASM takes place in every province of the district (i.e. every political subdivision within the region),
and these two regions attract LSM investment, more cases of overlap are expected over the next years, as it will be explained (Wiener, 2019; Valdés et al.; 2019).

The data above suggests that both types of mining scales have and will continue to operate in the most mineralized spaces or regions of the country. Likewise, it is safe to assume that most illegal ASM producers -who are not registered in the formalization process; who operate in Protected Areas, or with machinery that doesn’t “match” the artisanal regulatory limits, are operating in the same regions as those registered. The difference is the lack of accountability and therefore information about these groups.

More specifically with regards to the interface, an analysis of data provided by INGEMMET and MINEM official websites identified 111 overlap cases of formal operations (MSM and LSM companies) with ASM registrations within those formal concessions, amounting to 10,867 “registrations”. The Appendix C present the full list of 111 MSM and LSM companies with ASSM producers listed within the REINFO. It is important to point out that the DGFM list does not represent a full account of the interface cases in the country, since this is a government agency that only manages interface cases within the formalization process. However, as indicated, there are many overlap cases of which the government has no information and are begin managed privately, between ASM/LSM formal and informal actors. This does not mean, obviously, that there is no public information about these cases. It simply means there is no governmental information about them.

Within the DGFM list, this study aimed at those companies with the highest number of artisanal miners in their concessions, but information on many of these was not available in the public domain. Since information regarding specific conditions of interface cases was key for the QCA application, the study was able to gather information and therefore include 11 cases from this list, amounting to at least 7,372 registrations in total. The 11 cases included in Table 3.2 belong to the Direction of Formalization - DGFM list, but are not the 11 cases with the highest numbers of ASSM producers within their formal concessions at a national level. It is important to highlight that one “registration” is not directly equivalent to one individual. It is at least one person, but may represent a legal person, that is, a company or ASM association with significantly higher numbers.
Table 3.2. Top 11 formal LSM companies with *registered ASM miners* operating in concessions considered for this study\(^\text{12}\)

<table>
<thead>
<tr>
<th>Title Holder</th>
<th>Total &quot;registrations&quot;</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compañía Minera Caraveli S.A.C.</td>
<td>3511</td>
<td>Arequipa</td>
</tr>
<tr>
<td>Compañía Minera Poderosa S.A.</td>
<td>1168</td>
<td>La Libertad</td>
</tr>
<tr>
<td>Minera Las Bambas S.A.</td>
<td>507</td>
<td>Apurímac</td>
</tr>
<tr>
<td>Minera Yanaquihua S.A.C.</td>
<td>473</td>
<td>Arequipa</td>
</tr>
<tr>
<td>Compañía Minera Ares S.A.C.</td>
<td>449</td>
<td>Arequipa</td>
</tr>
<tr>
<td>Consorcio Minero Horizonte S.A.</td>
<td>413</td>
<td>La Libertad</td>
</tr>
<tr>
<td>Minera Barrick Misquichilca S.A.</td>
<td>292</td>
<td>La Libertad</td>
</tr>
<tr>
<td>Shahuindo S.A.C.</td>
<td>194</td>
<td>Cajamarca</td>
</tr>
<tr>
<td>Southern Peru Copper Corporation</td>
<td>163</td>
<td>Apurímac</td>
</tr>
<tr>
<td>Minera Aurífera RETAMAS S.A.</td>
<td>138</td>
<td>La Libertad</td>
</tr>
<tr>
<td>Compañía Minera Zafranal S.A.C.</td>
<td>64</td>
<td>Arequipa</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7372</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: Database MINEM (2020)

\(^\text{12}\) This study does not present numbers of REINFO registrations for the other 8 cases, as this is information that appears in the ECs, and access to those documents is extremely difficult.
3.1.2 The interface at the sample level

Besides these 11 cases from the DGFM list, the study was able to complete information for other 9 cases that did not belong to the list, since the study also wanted to approach cases that were not institutionalizing the formalization process in full. This was of paramount importance, in order to capture cases that would illustrate how the dynamics of negotiation towards an EC unraveled where the process of formalization had not been completely institutionalized. The final sample is listed in Table 3.3.

Table 3.3. Final Sample (20 cases)

<table>
<thead>
<tr>
<th>Companies</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oban S.A.C.</td>
<td>Ancash</td>
</tr>
<tr>
<td>Minera Las Bambas S.A.</td>
<td>Apurímac</td>
</tr>
<tr>
<td>Empresa Anabi S.A.C.</td>
<td>Apurímac</td>
</tr>
<tr>
<td>Compañía Minera Ares S.A.C.</td>
<td>Apurímac</td>
</tr>
<tr>
<td>Southern Peru Copper Corporation</td>
<td>Apurímac</td>
</tr>
<tr>
<td>Minera Yanacuihua S.A.C.</td>
<td>Arequipa</td>
</tr>
<tr>
<td>Inca One Gold Corp.</td>
<td>Arequipa</td>
</tr>
<tr>
<td>Compañía Minera Caravelí S.A.C.</td>
<td>Arequipa</td>
</tr>
<tr>
<td>IED Mining S.A.C.</td>
<td>Arequipa</td>
</tr>
<tr>
<td>Compañía Minera Zafranal S.A.C.</td>
<td>Arequipa</td>
</tr>
<tr>
<td>Shahuindo S.A.C.</td>
<td>Cajamarca</td>
</tr>
<tr>
<td>Minera Barrick Misquichilca S.A.</td>
<td>La Libertad</td>
</tr>
<tr>
<td>Summa Gold Corporation</td>
<td>La Libertad</td>
</tr>
<tr>
<td>Consorcio Minero Horizonte S.A.</td>
<td>La Libertad</td>
</tr>
<tr>
<td>Minera aurífera RETAMAS S.A.</td>
<td>La Libertad</td>
</tr>
<tr>
<td>Compañía Minera Poderosa S.A.</td>
<td>La Libertad</td>
</tr>
<tr>
<td>Minera Vicuña S.A.C.</td>
<td>Lima</td>
</tr>
<tr>
<td>Consorcio Minero ATE S.A.C.</td>
<td>Piura</td>
</tr>
<tr>
<td>Minera Leona de Oro S.A.C.</td>
<td>Piura</td>
</tr>
<tr>
<td>Río Blanco Copper S.A.C.</td>
<td>Piura</td>
</tr>
</tbody>
</table>
3.1.3 Description of sample by mining regions

It must be noted that what this final sample highlights as critical regions match those identified by the DGFM. Out of twenty cases, 9 are found in the north: 5 in La Libertad, 3 in Piura and one in Cajamarca. Besides one case in Ancash and one in Lima in the Center, all the other cases are in the “Southern Mining Corridor”: 5 in Arequipa and 4 in Apurimac, two of the regions with the highest amount of ASM miners in Peru. The final sample distribution also matches the areas with the more robust geophysical and geochemical anomalies, as INGEMMET (2020) indicates:

**Table 3.4. High mining-geological potential areas (geophysical and geochemical anomalies).**

<table>
<thead>
<tr>
<th>No.</th>
<th>Prospect</th>
<th>Area (hectare)</th>
<th>Region</th>
<th>Possible Type of ore mineral deposit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Antabamba Bloque 3</td>
<td>2,800</td>
<td>Apurímac</td>
<td>Porphyry Cu-Au</td>
</tr>
<tr>
<td>2</td>
<td>Huisani</td>
<td>3,100</td>
<td>Apurímac</td>
<td>Skarn Zn-Cu</td>
</tr>
<tr>
<td>3</td>
<td>Chárrapa Bloque 4</td>
<td>8,100</td>
<td>Arequipa</td>
<td>Porphyry Cu</td>
</tr>
<tr>
<td>4</td>
<td>Zona 2</td>
<td>11,100</td>
<td>Lima</td>
<td>VMS Zn-Cu</td>
</tr>
<tr>
<td>5</td>
<td>Antabamba Bloque 2</td>
<td>4,000</td>
<td>Apurímac</td>
<td>Porphyry Cu-Au Mesothermal veins Cu-Au-Ag</td>
</tr>
<tr>
<td>6</td>
<td>Pampa Grande</td>
<td>8,700</td>
<td>La Libertad</td>
<td>HS Epithermal Au Porphyry Cu</td>
</tr>
</tbody>
</table>

**Northern Mining Corridor (La Libertad, Piura and Cajamarca: 9 cases)**

- **La Libertad (5 cases)**
  
  The Region of La Libertad is one where the greatest amount of overlap was expected, considering that the “Batalito de Pataz” is a key gold mining for all scales, but mostly ASM, SSM and MSM. According to INGEMMET (2018, p.42), this is an area of several geological faults with superficial epithermal gold veins that are ideal for ASM producers, who explore the area both randomly and with somewhat reliable information. Within DGFM’s list, several cases with the largest amount of REINFO producers belong to La Libertad, accounting for more than 1,000 ASM registrations. During this research, additional cases were identified that could not be included in this study, such as Minera Sayapullo. This case, as others, did not satisfy the “quality of information available criteria” for all 5 conditions and outcome, and therefore could not be included. Similar interface maps of other key operations in this region were produced for the cases of Consorcio Minero Horizonte, Minera Aurífera RETAMAS (4% of Peruvian gold production) and Minera Poderosa (7% of Peruvian gold production) and Barrick (5% of all gold production).
• Piura (3)

The absence of Piura in the DGFM list but its strong presence in our cases may be related to the fact that Piura is one of the regions, after Madre de Dios and Puno, with the largest presence of illegal miners. Authorities in the region consider that there are some 10,000 informal miners in Piura, who are concentrated in the Sierra de Ayabaca and Huancabamba, in addition to Las Lomas and Tambogrande. However, after nine years since the formalization process began, only 22 of a total of 1,372 artisanal miners registered in the Comprehensive Registry of Mining Formalization (REINFO) completed the process by 2020.13

However; Piura configures a particular case of land ownership and communal principles of self-management and governance that also apply to subsoil and underground resources (Veiga, Angeloci-Santos, Ñiquen, W & Saccatore, 2015). The “Frentes de Defensa” and “Rondas Campesina”, communal forms of organization for several issues at the communal level tend to align with the ASM informal sector in this region, in that is now expanding in a directly confrontational “anti-state” manner, rejecting formal investments. This type of ASM would be in fact pushing out formal LSM mining investments, as in the cases of Rio Blanco and Tambogrande. Tambogrande is a world-famous social conflict case identified by the DGFM in their list as an interface case, where the community expelled a formal LSM Canadian company, and now hosts informal and illegal ASM operations, mainly because the importance of poverty alleviation of rural community (Toledo & Veiga, 2018; Valdés et al., 2019). Both our sample and the literature reveal that Piura may become another region for future increased overlap, considering MINEM expects that Piura and Cajamarca will receive 41% of all mining investments between 2019 and 2028 (MINEM, 2019)14

• Cajamarca (1)

Although there is just one case analyzed in this region, the interface at Cajamarca is described in the literature as being dominated by the “Ronderos”, who are extremely hostiles against the State and formal mining operations, especially from large companies like Newmont (Conga) (Valdés et al., 2019). Cajamarca is the richest gold mining region of the country, and it also has an illegal sector growing at the border with Ecuador (obviously the DGFM map wouldn’t capture these cases nor dynamics).

---


14 Peru Mining Vision 2030 (MINEM, 2019).
Central Andes (Ancash and Lima: 2 cases)

- **Lima (1)**
  It has been widely documented that the Region of Lima, even at the outskirts of the metropolitan area (in Carabayllo), there is illegal mining. Only one fully developed case belongs to this region, and it is a “negative” case of an extremely conflictive relationship with the community of the Leoncio Prado district.

- **Ancash (1)**
  Only one fully developed case belonged to this region, with a copper exploration project (“Antamayo”), close to the eastern limits with Huanuco. The title holder of this case is OBAN SAC, the Peruvian name of a Canadian Junior company BRAEVAL (today, Osisko Mining Inc.) Ancash hosts one of the largest copper mega-operations of the country, Antamina, which appears on the DGFM list as having only 5 informal miners registrations (although Teck is treated as another case in the DGFM list with an extra 8). Ancash is one of the regions with the largest number of miners in REINFO; however, neither the DGFM list nor our sample collected or was informed about any significant cases of LSM/ASM overlap.

Southern Mining Corridor (Arequipa and Apurimac: 9 cases)

- **Arequipa (5)**
  There is informal ASM in Arequipa in all Provinces within the region (Wiener, 2019), and is currently the “poster child” of ASSM formalization in the country: it has, by far, the largest number of informal ASM producers registered in the process and the highest rates of success formalizing. It hosts several formal LSM companies currently operating (Cerro Verde is a copper mega-project), which in turn have a large number of artisanal miners present in their concessions. One case is the Caravelí Mining Company, which has 3,000 (three thousand) artisanal miners expecting to arrive at an EC to formalize in different areas of the Region.

  This region is key at the interface because it is one of the country’s mineral processing “hubs”. Several gold and copper processing plants —the most famous of those being “Laytaruma”— are in Chala and in Nazca (Region of Ica). It has been reported that there are 24 processing plants in the Nazca province, carrying out financial operations for approximately USD$ 350 million (Valdés et al., 2019). These plants process ore from the districts of Caylloma, Chachas and Castilla. The processing plants tend to embrace a “stockpiling business model”, whereby they collect the ore and pay the miner a price according to its grade, before processing. The plants then benefit from the mineral recovery and its further commercialization to gold traders.
Besides the “processing plant” business model at the interface; the “stockpiling model” not only processes ASM production from local and distant ASM miners, it also allows them to extract within their concessions, but for processing at the formal operation, as sub-contractors. The case of MYSAC is an example of this business model and the map is below. The map reveals that miners are located on epithermal superficial veins. This type of veins were not deemed economically valuable for previous LSM companies exploring the area, thus, the ASM producers were integrated and “upgraded” into a Small-Scale project (SSM). This is also a case were miners arrived before LSM and became informal after the reform during the 1990’s. So they were not “invaders”, for instance.

- Apurímac (4)

Apurímac is another region that hosts informal ASM producers in every single province within the region. Valdés et al. (2019) estimates that the two provinces of Cconacaca and Grau transport between 4 and 5 tons of mineral per week, for processing, to plants in Arequipa and/or Ica, through Abancay, using the route Pachachaca-Chalhuanca-Puquio-Nazca. It is important to remark that before congress and other political platforms, ASSM miners from Apurímac demand that the State build copper processing plants in this region (Peruvian Parliament, 2018). Setting up processing plants has nonetheless been met with strong opposition from communities and authorities alike, due to fears about the environmental impacts of these miners’ practices.

Similar to Arequipa, Apurímac also attracts LSM investments, such as Las Bambas, one of the country’s most important copper extraction projects. Las Bambas has been recognized as one of the largest unsolved cases of interface in the country: 507 registrations within their concessions, and the miners are located where the LSM company, MMG, intends to open its second mining pit in the future (as the map reveal, the green dots are concentrated in the “sulfobamba” grid, overlapping with the porphyry in the subsurface (as the pink color indicates in the map in the Appendix I).

According to INGEMMET, this is a unique case where gold and copper oxide can be extracted through both informal ASM and SSM means, because of a previous glacier formation in the area. One of the key findings about the interface cases of this region is that the growth of the “ASSM” sector is giving rise to a new scenario: that of illegal communal copper Small-Scale (SSM) extraction. This communal mining is very similar to that of Cajamarca: confrontational towards both the state and formal LSM investments (Valdés; et al., 2019; Wiener, 2019).
3.2 Qualitative Comparative Analysis (QCA):

3.2.1 Research approach, key concepts and main processes

QCA was selected as a research approach because it is well suited to problems that involve causal complexity, i.e. whereby there may be several explanations for the same observed outcome (in this case, the EC). Unlike regression which uses linear algebra to quantify the average influence of individual factors on an outcome of interest, QCA applies binary logic and “set theory” to identify the minimal combinations of conditions that are necessary and/or sufficient for an outcome (the EC) to occur within a set of cases analyzed (Kunz, Fischer, Ingold & Hering, 2015). This allows to make explicit the interactions between an empirically and theoretically grounded set of conditions. The purpose of using QCA as a research approach for this problem is to allow us to:

- tackle an intermediate amount of interface cases
- summarize data visually in Truth Tables (explained below)
- check the coherence of this data with claims of subset relations
- test hypotheses, empirical and theoretical knowledge through the conditions explored in each case
- build theory: advance new arguments for new empirical evidence presented.

According to Charles Ragin (cited in Rihoux & De Meur, 2009) -the American sociologist that introduced and developed its foundations- QCA is a “bridge” between qualitative (case-study oriented) and quantitative (variable oriented) research strategies. QCA is a “bridge” between these research strategies in that it allows researchers to overcome “the limitations of net-effect thinking” of individual variables that is more characteristic of a statistical approach (Ragin, 2006), but also the limitations of an empirically rich examination of studying only a few cases at a time, which does not allow for generalization.

As Ragin emphasized (2006), QCA objectives are different from statistical analyses in that QCA is “explicitly configurational” (Rihoux & Ragin, 2009) “by virtue of giving premium to causal complexity, seeks to detect different conjunctions of conditions- configurations that leading all to the same outcome” (Grofman& Schneider, 2009). In order to display relations between conditions and indicate which descriptive accounts apply to specific cases, or group of cases, the notions of logical necessity and sufficiency are key. A condition is necessary when the outcome is never present without it. Sufficiency does imply that the presence of the condition will, accompany the event’s occurrence (Halperin & Heath, 2012).
Key concepts

An important aspect of any QCA application is that of the acceptable proportion and good balance between the number of cases and conditions (Ragin, 2006; Rihoux, 2009, Halperin & Heath, 2012). Schlosser & De Meur (2009) indicates that the ideal balance is not a purely numerical one. A common practice in an intermediate N analysis (10-40 cases) would be to select from 4 to 6-7 conditions. This study tackles 20 cases (intermediate N) and works with 5 conditions, so it is within what is considered good practice.

This research applies QCA to explore the influence that 5 theorized conditions (factors) may have played in bringing about an Exploitation Contract (EC) between the formal LSM and informal ASM scales/sectors. The absence or presence of these 5 conditions were arranged in a binary “Truth Table” for 20 cases, in order to arrive at “Solution Formulas”. The Solution Formulas with the greatest number of conditions represent the most prevalent conditions that can explain a positive (or a negative) outcome.

There are two ways of developing a QCA analysis Truth Table (TT), depending on the mathematical approach used to simplify the solution formula obtained. One is known as a “fuzzy-set QCA” or fsQCA, in which variables can take different values on an interval scale between 0.0 and 1.0. The other way is known as “crisp-set QCA” or csQCA, whereby all hypothesized conditions in the analysis are treated as dichotomies: the condition is either present (and therefore a “1” is assigned) or absent (a “0” is assigned) (Halperin & Heath, 2012, Rihoux & Ragin, 2009; Ragin, 2006). This study carries out a crisp set QCA analysis, where a first step is to combine as many “compatible” rows of the TT as possible. This involves eliminating all redundant terms. As Halperin & Heath indicates: “If two combinations differ only on one factor but produce the same result; then the factor they differ can be thought of as irrelevant (2012, p.220)”. This effort is clear in the TT groups and label cases presented in the analysis.

A crisp-set QCA was utilized in this study because: a) some conditions were relatively straightforward to represent (for instance, if miners are exploiting the same mineral in the same space), and (b) since this analysis is an innovative application of QCA in the resource governance space, the crisp-set QCA is an ideal starting point. Further complexity (e.g. fuzzy-set) can be added in future iterations of the method, ideally with a larger number of cases and conditions.
Processes

Qualitative Comparative Analysis (QCA)’s use of Boolean algebra makes it possible to bring the logic and “empirical intensity” of qualitative approaches to studies that embrace more than a handful of cases, thus allowing the researcher to move beyond a "small-N" research strategy, without sacrificing the “empirical intimacy” of qualitative strategies (Rihoux et al., 2009; Halperin & Heath, 2012). Boolean methods of logical comparison represent each case as a row in a Table, illustrated as a combination of conditions in relation to an outcome. This data is then entered into a software — in this case Tosmana — that applies algorithms to simplify the data into a matrix, reformulated as a “Truth Table” that visualizes the different combinations of conditions that occur when a specific outcome is also present. Tosmana v.1.52 software was used for data analysis, applying the crisp-set QCA based on the Boolean minimization algebraic method.

A Boolean function is an expression linking binary variables through the connectors OR, AND, and NOT, and the parentheses. For a given value of variables, the function can be 0 or 1. The design of a “circuit” or a “path” by Boolean methods often requires a truth table according to the input and output conditions. Implementation of a boolean function using a logical diagram, can be obtained from the truth table, but the optimal way is to obtain it from a simplified function. The logical diagram of an unsimplified function has more elements than the logical diagram of a simplified function since the former is more complex. From this table a Boolean equation is then derived, it is simplified and leads to the circuit desired logic. The circuit obtained by this method is optimal because it requires a minimum number of “gates” or stages in the path for its realization of the outcome.\footnote{This is the instruction manual the student was using to apply Tosmana properly: https://www.corwin.com/sites/default/files/upm-binaries/23237_Chapter_3.pdf}

Simply put, this operation consists of the “reduction” of a long, complex expression into a shorter, more parsimonious expression (Rihoux & De Meur, 2009). That means “if two Boolean expressions differ in only one causal condition yet produce the same outcome, then the causal condition that distinguishes the two expressions can be considered irrelevant and can be removed to create a simpler, combined expression” (Ragin, 1987, p. 93, cited in Rihoux & De Meur, 2009). According to Ragin, “these minimization procedures mimic case-oriented comparative methods but accomplish the most cognitively demanding task — making multiple comparisons of configurations — through computer algorithms”. It does not attempt to distill the “net-effect” of single or independent variables. Nevertheless, at the heart of the data analysis within a complex set of theoretic conditions, QCA has to restate the Truth Table
described above in terms of the “Solution Formulas” mentioned above: a “parsimonious and encompassing truth-functional proposition or set of propositions” (Grofman & Schneider, 2009), that is, a simplified and synthesized version of the formula.

For example, adapting an exercise carried out by Grofman & Schneider (2009, p.665), primitive expressions or combinations could be:

\[ PUCS + pUCs + PUCs \rightarrow W. \]

By the Boolean minimization, a parsimonious expression is:

\[ UC (P + S) \rightarrow W. \]

Finally, it is important to explain the notions of consistency and coverage (Grofman & Schneider, 2009). For sufficiency relations, the parameter of consistency expresses “the proportion of cases with the condition X where we also find the Outcome Y, relative to all cases with X” (Ragin, 2006). The higher the consistency, the closer is to be a consistently sufficient condition. Thus, 100% percent consistency is, strictly speaking, a sufficient condition.

The second parameter, coverage, only makes sense when it is applied to conditions that are “consistent enough” to be regarded as sufficient for Y. “It is the number of cases with Y where we also find X, relative to all cases with Y (Ragin 2006). The higher the coverage score for X, the more cases displaying Y are covered, and thus are explained by these sufficient conditions (Grofman & Schneider, 2009). Accordingly, the Solution Formula’s coverage indicates the overall coverage of all sufficient conjunctions combined.

As indicated by Pérez-Liñán (2007), “the comparison in terms of sufficiency must be made according to all the causal configurations (combinations) corresponding to a typological theory, and not to the variables treated individually. That is, when two or more conditions are jointly necessary to produce a result, they are also individually necessary. This means that if the X * Z configuration is essential to achieve Y, a comparison of the behavior of X or Z for all positive cases of Y will establish that each of the two factors, although analyzed separately, is present in each instance” (2007, p.22).
3.2.2 Outcome and conditions: theoretical and empirical “grounding” and justification

According to Schneider & Wageman. (2010), good practice in QCA is achieved when “The Conditions and Outcome are selected and conceptualized on the basis of adequate prior theoretical knowledge as well as empirical insights gained throughout the research process (2010, p.403)”. Accordingly, this section provides a detailed account and justification of the theoretical and empirical grounds for the outcome and the conditions utilized.

Outcome: Exploitation Contract (EC) - Framework Agreement (FA)

As explained above; since experts and most of the literature points out to the EC or FA as the main bottleneck within the formalization process, the core objective of this study was particularly concerned about understanding the underlying factors or conditions that might have been instrumental in bringing about or, on the contrary, preventing the arrival at “Exploitation Contract”. The outcome is therefore the presence or absence of an operating contract or agreement between ASM and LSM. The study operates with 20 cases, of which 12 are “positive” cases (with and EC or FA in place) and 8 are “negative” cases (the outcome is an absence of an EC or FA). Operationally, to consider a positive case (“1” assigned), an exploitation contract must have been signed between the formal mining company and artisanal miners or, in any case, there must be a “Framework Agreement” (“Acuerdo Marco”, in Spanish) for the EC, which is usually the very last step - after a long negotiating process between the parties- before signing the final EC.

Conditions:

Schlosser & De Meur (2009) also indicate it is important to keep the number of conditions low and moderate to avoid the “many variables- few cases” problem highlighted by Lipjart (1971). However, Schneider & Wageman (2010) indicates a clear restriction: when we deal with heterogeneous phenomena and micro level data, in crisp sets QCA, “using more conditions helps to reduce the number of contradictory rows and to raise the consistency values (2010: 402)”. This is an advantage, for the better specified a truth table is, the stronger the basis for the inferences advanced in the findings, conclusions, and therefore recommendations, will be. This practice was adopted in the study. Since the number of cases was intermediate and
relatively manageable in terms of “empirical intensity”, the number of conditions allowed for analyzing a variety of dimensions within a controlled amount of cases.

From the literature review and the scoping of the cases, the study started with 8 conditions for the analysis of the cases.

- Geological composition
- Gold price in the international market
- State intervention and enabling legal / policy framework (windows of opportunity)
- Origin of artisanal miners (native or foreign)
- ASM producers are eager to formalize and grow a mining business
- Degree of organization of ASM social groups
- Degree of sophistication/precariousness of ASM extraction
- Corporate mindset

However, after a reevaluation of these initial conditions, detailed knowledge of cases allowed the researcher to reduce the analysis to 5 conditions. Two approaches were adopted. First, irrelevant conditions were ruled out if they did not show any influence on the trajectory of the case and the outcome. Second, the initial conditions were ruled out conditions through your field research and as a result of your own theorizing as a researcher, when you gained more detailed knowledge of the cases.

For instance; at the beginning it was hypothesized that if ASM miners were local or belonged to the Area of Influence of an LSM company, this could be a greater incentive for formal mining projects to engage with them, as opposed to engaging with foreign “invaders” that do not even belong to the local community. However; the cases began to reveal that the organizational strength and the willingness to formalize was more important than the ASM producers’ origin, since there were cases in which foreign miners were able to organize local miners and guide them through negotiations with the formal company (as the Antamayo case). Thus, the final relevant conditions for the analysis are:

*Condition ASM-WILL: ASM miners are willing to organize a formal mining business*

This is the most empirically grounded of all conditions, since its empirical relevance was emphasized by experts in terms of a difference between “accidental” or “random” miners (typical ASM miners), on one hand, and miners who have organized collectively into an enterprise, who have experience (mostly from working in LSM mines before), who know their trade and business very well, and who have the capacity to thrive as a mining business.
Random, foreign and scattered miners do not provide a visible stakeholder, and this is fundamental to begin a negotiation process from the formal perspective.

An alternative theoretical statement for this condition is formulated by the IFC: “ASM Organization is a requirement, as it is impossible to deal with multiple individual and independent parties (CASM, 2009, p. 22)”. Considering the great variety of ASM producers, this condition intends to grasp the will to enter into legality, and the strength of the social and productive fabric of informal ASM miners within a formal LSM concession. In reality, interface cases where ASM producers have absolutely no intentions to formalize are numerous and the study needed to shed light on this condition.

A value of 1 was assigned for this condition only if indisputable evidence of a will to formalize on behalf of ASM producers was found, such as formal letters or requests to LSM formal companies for exploitation spaces, for technical assistance and for financial support to endure the formalization process’ costs. Some cases revealed outright conflict and blockades - or threats of future blockades- of formal operations until the demand to support the formalization process is considered by the formal company. This was also considered evidence of this condition. ASM producers, as LSM companies, also have incentives to enter the mining business, so another evidence considered was the creation of Communal Enterprises, before the law, to enter the mining business and the formalization process.

Condition GEO_COMP: Geological Competition

Another important condition was to represent the geological component in some meaningful way, considering that the issue of overlap arises because of a mineralized area with significant economic value for both parties, and that the ASM/LSM interface may have implications for mine design and development. Along these lines, there is a wide array of types of overlap, depending on the type of extraction techniques and the productive stage in which the two fronts of the issue are found. Accordingly, this condition intends to grasp the “intensity of the overlap/interface”, in order to understand the role that geology may play in explaining positive or negative outcomes towards an agreement. The chart below by Kemp & Owen (2019) allowed representation of the different types of interface that one may find.
Figure 3.4. Basic typology of LSM-ASM interfaces

<table>
<thead>
<tr>
<th>MINERALS OR METALS</th>
<th>TYPE 1</th>
<th>TYPE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIFFERENT</td>
<td>e.g. LSM target gold, ASM target nickel/cobalt in the same area of the lease</td>
<td>e.g. LSM target cooper in mine pit, ASM target gold in tailings</td>
</tr>
<tr>
<td>SAME</td>
<td>e.g. LSM and ASM target gold in mine pit</td>
<td>e.g. LSM target gold in mine pit, ASM target gold in local river</td>
</tr>
</tbody>
</table>

SAME DIFFERENT
TARGET AREA WITHIN CONCESSION

Source: Kemp & Owen (2019)

Since this study uses dichotomous conditions that only allow two values -1 for presence and 0 for absence of a certain condition- a value of 1 was assigned when the interface type indicated that both ASM and LSM producers seek to exploit the same mineral -be it gold, copper, silver, etc.,- in the same geographical area (concessions), even if they are going to target different types of mineralization (e.g. ASM veins and LSM a disseminated deposit). That is, we assigned a 1 whenever we found a “Type 4 Interface”.

Another way to understand the presence of this “geological competition” condition is as an absence of delimitation -and concomitant “invasion”- of spaces for differentiated scales of exploitation. Conversely, absence of competition or absence of this condition - a 0 assigned- would represent a clear delimitation of independent - though possibly, but not necessarily, integrated- spaces for exploitation. This condition tries to indicate, in other words, that whenever there is a Type 4 Interface and ASM miners target the same mineral in the same space, no agreement will be brought about.
**Condition CORP_CULT: Corporate Culture towards ASM**

Considering the potential conflict underway when there is LSM/ASM overlap, this condition aims at grasping the LSM company corporate attitude, mentality or approach towards ASM. According to UNEP (2012) and IGF (2018) LSM companies can have 4 different approaches towards ASM.

1. Tolerate the presence of informal ASGM activity provided it does not encroach on or affect their operations;
2. Try to disperse miners by calling in public or private security forces;
3. Try to buy out ASGM operations (by buying mine pits/shafts and or employing some of the miners); or
4. Build a sustainable relationship with ASM actors.

Along these lines, some LSM companies have a very proactive, progressive and inclusive discourse, while others prefer the judicial, non-negotiable, law-enforcement pathway with straight confrontation and the use of force. This study assigned a value of 1 when the mining company studied made an explicit effort to frame a policy or “road map” to engage ASSM proactively and, especially, not reactively. That is, when the formal business structures a more organic and systematic response (CASM, 2009), rather than a reaction to specific events of violence and / or legal issues, for instance.

**Condition CORP_INCENT: Corporate Incentive**

Considering the complexity of this issue, on one hand, and, on the other, the high levels of legal simplicity and predictability in which LSM need to operate in order to stay competitive and profitable towards their shareholders, the study proposed exploring the condition of incentives or corporate motivations for which an LSM company might decide to support ASM producers. One example is the idea advanced by the IFC (CASM, 2009) that engaging ASM miners “can also mean a comparative advantage”. Another main driver behind a corporate decision in favor of an agreement with ASM is obtaining a Social License to operate (SLO) to access specific land for operations.
Besides SLO, as Hilson et al. (2019) points out, the motivation for LSM engagement with ASM will vary in almost all operating circumstances, but it is likely to fall into at least one of the following broad categories:

- Risk minimization and security
- Managing reputational risk
- Maximization of community development opportunities
- Pressure for corporate accountability and maximization of company benefit such as exploration benefits and improved mine closure planning

Simply put: for every single case explored, we tried to determine if there was a “business case” behind the motivation for agreement (a 1 assigned) or, on the contrary, the disincentive to reach one with informal ASM producers (0 assigned).

*Condition THIRD_ACT: Third Actor*

The reason why the interface involves “resource curse”, “resource nationalism”, “state capacity” and “inclusion” discussions, is because the ASM/LSM interface, both in Peru and globally, generally occurs in areas with a tangible lack of public services, law enforcement officials and overall state presence. Confrontation or negotiation, thus, tends to be direct and tends to reach a deadlock easily. Not surprisingly, international development agencies and the state themselves have been acting and intervening as brokers, mediators, conflict managers or dialogue facilitators. Therefore, the study explores the role that might have played an intervention of a third actor or “broker”, or any person or organization which acts as a mediator between the parties. In this case, the “threshold” was established as to assign a 1 when there was an intervention by an actor that did not belong to the LSM company nor to the ASM producers. For instance, potential actors here are the State (“ombudsman” or “Defensor del Pueblo”, MINEM, MINAM), but also NGOs, consulting companies or independent consultants.

Theoretical grounds for this condition are provided by IIED (2015), IGF (2018) and, for instance, by UNITAR, when it suggests managing LSM/ASM conflicts by appointing a neutral third party to mediate or to act as a facilitator/mediator. “As the government is typically responsible for allocating mineral rights to LSM and ASGM operations, it should also be responsible for guaranteeing and protecting access to minerals. The government is therefore well positioned to serve as a facilitator/mediator. However, in cases where government
capacity is too limited to manage ASGMLSM conflicts, stakeholders such as NGOs, community leaders, customary authorities, or development organizations may take on the role of facilitator/mediator” (UNITAR, 2018a, p.67).

3.2.3 Case selection criteria and final sample

The first criteria needed to tackle a much-anticipated challenge that largely depicts the nature of the problem analyzed: the interface is an under-researched topic in Peru and there are no systematic, large N studies about it. Moreover, the very few cases for which there is abundant public information have been arguably “over-researched”, for different reasons. Also, formal companies engaged in this interface are reluctant to publicely share the details of their internal dynamics, since it is an uncertain socio-political and legal terrain.

Therefore, the first standard of good practice followed for the selection process had to be driven by “the quality of empirical evidence possible to obtain” (Schneider & Wageman, 2010). Accordingly, the study worked only with: a) information available in the public domain and b) with information specifically and formally requested from the main Peruvian agencies with political authority on the matter. These agencies are the Ministry of Energy and Mines (MINEM), especially the General Direction of Formalization (DGFM, in Spanish), and the INGEMMET - the Geological, Mining, and Metallurgical Institute- which is the scientific and management agency part of MINEM devoted to the study of the mineral resources, geology and regulation of mineral rights. Not interviewing any company representative or specific ASM organizations involved in the 20 cases allowed the study to balance the input provided by the actors involved. This study operated with the same sources of information to develop all 20 cases.

This criterion, however, entailed that some cases initially identified were dropped and other added throughout the course of the research, because there was no information available on the public domain on them, or the experts consulted were not familiarized with the cases. As the data collection section expresses, key actors in the sector were also informally contacted to obtain information or specific confirmation on the presence of one or more of the 5 conditions that had been used to complete information in the Truth Tables.
The second case selection criterion is a “good practice” highlighted both by Schlosser & De Meur (2009) and Schneider & Wageman (2010), which suggests that cases should represent both negative and positive outcomes. Thus, in order to secure a representative sample of both types of outcomes, this study worked with 20 cases, out of which 12 cases arrived at an EC, and 8 cases did not (negative outcome). This balanced sample is important for ensuring our claims about subsets are empirically grounded and, thus, can meaningfully contribute to test and build theory, since most literature focus on success stories (positive outcome) rather than on failures.

As the full list in the Appendix C demonstrates, MINEM–DGFM has identified thus far 111 cases of interface of formal Medium-Scale Mining (MSM) and/or LSM companies combined that have a total of 10,867 registrations of informal ASM producers within their legal concessions. Nevertheless, selecting only members of this list (say, the “20 companies with the highest numbers of registrations to formalize in their concessions”) would have shed light only about how the interface works within formalization contexts, when in reality, there is considerable overlap in concessions where ASM producers have absolutely no intentions to formalize. In order to shed light on the formal/informal interface dynamics outside of formalization contexts and scouting for cases where state institutions (MINEM, INGEMMET, DREMS) have no authority or reach, we identified 137 cases in total, where the agreements or the interface is begin managed without state’s knowledge or intervention. Information for these extra cases was provided by the experts or was still publicly available in company’s websites, news releases and publicly available information. Interface cases managed as a private matter are not unusual in this sector, as the findings and conclusions will reveal and discuss.

---

16 You Tube Videos in the case of Poderosa, for instance; allow to confirm that the State has actively participated at critical moments in their negotiations.
Final Sample

The selected cases are presented below. These cases are the 20 cases for which the researcher could gather information of the highest quality or certainty with regards to the conditions and outcome studied.

**Table 3.5. Cases**

<table>
<thead>
<tr>
<th>No.</th>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Oban S.A.C.</td>
</tr>
<tr>
<td>2</td>
<td>Minera Yanaquihua S.A.C.</td>
</tr>
<tr>
<td>3</td>
<td>Compañía Minera Ares S.A.C.</td>
</tr>
<tr>
<td>4</td>
<td>Minera Barrick Misquichilca S.A.</td>
</tr>
<tr>
<td>5</td>
<td>Compañía Minera Poderosa S.A.</td>
</tr>
<tr>
<td>6</td>
<td>Inca One Gold Corp.</td>
</tr>
<tr>
<td>7</td>
<td>Minera Vicuñita S.A.C.</td>
</tr>
<tr>
<td>8</td>
<td>Summa Gold Corporation S.A.C.</td>
</tr>
<tr>
<td>9</td>
<td>Minera Las Bambas S.A.C.</td>
</tr>
<tr>
<td>10</td>
<td>Consorcio Minero Horizonte S.A.</td>
</tr>
<tr>
<td>11</td>
<td>Shahuindo S.A.C.</td>
</tr>
<tr>
<td>12</td>
<td>Compañía Minera Caravelí S.A.C.</td>
</tr>
<tr>
<td>13</td>
<td>Consorcio Minero ATE S.A.C.</td>
</tr>
<tr>
<td>14</td>
<td>Minera Leona de Oro S.A.C.</td>
</tr>
<tr>
<td>15</td>
<td>IED Mining S.A.C.</td>
</tr>
<tr>
<td>16</td>
<td>Empresa Anabi S.A.C.</td>
</tr>
<tr>
<td>17</td>
<td>Southern Peru Copper Corporation</td>
</tr>
<tr>
<td>18</td>
<td>Compañía Minera Zafranal S.A.C.</td>
</tr>
<tr>
<td>19</td>
<td>Minera Aurífera Retamas S.A.</td>
</tr>
<tr>
<td>20</td>
<td>Río Blanco Copper S.A.</td>
</tr>
</tbody>
</table>
3.3 Data Collection and Analysis

This research began with a comprehensive literature review on both the global or international front, exploring cases of ASM/LSM interaction in Africa, Asia and Latin America, which was particularly useful to identify a wide set of conditions (8, initially). A more specific literature review and scoping of information allowed to distill these through an empirical correlation process vis a vis the Peruvian context, until 5 conditions were reached. The literature review included books on the history of mining in Peru, past and present legal framework for the ASM sector and for ASM formalization, official reports issued by Government agencies and their portals downloadable information, ASM global portals, indexed journals at the UBC library, international and local newspapers and corporate websites, especially looking for sustainability reports or News Releases regarding the agreements or contracts.

As indicated, the research process relied primarily upon secondary information available in the public domain, as well as official information formally requested to the key Peruvian governmental agencies mentioned above. In order to avoid taking at face-value the initial information collected, the interpretation of the information -especially assigning 1's and 0's- was validated through a limited number of consultations with experts who were knowledgeable on the topic in general and/or some of the cases of interest (see Appendix A for the full list).

There are two key stages in the preliminary process of QCA application: identifying the potential conditions and reaching the final ones, on one hand, and, on the other, verbalizing them in the most precise way possible, based on both theoretical and empirical grounds (Schneider & Wageman; 2010).

In order to refine these fundamental operations in the preliminary stages of QCA, the researcher presented the study’s research plan at two different settings with mineral policy and LSM/ASM experts. One took place at the Center for Mining and Sustainability Studies (CEMS) of Universidad del Pacifico (UP) in Lima, Peru. This presentation was carried out in the context of a “Business Models for ASM/LSM Integration” workshop, organized by CEMS and Solidaridad Network. At this presentation, the researcher received a formal invitation from the Director of the DGFM to present the research plan at the General Direction of Formalization (DGFM) of MINEM. This presentation gave a unique opportunity to refine the central features of his model, since a wide array of experts provided feedback on the definition of the conditions, its proper verbalization and the validation of the initial formulation of their statements in terms of logical necessity and sufficiency.
Once the data collection process was completed, the final synthesis of each case was organized in a standardized “Truth Table Form”, especially designed to fill out completely each case, while providing a wide array of extra information that was crucial to understand the specific dynamics in which the interface occurred. The TT Forms are designed to provide a brief narrative of topics influencing the interface, ranging from geography to economics, history, political struggle, violence, negotiations and negotiators, environmental issues, mergers and acquisitions, price of gold in relation to the timeline of agreements or contracts, among other issues. Please refer to the annexes to visualize this document for each one of the twenty cases.

The next step was reaching high confidence levels on the quality of the data obtained for solving 20 cases in terms of their outcome, 5 conditions, type of interfaces assigned, and the general data on the project. The data relevant for the Truth Table was then entered in a software - in this case Tosmana-, which applied algorithms to simplify the data into the final “Truth Table”. This Truth table was the main instrument of analysis for this research. Once a final, consistent and coherent Tosmana report was produced, the analysis began. The preliminary findings were later discussed with UBC professors and colleagues, for review and feedback.
4. Findings and discussion

In order to respond to the research question and analyze the data collected for the above conditions in relation to an Exploitation Contract (EC), this section presents the Truth Table (Table 4.1) constructed according to csQCA methodology.

Table 4.1. Truth Table

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Outcome:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASM willingness</td>
<td>Contract</td>
</tr>
<tr>
<td>Geological</td>
<td>agreement (O)</td>
</tr>
<tr>
<td>competition</td>
<td>No. cases</td>
</tr>
<tr>
<td>Corporate culture</td>
<td></td>
</tr>
<tr>
<td>Corporate</td>
<td></td>
</tr>
<tr>
<td>incentive</td>
<td></td>
</tr>
<tr>
<td>Third actor</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4.2. Outcomes, combinations and number of cases

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Combination</th>
<th>Nº cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive outcome: 4 combinations</td>
<td>Combination 1</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Combination 2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Combination 3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Combination 4</td>
<td>1</td>
</tr>
<tr>
<td>Negative outcome: 4 combinations</td>
<td>Combination 5</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Combination 6</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Combination 7</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Combination 8</td>
<td>1</td>
</tr>
</tbody>
</table>
The sample encompassed 4 combinations with a positive outcome (an EC), and 4 combinations for a negative outcome (no EC). Of the 32 possible theoretical combinations, only 8 combinations were observed within our cases analyzed. Likewise, one combination groups 8 cases of interface with agreement, other groups 5 cases with no agreement, another combination 2 cases with agreement and 5 combinations only matched 1 case (2 with agreement and the other 3 without one). In this sense, being an analysis of small N, it is evident that there is a “limited diversity” (Ragin, 2006; Grofman & Schneider, 2009) with respect the full amount of possible theoretical combinations.\footnote{This study used the Tosmana version 1.6.1 software, as a tool to develop the QCA tools. The detail of the case matrix and its labels can be found in the Appendix A.}

The analysis of the solution formulas will not consider the logical remainders here (i.e. all those possibilities without a “real” case observed), in order to analyze the configuration of conditions based on real case studies only.\footnote{The Appendix A include a detail analysis of the logical remainders.} Table 4.3 presents the combinations of conditions and the cases

**Table 4.3. Outcome, combinations of conditions and cases**

<table>
<thead>
<tr>
<th>ASM willingness</th>
<th>Geological competition</th>
<th>Corporate culture</th>
<th>Corporate incentive</th>
<th>Third actor</th>
<th>Contract agreement</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>ANT, YNQ, ARES, BRCK, ATE, LDO, IED, ZFR</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>HRZ</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>SMG, MRS</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>POD</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>INK</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>VIC, BMB, ANB, SPCC, RB</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>CRV</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>SHA</td>
</tr>
</tbody>
</table>
It is important to remember that the truth table is the systematization of the combinations of conditions of the cases. Since the truth table allows visualizing all combinations, in order to analyze the conditions in terms of sufficiency, a logical minimization process is required. This is a process that allows the information contained in the truth table to be represented in a much simpler way, yielding the “parsimonious solution”, which is the simplest logical expression for the sufficiency conditions (Grofman & Schneider, 2009, p.665).\(^{19}\)

This logical minimization —also called “Boolean minimization”— allows reducing these initial combinations in solution formulas, so it is expected that the number of solution formulas are fewer than the number of combinations in the truth table. In this study, the initial number of combinations is 8 and the number of solution formulas is 7 (3 for the positive outcome and 4 for the negative outcome).

### Table 4.4. Outcomes and solution formulas

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Solution Formulas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive</strong></td>
<td><strong>Outcome</strong></td>
</tr>
<tr>
<td>ASM_WILL * CORP_CULT * CORP_INCENT * THIRD_ACT</td>
<td></td>
</tr>
<tr>
<td>ASM_WILL * GEO_COMP * CORP_CULT * CORP_INCENT</td>
<td></td>
</tr>
<tr>
<td>ASM_WILL * GEO_COMP * CORP_INCENT * THIRD_ACT</td>
<td></td>
</tr>
<tr>
<td><strong>Negative</strong></td>
<td><strong>Outcome</strong></td>
</tr>
<tr>
<td>^ASM_WILL * GEO_COMP * ^CORP_CULT * ^CORP_INCENT * ^THIRD_ACT</td>
<td></td>
</tr>
<tr>
<td>^ASM_WILL * ~GEO_COMP * CORP_CULT * CORP_INCENT * ~THIRD_ACT</td>
<td></td>
</tr>
<tr>
<td>ASM_WILL * GEO_COMP * ~CORP_CULT * ~CORP_INCENT * THIRD_ACT</td>
<td></td>
</tr>
<tr>
<td>^ASM_WILL * GEO_COMP * ~CORP_CULT * CORP_INCENT * THIRD_ACT</td>
<td></td>
</tr>
</tbody>
</table>

\(^{19}\) To review the Parsimonious solution, please refer to the Appendix A. The inclusion of logical remainders in the csQCA allows us to make more “parsimonious” — i.e. less complex — explanations including those combinations that do not contain cases but are still consistent.
4.1 Conditions for Arriving at an Exploitation Contract

The csQCA offers three solution formulas that may bring about an EC. These three formulas show a solid consistency (1.0), and combined they explain the 12 cases with a positive outcome\(^{20}\). These solution formulas are the sufficient conjunctions of conditions that will lead to an EC. This means that whenever the full set of conditions of each solution formula is met, the chances to arrive at an EC are considerably enhanced.

Table 4.5. Solution Formulas, Consistency and Coverage for positive outcome

<table>
<thead>
<tr>
<th>Solution formulas</th>
<th>Consistency</th>
<th>Coverage</th>
<th>No. cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ASM_WILL * CORP_CULT * CORP_INCENT * THIRD_ACT</td>
<td>1.000</td>
<td>0.750</td>
<td>9</td>
</tr>
<tr>
<td>2. ASM_WILL * GEO_COMP * CORP_CULT * CORP_INCENT</td>
<td>1.000</td>
<td>0.250</td>
<td>3</td>
</tr>
<tr>
<td>3. ASM_WILL * GEO_COMP * CORP_INCENT * THIRD_ACT</td>
<td>1.000</td>
<td>0.167</td>
<td>2</td>
</tr>
</tbody>
</table>

solution coverage: 1.000 solution consistency: 1.000

It is worth noting that these three different formulas seem to change when there is geological competition. In other words, there is one type of combination when there is no competition and there are two types of combination when there is competition. The first impression is that this could be due to a numerical composition of cases given that, according to the original table of cases, 9 cases out of 12 do not present geological competition. However, as we will explain later, theoretically, geological competition can be an important factor in the design of strategies that can bring about an agreement.

The first observation is that the “Solution Formula 1” (SF1) in Table 4.3, groups the largest number of positives cases (9) with a coverage rate of 0.75. In other words, this combination is observed more often than the other two.

A second observation is that the combinations 2 and 3 group a smaller number of cases with a 0.25 and 0.16 of coverage, respectively. In these combinations, the competition for the mineral is intense, configuring a more complex scenario to reach an agreement. This is the type of interface that may require a special strategy on behalf of the mining company, or the intervention of a third actor, in addition to the ASM willingness and the corporate incentive. This is coherent, since when one of the parties operates in the other’s area, this may result in

\(^{20}\) The consistency index reflects the proportion of cases that have the outcome of interest in each solution formula.
a direct confrontation (not necessarily violent), and its solution will depend on whether the mining company considers ASM legitimate and a relevant stakeholder, or if a third, independent, actor appears to play a mediation role.

It is important to highlight that the solution formulas cover the cases that satisfy the set of conditions of each one of the solution formulas after the Boolean minimization. For this reason, it is possible for a case to fit in more than one solution formula. This is the case of Minera Poderosa (POD), which satisfies each one of the full set of conditions of the three solution formulas. In this sense, the sum of the number of cases covered by each solution formula (9+2+3, respectively), does not mean an increase in positive cases (12), it only means that the case of Poderosa is explained by the three solution formulas.

**Table 4.6. Solution formulas and cases with agreement**

<table>
<thead>
<tr>
<th>Solution formulas</th>
<th>Cases covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASM_WILL * CORP_CULT * CORP_INCENT * THIRD_ACT +</td>
<td>(ANT, YNQ, ARES, BRCK, ATE, LDO, IED, ZFR+POD)</td>
</tr>
<tr>
<td>ASM_WILL * GEO_COMP * CORP_CULT * CORP_INCENT +</td>
<td>(POD+SMG, MRS)</td>
</tr>
<tr>
<td>ASM_WILL * GEO_COMP * CORP_INCENT * THIRD_ACT</td>
<td>(POD+HRZ)</td>
</tr>
</tbody>
</table>

**Solution Formula 1: ASM_WILL * CORP_CULT * CORP_INCENT * THIRD_ACT**

In this combination of conditions, the first thing to point out is the absence of geological competition between ASM and LSM. This absence is important as the potential conflicts for accessing the mineral are significantly reduced. In this context, ASM producers willingness to formalize, the corporate attitude or mentality is proactive?, the entrepreneurial incentive and the presence of a third actor can lead to establishing an agreement, as the actors show a favorable disposition to establish commercial and coexistence relationships, accompanied by the presence of an external agent that serves as “warranty”. At the same time, in this set of conditions, both artisanal miners and the formal mining company can obtain direct benefits from the agreement.
For example, the cases of Minera Yanaquihua, Minera Barrick and Antamayo-Oban depict very well the interaction between conditions in this formula. In these cases, artisanal miners showed a willingness to participate in formal mining from a local or community organization, while community relations teams encouraged their direct board to establish “good coexistence” practices with artisanal miners, as well as a potential business case with economic benefits or business reputation. In these cases, the presence of the State, an NGO or an external organization helped establish the links between ASM and LSM, leading to the signing of an agreement between the parties. It is worth recalling that this combination of conditions covers 9 of 20 cases studied.

**Solution Formula 2: ASM_WILL * GEO_COMP * CORP_CULT * CORP_INCENT**

In this combination, geological competition configures a complex scenario, shifting the “weight” of conditions for the agreement to the relationships and incentives of the actors involved. On one hand, artisanal miners show a clear incentive to formalize within the legal framework, either through a communal company or the regular processes established by the regulations. On the other, this combination requires greater involvement of the formal mining company, since it not only requires a corporate incentive for the agreement, but also needs a “Corporate Culture” that can anticipate the issue and therefore devise a strategy that can underpin and allow the agreement to progress. In other words, the corporate dimension on the formal front, in this set of conditions, has a double challenge: the organizational one (internal), and the commercial one, since it needs to define clear incentives, a business case, to engage with informal ASM. The absence of intervention from a third actor in this case shifts the burden either to the formal company and/or to artisanal miners, depending on the case scenario.

The Summa Gold and Retamas MARSA cases illustrate this situation. Both cases show a complex scenario due to an intense Type 4 interface, the persistence of a small group of artisanal miners close to illegality and the absence of the State or a third actor that address the issue head-on. In this context, an important group of local miners showed a clear disposition and economic incentives to formalize and access the agreement. On their front, both companies have clear corporate incentives, so the inclusion of artisanal miners who want to formalize would bring economic and social returns. Corporate Culture is essential in this context, since geological competition requires the delimitation of clear areas for mineral exploitation with artisanal miners and the terms of the agreement based on clear guidelines by a team of social management or community relations endorsed by the company’s upper
management. In other words, the relationship strategy with the miners has been developed in a proactive and preventive way, paying close attention to the costs of dealing with a conflictive situation at a later stage. Thus, these companies opt for the agreement to avoid potential high-tension conflicts with local miners, in addition to increasing their production through stockpiling mineral extracted by ASSM producers.

**Solution Formula 3: ASM_WILL * GEO_COMP * CORP_INCENT * THIRD_ACT**

In this combination with Geological Competition, corporate culture does not appear as a necessary condition for agreement, while the presence of a third actor appears as a key condition. In this sense, it is possible to find cases where the mining company does not manage preventively its interactions with ASSM producers, despite having a corporate incentive - either economic (greater production) or social (anticipate conflicts or license to operate). In the absence of a solid corporate culture, the presence of a third actor as a mediator or guarantor of the agreement establishment process is essential, either to promote a relationship strategy with artisanal miners and facilitate their entry into the formal market or to serve as mediator in crisis contexts, or to advise the mining company when it deploys a reactive strategy. In other words, the third actor compensates the company’s lack of capacities or policy to deal with the interface in crisis contexts. A third actor may be able to direct the interactions towards an agreement that also meets the formal side’s “business case”.

The case of Consorcio Minero Horizonte is an example of this situation, where geological competition has been tense for several years, since the ASM expansion brought about by a dramatic increase in the price of gold. A large group of artisanal miners showed interest in operating formally in the area, even setting up an ASM company, although they were unable to complete the formalization process due to the lack of an EC. Horizonte did not have a corporate culture open to artisanal mining until then, so it did not foresee or deal with potential conflicts, which escalated in time, due to increasing demands for the contract and for specific delimitation of areas of operation. Motivated by the need to operate without interruptions due to conflicts and coexistence, Horizonte and the artisanal miners began the negotiation of the exploitation contracts with a visible participation of the State as mediator. This role of observer of the process allowed the State to bring together the motivations and incentives of both parties.
4.2 Analysis of Necessary Conditions for an EC

The Analysis of Necessary Conditions (ANC) finds two necessary conditions to achieve the agreement: the ASM Willingness and the Corporate Incentive. Both must be present as minimum conditions to build the ground for reaching an agreement. The case studies indicate that:

*These conditions are strictly necessary to reach the agreement and are enhanced by the presence of a third actor or the corporate culture regardless of whether there is geological competition or not.*

**Table 4.7. Analysis of Necessary Condition for the EC**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Consistency</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASM_WILL</td>
<td>1.000</td>
<td>0.923</td>
</tr>
<tr>
<td>CORP_INCENT</td>
<td>1.000</td>
<td>0.857</td>
</tr>
<tr>
<td>CORP_CULT</td>
<td>0.917</td>
<td>0.917</td>
</tr>
<tr>
<td>THIRD_ACT</td>
<td>0.833</td>
<td>0.833</td>
</tr>
<tr>
<td>~GEO_COMP</td>
<td>0.667</td>
<td>0.889</td>
</tr>
<tr>
<td>GEO_COMP</td>
<td>0.333</td>
<td>0.364</td>
</tr>
<tr>
<td>~THIRD_ACT</td>
<td>0.167</td>
<td>0.250</td>
</tr>
<tr>
<td>~CORP_CULT</td>
<td>0.083</td>
<td>0.125</td>
</tr>
<tr>
<td>~ASM_WILL</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>~CORP_INCENT</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

In other words, the minimum condition implies the necessity of the condition of artisanal miners willing to access the mining market formally and the formal mining company realizing the business cases or the benefit that the EC would bring about. This could entail a third party’s involvement. In the end, the mining sector is a business and the economic incentive of artisanal miners and the formal mining company can converge in the agreement if the benefits they can obtain are clearly and transparently established, either to increase production levels for stockpiling ore, obtaining traceability certifications for artisanal production, access to international investment funds for cooperation with local development, social license to operate on behalf of LSM companies, royalties for the exploitation of concessions, among other benefits.
The Corporate Culture, which according to the analysis is close to be a necessary condition (0.9), is a crucial factor for the agreement. The Solution Formulas show this condition is a key factor in a context of geological competition, which requires a higher degree of conflict management, especially during the agreement’s negotiation process. This condition, however, certainly entails a broader corporate “buy-in” dimension for higher levels of management.

Regarding the Third Actor condition, the main finding concedes greater importance to the actors’ incentives than to the intervention of a broker or mediator. In other words, the third actor plays a role in making the agreement viable, thus turning into an important condition in contexts where corporate culture is absent. However, this condition’s presence is not necessary to reach the agreement, which does not mean that it is irrelevant. The intervention of the third actor will be important insofar as it functions as guarantor of the agreement. For example, the State, through the provision of training workshops for formalization or NGOs that advise artisanal miners on legal documentation, contributes to galvanizing the agreement, but this agreement will undoubtedly require the two conditions already indicated.

It is clear from these cases that the negotiation of the agreement begins with private actors’ initiatives guided by economic incentives. This should come as no surprise, given the State’s absence in mining contexts. LSM formal companies, out of interface contexts, also negotiate their own Impact Benefit Agreements (IBAs) with local populations with no state’s intervention, generally. It is more an arrangement between private parties. The State is either absent or an intermittent actor as a promoter of ASM formalization and oversight. Therefore, these private actors face a complex scenario where all accompaniment by a third actor contributes significantly, while their absence will have complex consequences for the sustainability and respect of the agreements in a context of State’s structural weakness.
4.3 Conditions that prevent establishing an Exploitation Contract (EC)

The csQCA offers four combinations of conditions to explain the absence of agreement. These four formulas show a solid consistency (1.0), and together they explain the 8 cases with a negative outcome.

Table 4.8. Solution Formulas, Consistency and Coverage for negative outcome

<table>
<thead>
<tr>
<th>Consistency</th>
<th>Coverage</th>
<th>Unique cov.</th>
<th>No cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ~ASM_WILL * GEO_COMP * ~CORP_CULT * ~CORP_INCENT * ~THIRD_ACT</td>
<td>1.000</td>
<td>0.625</td>
<td>5</td>
</tr>
<tr>
<td>2. ~ASM_WILL * ~GEO_COMP * CORP_CULT * CORP_INCENT * ~THIRD_ACT</td>
<td>1.000</td>
<td>0.125</td>
<td>1</td>
</tr>
<tr>
<td>3. ASM_WILL * GEO_COMP * ~CORP_CULT * ~CORP_INCENT * THIRD_ACT</td>
<td>1.000</td>
<td>0.125</td>
<td>1</td>
</tr>
<tr>
<td>4. ~ASM_WILL * GEO_COMP * ~CORP_CULT * CORP_INCENT * THIRD_ACT</td>
<td>1.000</td>
<td>0.125</td>
<td>1</td>
</tr>
</tbody>
</table>

It is worth mentioning that the four formulas seem to change when there is geological competition. There are three types of combinations when there is geological competition and a combination in which this condition is not present. This could be due to the composition of the number of cases since, according to the original table of cases, in 7 of the 8 cases in which there is no agreement, the condition of geological competence is present.

First; combination 1 groups the largest number of negative cases (5) with a coverage of 0.62. In that sense, this combination turns out to be more common than the other three combinations.

Second, combination 2 groups a smaller number of cases with a coverage of 0.12. In this combination, the absence of one of the necessary conditions, in this case, the ASM willingness to be formalized, explains the negative outcome, even though the company did have an incentive to support the formalization process.

Third, combinations 3 and 4 group an equal number of cases as combination 2, with coverage also 0.12 in both cases. In these combinations, competition for the mineral is a present condition, but in either one of them are the two conditions necessary, which explains why there is no agreement, regardless of the presence of a third actor.
Table 4.9. Solution formulas and cases without agreement

<table>
<thead>
<tr>
<th>Solution formulas</th>
<th>Cases explained</th>
</tr>
</thead>
<tbody>
<tr>
<td>¬ASM.WILL * GEO.COMP * ¬CORP.CULT * ¬CORP.INCENT * ¬THIRD.ACT</td>
<td>(VIC, BMB, ANB, SPCC, RB)</td>
</tr>
<tr>
<td>ASM.WILL * GEO.COMP * ¬CORP.CULT * ¬CORP.INCENT * THIRD.ACT</td>
<td>(SHA)</td>
</tr>
<tr>
<td>¬ASM.WILL * ¬GEO.COMP * CORP.CULT * CORP.INCENT * ¬THIRD.ACT</td>
<td>(INK)</td>
</tr>
<tr>
<td>¬ASM.WILL * GEO.COMP * ¬CORP.CULT * CORP.INCENT * THIRD.ACT</td>
<td>(CRV)</td>
</tr>
</tbody>
</table>

In order to organize the discussion of the cases that did not reach agreement, the solution formulas were grouped in relation to the absence of the necessary conditions identified in the cases with a positive outcome. According to this, three scenarios emerged:

**Scenario 1: When there is geological competition, but neither party has incentives to enter an EC**

\[
\text{NO ASM.WILL} \times \text{GEO.COMP} \times \text{NO CORP.CULT} \times \text{NO CORP.INCENT} \times \text{NO THIRD.ACT}
\]

This is the negative outcome’s “worst possible” combination, given that none of the necessary or sufficient conditions for the agreement are present. Five cases show this combination of conditions. This is coherent, since none of the parties is interested in reaching an agreement. On the contrary, artisanal miners prefer to remain illegal or informal and the company has no incentive to support their formalization. Besides, the company did not have a corporate culture or mindset to support artisanal miners. In these cases, no independent or external actor (the State, NGOs, consulting firms, etc.), appears to play the role of mediator between the parties.

For example, the cases of Minera Las Bambas and Minera Vicuña, LSM and SSM operators, respectively, fall under this formula. In both cases, artisanal miners compete directly and actively to access the mineral without showing any indication of entering the formal market, either because they are seasonal miners, or because of a long history of informality in the locality, or because of the high costs of entering the formal market. For their part, none of the companies has a corporate culture that suggests any openness towards ASM. Therefore, they also do not identify any incentive to support the formalization process. On the contrary, they consider that the economic benefits that they would obtain exploiting the mineral themselves
would be greater than if they worked in coordination with artisanal miners. This situation is aggravated by the absence of a third actor that could mediate between the parties, especially, the absence of the State. In sum, there is no agreement because none of the parties has incentives or no external actor was able to forge a collaboration towards a minimum agreement.

**Scenario 2: When there is Geological Competition and at least one of the parties has no incentive to enter an EC, despite the presence of a Third Actor.**

In this scenario we have two combinations where at least one of the necessary conditions for the agreement is absent. In the case of the first combination, there is no corporate incentive on the part of the company, and in the case of the second combination, the will of artisanal miners is lacking. This occurs even though in both cases there is the presence of a third actor who fulfilled the role of mediator.

| ASM_WILL | GEO_COMP | NO CORP_CULT | NO CORP_INCENT | THIRD_ACT |

In the first combination, the negative outcome is expected, because only artisanal miners are willing to comply with the formalization process, but the mining company has no corporate incentive or corporate openness to support them. This is the case of Shahuindo in Cajamarca, where the artisanal miners present in the company concession did show an interest in the formalization process, even meeting with company representatives. However, the situation changed with the change of the concession holder because the new owner company did not have a corporate openness towards the ASM nor did it find any incentive to support the formalization process – and this is the main reason why the dialogue process was stopped.\(^\text{21}\)

Regarding the Third Actor, it is important to mention that the previous company hired the services of an independent consultant to manage the dialogue process with its stakeholders, including artisanal miners. However, after the merger between Tahoe Resources and Pan American Silver this latter company did not continue the dialogue and broke relationships with ASSM miners.

\(^{21}\) The role of “Mergers and Acquisitions” as a condition for an EC is explored in the conclusions, but in the literature is very acutely described by Hilson (2020). In a larger “N”, with the option of adding more conditions, this could be an ideal candidate to add, since it’s been validated theoretically and empirically.
In the second combination, it is the company that does have a corporate incentive to support artisanal miners, but it is precisely this group that is not interested in complying with the formalization process. This is the case of Compañía Minera Caravelí, which does not have an “open” corporate policy or mentality towards ASM, even though it has economic incentives to support artisanal miners. However, it is precisely this group that is not interested in complying with the formalization process, despite the efforts made also by the State, through the DREM Arequipa.

**Scenario 3: When there is Corporate Incentive, but no Will of ASM producers, even without Geological Competition, and no Third Actor**

Among the combinations that result in the failure to reach an agreement, this is also relatively better than the first combination since there is presence of one of the necessary and sufficient conditions for the achievement of an agreement, like the two previous ones. In this sense, the outcome is explained by the unilateral incentive on behalf of the company, while artisanal miners did not show interest in the mining formalization process. Likewise, there has been no competition for the mineral between the parties, nor has there been any participation by any actor that fulfills the role of mediator.

This is the case of Inca One Gold Corp, a processing facility that collects mineral (“processing plant business model”), but does not carry out any exploitation activities in its concessions, which is why there is no competition for the mineral. On the contrary, the company purchases ore from artisanal miners present in its concession areas, and thus its corporate incentive is purely economic: access as much ore for processing as possible. There is really no incentive to ensure that the other side of the productive chain is traceable or sustainable. Likewise, artisanal miners have no major interest in the formalization process and the sales agreements they have with the company are not completely formal. They are free to sell their ore to whom pays the better price. It should be mentioned that there has also been no participation of any independent actor in this combination.
4.4 Discussion of QCA findings: implications for stakeholders and policymakers

Arriving at an EC is an extremely private issue, but both the State’s role and “corporate culture” are key for galvanizing and sustaining the agreements

An appropriate way to express the main finding of the QCA application is by pointing out that arriving at an EC, in Peru, due to a lack of state presence in mining regions, is an issue to be resolved mainly among private parties. However, even though the QCA approach allowed for generalizations of the cases in terms of necessary conditions for an EC to be reached, it is important to reflect on the implications of the more qualitative findings of this main conclusion, especially with regards to the role of the State and the corporate culture (the non-necessary conditions). These insights, based on the specific cases approached, are valuable for policy making and for the stakeholders involved and will enrich the Solution Formula findings with empirical grounds that can connect with policy making for the ASM-LSM interface.

On ASM willingness to formalize: promote upgrading

As explained in the periodization, the ASM/LSM overlap is a consequence of the mining reform during the 1990’s since in fact many of these miners (especially in Arequipa and La Libertad) were in those areas before LSM (in our cases of La Libertad, ASM miners have been there since colonial times). In addition, a new phenomenon is that new ASM miners are registering in the REINFO as a strategy to simply begin a negotiation with a formal company in order to take advantage of the situation, with no real mining incentive, after the mining boom in the decade of 2000.

Regardless of the purposes of ASM producers in LSM formal concession, ASM decentralizes the production, allows the development of small concessions, increasing local employment levels, and provides alternative livelihood for rural communities. If there are one million people directly and indirectly connected to the activity in Peru, as most estimates indicate, then ASM “jobs” account for 3-4% of the national population. The importance of “the “social role” of ASM cannot and has not been overstated in the literature (Torres, 2007). While LSM provides employment for 2% of the national PEA (INEI, 2015), ASM provides employment for significantly larger percentages in the areas selected, and this in part explains its “pandemic” nature (Torres, 2014).
Table 4.10. Estimation of the participation of ASM in the Population Economically Active (PEA) in the main gold mining areas of artisanal mining in Peru

<table>
<thead>
<tr>
<th>Department</th>
<th>PEA</th>
<th>ASM PEA (Estimate)</th>
<th>% of participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arequipa</td>
<td>821,600</td>
<td>166,054</td>
<td>23%</td>
</tr>
<tr>
<td>Ayacucho</td>
<td>380,900</td>
<td>93,646</td>
<td>25%</td>
</tr>
<tr>
<td>Puno</td>
<td>821,600</td>
<td>83,790</td>
<td>10%</td>
</tr>
<tr>
<td>Apurímac</td>
<td>267,900</td>
<td>77,278</td>
<td>29%</td>
</tr>
<tr>
<td>La Libertad</td>
<td>1,033,300</td>
<td>69,398</td>
<td>7%</td>
</tr>
<tr>
<td>Madre de Dios</td>
<td>87,300</td>
<td>64,932</td>
<td>74%</td>
</tr>
<tr>
<td>Piura</td>
<td>974,700</td>
<td>19,586</td>
<td>2%</td>
</tr>
</tbody>
</table>

Source: UNDP (2020)

Decades of formalization policies and attempts to reduce or eliminate mercury use in the ASGM sector have delivered very poor results (Cuadros, 2013; De la Flor, 2019; UNITAR, 2018; Valdés et al.; 2019; SPDA, 2014, MINAM, 2017, Veiga & Fadina, 2020; Peruvian Parliament, 2018). Less than 1% of artisanal miners Latin America are formalized (Marshall & Veiga, 2019). The reasons, due to inherent complexity of the sector, are varied, but by 1995 the World Bank was already stressing that none of the problems related to artisanal mining could be effectively tackled until a prime need was met: legal titles (Barry, 1996; Hruschka, 2003; IGF, 2018). In Peru, “Experience shows that what determines the level of informality of the activity - and, therefore, its profitability - is not the adaptation of the law, but the solidity of the system of access to land and concessions” (Arriarán & Gómez, 2008, p.169). The spaces for ASM—if formal and sustainable economies are the objective—need to be granted.

Besides securing spaces for ASM, policy should aim not at formalizing but at promoting ASM “upgrading”, towards “mining MSMEs” at the “clusters”. Since 2009, the WB recommends employing artisanal miners as subcontractors, and entering joint ventures or contract agreements with them to achieve friendly coexistence (CASM, 2009). But these recipes are no panacea: the Poderosa case shows the disadvantages of ASM growth within their formal concessions, to the point where a new geological competition begins, even with an EC in place. Yanaquihua shows that Shared Value (Porter & Kramer, 2011) approaches may be successful if and only if this accompanied by a strong corporate culture supporting formalization (this company’s vision is to become the national leader in formalization), but this will be compromised in there is a merger and acquisition (Shahuindo). Our cases suggest that there are empirical grounds to promote coexistence but enhancing both parties independently from each other to the largest extent possible. Peaceful but independent coexistence should
be fostered, for the two sectors are notably different in extraction techniques and impacts and therefore clearly need different policy treatment.

More specifically, experts consulted indicate that a central component of this strategy must involve upgrading ASM productivity into becoming SSM operations and aim at building more productive and efficient associations and projects. On the business side, there is space for business growth for ASM, but a combination of conditions -including their own mentality and willingness to formalize- prevent this growth. Those ASM producers willing to formalize should be integrated in value chains at the “mining clusters” where they operate. The Peruvian state has currently a large set of innovation programs to promote the formalization and strengthening of MYPIMES in all sectors. PRODUCE, the Ministry of Production and MINEM should integrate policy to turn these ASM producers into mining MSMEs (Cano & Xavier, 2019, CCSI 2016, Columbia University, 2019).

On LSM corporate incentive and corporate culture

The corporate incentive or business case is a necessary condition to arrive at an EC, but the stories and timelines of cases with an EC, have proven that the condition that our study called an ASM “Corporate Culture” was almost necessary, reaching 0.917 of consistency. Corporate Culture towards ASM was understood as a proactive -not reactive- attitude, mentality of openness towards engaging in a constructive dialogue with the sector.

From a theoretical point of view, the QCA application was valuable for theory testing and building, since an EC is usually not the first management option from a formal business perspective. It takes a significant amount of effort and negotiation, first, from a specific individual to convince members from other areas of the company (lawyers, engineers, community relations strategists, the Board, among others) to take the most challenging and complex road of engaging with informal ASM producers. Reaching a 0.917 degree of consistency means it was not only sound to pose it as a condition, it also confirmed that this corporate culture is key to reach an agreement.

For this reason, it is reasonable to presume that those cases with an agreement which have a corporate policy geared towards ASM engagement should be in a better position to sustaining the agreements over time. For instance, Consorcio Minero Horizonte has hired ASM producers in an EC but, lacking a corporate culture, the EC hasn’t satisfied the ASM miners, who feel they are simply getting low paid jobs, instead of being owners of small projects, as in the MYSAC case. In all these examples, the sustainability of the arrangement
is in question towards the future mainly because it is not clear how much the formal side really believes in supporting ASM miners and will institutionalize that support. In some cases, there is a long internal process for the formal sector until this friendly approach “matures” into policy. To reach this point; a formal project needs to name a champion or a special division of formalization within the company, develop a tailored diagnosis and monitoring system (GRI helps but the conditions might not be addressed by their templates) and link the ASM support to wider community benefits/interests or to state policies aiming at developing MSMEs at the local level. Usually Regional Governments (GORES) and the Ministry of Production (PRODUCE) have local development strategies with which ASM miners could connect, but they generally need to be triggered by a leading stakeholder, as an LSM company.

On the Geological Competition Condition: secure but reduce spaces

One of the advantages of an intermediate case study on the interface in Peru was collecting enough cases to demonstrate that the LSM-ASM interface in Peru takes place in all types of mineralization and that most positive cases sampled do not present geological competition, while 7 of the 8 negative cases did present this condition.

This shows that the overlap occurs between ASM and all other scales, and this explains why there is some level of interaction of formal and informal mining at all these scales as well. The reason for this overlap with all scales and deposits, according to INGEMMET experts, is that the political and economic structure in rural areas (poverty) has displaced miners to all and any mineralized region of the country, exactly in the same way in which a rural migrant from the Sierra to Lima in the 1990s finds no economic opportunities in the city, and becomes a “wandering” or “itinerant” economic actor (selling candies in the street, for instance).

In Arequipa and Apurimac, two crucial regions for the issue, ASM concessions (in 2018) accounted for almost 35% of the region’s territory, while LSM concessions (MMG, Hudbay, Southern Peru, First Quantum, Minera ARES-Hoschild, and others) do not reach 2% of the territory (Wiener, 2019). The case of Apurimac is even more significant on two fronts: while LSM concessions account for less than 1.5% of the territory, ASM has concessions in almost 48% of the region.
Table 4.11. Status of mining concessions in Arequipa (November 2018)

<table>
<thead>
<tr>
<th>Owner stratum</th>
<th>No. of concession holders</th>
<th>Occupied area (ha)</th>
<th>% of Arequipa's surface under concession</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artisanal mining producer</td>
<td>1715</td>
<td>2,073,346.03</td>
<td>32.78%</td>
</tr>
<tr>
<td>Small mining producer</td>
<td>49</td>
<td>111,020.65</td>
<td>1.76%</td>
</tr>
<tr>
<td>General Regime</td>
<td>5</td>
<td>121,798.95</td>
<td>1.93%</td>
</tr>
<tr>
<td>Total</td>
<td>1769</td>
<td>2,306,165.63</td>
<td>36.47%</td>
</tr>
</tbody>
</table>


Figure 4.1. Arequipa's surface under concession

### Table 4.12. Status of mining concessions in Apurímac

<table>
<thead>
<tr>
<th>Owner stratum</th>
<th>N° of concession holders</th>
<th>Occupied area (ha)</th>
<th>% of Apurímac surface under concession</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artisanal mining producer</td>
<td>601</td>
<td>922,851.00</td>
<td>43.71%</td>
</tr>
<tr>
<td>Small mining producer</td>
<td>33</td>
<td>85,765.88</td>
<td>4.06%</td>
</tr>
<tr>
<td>General Regime</td>
<td>3</td>
<td>26,285.53</td>
<td>1.24%</td>
</tr>
<tr>
<td>Total</td>
<td>637</td>
<td>1,034,902.41</td>
<td>49.01%</td>
</tr>
</tbody>
</table>


### Figure 4.2. Apurímac's surface under concession

![Map showing the surface under concession in Apurímac](image)

The issue with this expansion in concessions is that conflicts with communities for water sources (Cano, 2017b), as well as with surface permits have been increasing considerably (Defensoria del Pueblo, 2013; MINAM, 2017). For this reason, there is a sense in which the Artisanal scale needs to be reformulated. Is it sound for an ASM producer to obtain concessions of 1,000 hectares? Is that “Artisanal” mining? Mining is a business which requires extremely high investment, but in Peru, concessions are open to individuals who can obtain concessions of thousands of hectares without even having real plans for mine development. The grid size should be smaller but focalized on areas with proven economic value and protected or “blocked” for ASM production.

The examples of La Libertad and Batolito de Pataz, as INGEMMET indicates, is a powerful example of an ideal area for Artisanal-Scale-Gold-Mining, because of scattered but consistent presence of superficial veins. In all our cases the intrusive veins show presence of ASM producers. When ASM producers indicate there is no more space for them, then, they are partially correct in the sense that they work basically in intrusive areas, and these have almost been depleted already, or there is enough information on them and they have already been taken, in many cases by LSM companies but also by speculative title holders. The data on concessions showed for Arequipa and Apurimac hides the fact that LSM concessions (not deposits) are the ones blocking access to concessions with more economic value for them (green areas).

Therefore, the ASM “extractive frontier” needs access to LSM concessions, but currently the State will not take away this right from the title holder. It will just invite them to consider signing an EC and arriving at a sustainable business model. The cases show that the demand for “locked” or “earmarked” areas for ASM mining has not been resolved yet and will keep increasing. However; while the spaces need to be reduced they also need to be strategically targeted with geological information, and for this the INGEMMET and the DGFM must work together.

On the Third Actor: the role of the State and/or the “broker”

The cases studied, both negative and positive, indicate that the absence of the state, or lack of state capacity, and even the detrimental participation of the state in some cases of negative outcomes, does not mean that the state has no role to assume at the interface. In fact, the third actor condition reached a consistency level of 0.833, behind corporate culture. Even though the participation of the State is not necessary for reaching the EC, it has proven
fundamental in galvanizing the initial agreements of ASM/LSM interaction. The State has played a guaranteeing role in some important “emblematic” cases (as Barrick and Poderosa), and once the agreement enters effect, it is very likely that the State will have to play, at least, an oversight role, in order to ensure the sustainability of the agreement. From an ASM perspective, the State can and must break the deadlock; from the LSM front, the State has to be engaged to reestablish monopoly of power in territories, in order to enhance governance and sustain the business model to be implemented.

As indicated above, one fundamental way in which the State is important is with the appearance of the Geological Competition condition. The mapping of interface cases using INGEMMET’s software allows reading the layer “Regional Geology” upon which miners in REINFO are located. The interface maps indicate that there are ASM producers in all types of “intrusive deposits” (green, pink and yellow), and this explains why there is informal ASM in almost all areas with economic potential for mining. As INGEMMET regional geology map indicates, there are 23 metallogenetic areas in the country, which yield a wide array of deposit types. However, there is overlap even with porphyry deposits (intense pink, as in Las Bambas, for instance), which cannot be exploited with ASSM techniques, but they still target those deposits because they are chasing all mineralization opportunity (gold in this case), and, in some cases, simply as a bargaining strategy.

This entails a need, from a policy point of view, to map the interface and develop baselines for the “Northern and Southern Mining Corridors”. If the Peruvian Government aims to continue developing the “Southern Mining Corridor” and start developing the “Northern Mining Corridor” as a “cluster” for regional economic development (MINAM, 2019), it needs to prevent future clashes between formal and informal mining, for these would certainly continue blocking formal LSM projects. Patel and Bebbington (2016) used classification tree analysis of 2013 and 2015 Landsat-7 and Landsat-8 imagery for a similar effort for Ghana, illustrating how quantifying areas of spatial overlap between large and small-scale miners can help stakeholders implement more effective policy solutions, especially in the context of “reported social conflicts” between these scales. This finding applies to a limited area within Ghana, but it is clear how this type of insights might assist MINEM-DGFM and, most importantly, the DREMS, in anticipating conflict.

The geological competition and information issue involves the State because this could be a key instrument for territory allocation and to delineate workspaces for these scales/types of mining. This would allow to assess the geological intensity of the overlap’s competition — which interface type (Kemp & Owen, 2019a) needs to be managed— and assess appropriate
strategies. The mapping, geological study, as well as conditions assessment should be complemented with socio economic data specific to the areas involved, in order to match the government’s “cluster” approach and to tackle the fact that the “seasonal” and “scattered” nature of ASM is due partly to the fact that mining is frequently a complement to agricultural activities within a wider system of a “peasant economy” in rural areas (Torres, 2015; Valdés et. al, 2019; Wiener, 2019). Interface regional baselines must be developed in close coordination with INGEMMET’s Program for ASSM. MINEM has developed guidelines on developing ASM baselines and has stressed the need to develop them at the regional level for at least a decade (Torero, 2010), but clearly these intentions have not been translated into regional baselines (Cano, 2018).

Moreover, the framework applied to this study’s cases, using an expanded QCA set of conditions, could allow assessing if a specific interface case meets the minimum combination of conditions (ASM willingness to formalize and grow, and a “business case” for the LSM sector) for an agreement or at least a FA, in order to study possible solutions (technical assistance on the ASM front, and a business incentive on the LSM formal front, for instance).

Another fundamental dimension in which the State is called upon in the cases is to bridge the “ASM-LSM divide” or the “performance gap”. Calls for the Peruvian state to build institutions and bridge the “ASM-LSM divide” have been ongoing for more than a decade. Even orthodox neoliberal defenders of a “minimal state” and free trade, as former President Kuczynkski, proposed going back to the institution he managed in the 1980’s and create a “Banco Minero” or “Mining Development Bank” again. International certifications haven’t really had significant impact (Pedersen, 2019; Veiga & Fadina, 2020) and even a former National Security Minister has questioned the real formalization will of the embassies promoting these certifications (Valdés et al., 2019).

In Peru, as in most developing countries with a significant ASM sector, there are few productive vertical and horizontal linkages between formal LSM, MSM, SSM and informal and illegal ASM. This is defined as the “performance gap” (Aubyn, 2009; Pedersen, 2019) This can be attributed to conflicts between the sectors over land or mining rights, “chains of custody issues” and the high transaction costs implicated when sourcing from geographically dispersed ASM operations, which is one of the main disincentives or challenges of a formal operation (as the MYSAC case shows).

Our cases point out that a key linkage between the sectors are the processing plants. This opens a space for an SSM stockpiling business model, where a formal and legal investor is needed to finance and manage the processing plants for ASM producers, or to finance an
SSM or MSM operation in which ASM producers are still fundamental for total project’s output. It is important to highlight that the recovery dimension is where the ASM sector needs support and where the government can intervene, for the processing costs suffocate financially the ASM business and the processing plants reap most of the benefits.

Besides, an additional advantage of focusing on processing plants or on upgrading ASM operations is that substitutes for mercury in the amalgamation- as mill leaching (Veiga & Marshall, 2019) -will be used or found, and mercury use will be reduced or eliminated. In order to begin complying with the Minamata Convention, the Peruvian government has already started inception workshops in preparation for designing the National Action Plan (NAP) to reduce mercury use in Peru. Nevertheless, as Veiga & Fadina (2020) have demonstrated, after assessing 40 years of failed interventions to reduce mercury use in all continents, is that: coexistence between these scales is the solution to reduce mercury use, not technology.

Most Guidelines and a consensus has been built around the idea that the Ministry of Energy and Mines (MINEM) must help the artisanal miner in a tutelary role of assistance strength-oriented towards its entrepreneurial consolidation, “for a period up to 24 months”, says the norm, covering the following:

1. Operative and administrative, technological training that enables rational exploitation of the mineral deposit
2. Channeling of business process information that allows the artisanal miner to make use of opportunities that could arise and those provided by the current legislation
3. Facilitate suppliers and customers that are convenient, locally and internationally.
4. Facilitate Artisanal Miner with direct access to production input that is controlled by the State
5. Advisory services to identify funding sources

Nevertheless, in the 20 cases explored the State has not carried out these functions, since it can even barely support the Regional Directions of Mining (DREMS).
5. Conclusion

_The ASM/LSM interface in Peru is not a myth and the EC needs to be redesigned_

This study has demonstrated that, in Peru, the informal and illegal ASM sector overlaps with all scales of formal mining (SSM, MSM and LSM). The ASM sector, though largely made invisible by policy makers, has received attention of the World Bank, international certification mechanisms, embassies, development agencies and other multilateral organizations for at least four decades. There is reason to believe that this interest will continue, since Peru is the world’s 6th largest producer of gold, attracts 6% of exploration investment globally and the ASM sector produces an estimated 20% of Peruvian gold (World Bank, 2013). More than 90% of ASM in Peru is characterized as either informal or illegal (MINAM, 2017), and there is reason to believe that this will continue to expand as long as there is ongoing global demand for gold. For instance, only in Las Bambas—a critical mining project for the Peruvian government—there was a growth of 100 ASM registrations between December 2019 and April 2020. “REINFOS” in LSM and MSM concessions of the DGFM’s list have increased in almost all cases studied in this research project. In the end of 2019, REINFO has been reopened again until 2022 trying to absorb, at least, 150,000 miners that have been left out of the last round of the formalization process. In this sense, the number of “REINFOS” is expected to increase in the following years. The interface, therefore, is not a myth.

In terms of formal/informal coexistence, overlap, interfaces and interactions, the sample of cases studied in this research allowed identification of a “Tentative” list of “good practices” for ASM/LSM integration within the Peruvian context. The sample’s cases shed light on some intricate internal processes of maturity that formal companies underwent before engaging meaningfully with ASM producers, after an initial period of outright reluctance and confrontation. These internal processes are rich from a practitioner point of view and suggest that companies who pursue a corporate culture or corporate policy towards ASM early on and pursue certain practice, tend to fare better in their ASM engagement. Especially those that:

- **Report ASM presence to both government and stakeholders:** this is a good practice according to most sustainability reporting platforms, such as GRI and Responsible Mining Index (RMI), or OECD due diligence.
- **Assess ASM** in terms of risk and impact management in all phases of mine development, especially during the design process.
- **Provide Spaces and Help ASM get organized:** support ASM legality, state building and organization for formalization purposes.
• **Evaluate Type of Exploitation Contract and Business Model:** assess the risk of mergers and acquisitions and potential price drop scenarios. Considering there is no “silver-bullet” approach between integrating productive chains, cohabitation or “autonomous coexistence”, if the EC does not suit, it is important to design innovative business models.

• **Act early politically:** do not engage in “live and let live”, in the “gun show”, or the “pacific cohabitation” panacea (Aubyn, 2006, 2009).

With regards to the formalization process and its main “bottleneck”, the EC, the QCA method allowed investigation of 20 cases to demonstrate that arriving at an EC, due to a lack of state presence in mining regions, is a fundamentally private issue between “de facto” ASM producers and formal concessions holders of all scales of mining in Peru. The State as a third actor was found to be relevant, however the cases reveal that the EC and the formalization process is still far from tackling the interactions between formal and informal mining beyond a contract within a fundamentally bureaucratic process.

Moreover; the study showed that it is business incentives what guides the two key parties to an EC. Both informal/illegal ASM miners and all other formal scales are attempting to establish a profitable mining business. For the EC to be successful, then, the implementation of technical and commercial aspects are far more relevant, as the positive cases also indicate. While the EC does contemplate these aspects (as shown in section 2.2.2), it is still legalistic and, as indicated, can be used as a political or coercive tool for both parties.

A lesson learned, then, from a policy perspective is that the EC is a fundamentally legal instrument within a bureaucratic process, and as such will continue to be highly problematic for both parties involved. Given the extent to which both parties politically contest the EC (technically and legally), the cases also pose questions about the future sustainability of these mechanisms. For instance, since it does not contemplate future mergers and acquisitions or other questions of fundamental importance, such as the price of gold or the specific spaces in which the mineral will be disputed, it is still to see how these will develop into the future. The QCA application showed the high degree of difficulty and the multiple necessary and sufficient conditions needed to arrive at an EC. Most importantly, the study has treated cases where a technically perfect EC could be used “perversely” under each parties’ perception of each other’s approach to it.
In this sense, even though it might still be too early for assessing the implementation of these EC, the study’s findings suggest that it might be more efficient to resolve the “bottleneck” by resolving the “performance” gap (Pedersen, 2019). This trend was found in Africa, where States are attracting Foreign Direct Investment (FDI) in areas that have been earmarked to formalize ASM hubs more efficiently. In Peru, the call to build institutions for the sector, through more direct state intervention, has lasted decades, through processing plants or through financial or technical assistance for upgrading ASM producers into SSM (as the “Banco Minero” did decades ago). The call for connecting these ASM producers into productive chains of MSM operations as in Chile has been ongoing for years (Medina, 2014; Cano, 2017b; Reinoso, 2009, Mesa Técnica, 2018). This does not mean an exclusion of market based-mechanisms, but it does entail a specific line of action geared towards bridging the “ASM-MSM-LSM” divide.

This QCA analysis of the interface as a “wicked” problem, and of the EC as a policy bottleneck within the interface and ASM policy, has illustrated the challenges of managing an issue with no “silver bullet” solution. Mercury regulation and eradication efforts in some areas of the country are plagued of “unintended consequences”. Market forces and mining booms have demonstrated that linear planning is fundamentally flawed. “It assumes widespread consensus on goals, causal theory sufficiently developed as to permit prediction, and effective instrumental knowledge. But none of these conditions pertains.” as Ritter and Webber (1973) indicates. Therefore, it is clear that “top-down” and/or “command and control” resource governance strategies will continue to fail.

The clash of conflicting worldviews and epistemic communities is notorious at all levels. With regards to the State, ASM producers contend that it “has too many faces” (tax collection, explosives authorities, police, water agencies, environmental agencies), and there is a clear need to harmonize policy across sectors (especially the “conflicting worldviews” between MINEM and MINAM regarding ASM). These “conflicting worldviews” are expressed on, for instance, allocating USD 20.6 million for eradication (payments for military operations, as in the drug on wars), while the DREMS only receive USD 2 million for formalization efforts to deal with 60,000 applications with limited human and technical resources (DREMS are usually 2 people, and ASM is not the only task they need to attend).

This research suggest that there remains a need for the Peruvian State to harmonize its vision: while SUNAT is already collecting taxes on their production, ASM producers can still get harassed by police officers when they transport material or explosives, or by the formal title holders (Peruvian Parliament, 2018). Even worse, regional technocracies are still, a decade
after the formalization started, very poor. They have been dominated by corruption and high rotation of officials who never master the process and configure a great disincentive for miners to complete it (Cano, 2018).

There is a globally acknowledged role to play for LSM in the inclusion of ASM as a relevant stakeholder that can multiply economic benefits towards SDGs (Yakovleva and Vasquez, 2018; CCSI, 2016; Hilson, 2019; MINEM, 2019), and as the solution to reduce mercury use in developing mining countries (Veiga et al., 2020). How that gets interpreted for the local mining association (s) —at the SNMPE in Peru, for instance— remains an open question. The fact that the SNMPE has created, in 2019, a Committee for Informal Mining is an indicator that some action will be taken towards the sector, but thus far it has not suggested at all that coexistence or integration is even a possibility to reduce mercury use in the country (de la Flor, 2019).

As an intrinsically wicked problem, this is a collective action problem requiring complex and networked solutions (Crowley et al.; 2017), stakeholder management, institutional diversity theory (Ostrom, 2005), institutional design principles with increased participation, and decentralized resource regimes from a polycentric perspective (Ostrom, 2008, 2010). Knowledge networks between these formal companies engaging with ASM miners are certainly a dimension for collaboration. These are all approaches that will underpin the design of institutions or governance mechanisms to be effective and achieve sustainable outcomes (Bajtjargal et al., 2013).

Finally, it is clear that overcoming the bottleneck requires a national vision for the ASSM sector. Peru has developed a “Mining Vision” within the 2030 SDGs Agenda – which developed a section specifically dedicated to ASM, contemplating how ASM is a fundamental dimension in which LSM formal mining can enhance its contributions to the Sustainable Development Goals (SDGs), particularly with regards to SDG # 5 – Gender Equality and SDG 8 – Decent work and Economic Growth (CCSI, 2016, Columbia University, 2019). This initiative, which in the African continent appears to have more traction, received a lukewarm response and participation from the official formal LSM sector organization (SNMPE), and a critical assessment of the final document in the later stages of the Peru Mining Vision development.

The formal LSM sector in Peru has found it challenging to develop a coherent and inclusive vision of mining for the country, and for this reason counts upon limited political support from social actors, except for government and economic elites (Sanborn, 2018). It should come as no surprise, then, that the ASM sector has been clearly left out from the “Perú, País Minero”
national vision, even though it occupies such a fundamental social and economic role in the country’s key mining regions. In a country where 70% of the population belongs to the informal economy and informal miners produce at least 20% of gold’s production, this is a golden opportunity to incorporate marginalized sectors of the population at a Large- Scale.
6. Contributions and Limitations

6.1 Academic, applied and methodological contribution

Even after more than 30 decades of international media attention, ASM is still an under-researched topic and the interface even more so (Kemp & Owen 2019a). In terms of literature and cases studied at a scientific level, Africa clearly dominates the study of interface cases (Hilson et al., 2020; Pedersen, 2019; Bebbington et al., 2018). In that sense, this study is a direct contribution to build theory from an intermediate number of cases for Peru, a crucial mining jurisdiction for Latin America.

The literature review entailed an “intertwined” approach to explain ASM policy evolution within a wider policy history (1930-2020) and to shed light on the historical intricacies of political and economic processes that built a structural informal economy in Peru, and the LSM/ASM interface represents one such expression of it. The interpretation of the “interface” from comparing mining policy in Peru of the LSM vis a vis ASM sectors is also a contribution to build theory and may facilitate future comparisons with other countries in Latin America. For example, Ecuador and Colombia do not have LSM mining sectors that are as strongly developed in comparison to Peru or Chile; however, they have political elites willing to set up the “mining locomotive” for development, as President Santos in Colombia has been called it.22

On another front, selection of a methodology that specifically aims to capture the inherent “causal complexity” within the ASM sector, which entailed thinking of combination of conditions in ASM, is innovative. The “set theory conditions” advanced to analyze their effect on bringing about an EC have been tested, and the study develops strong indicators of the two necessary conditions that have to be present on the main two actors in order to bring about an EC. In addition, the application of a typology aiming to grasp the “intensity” of the interface cases is also a clear contribution to arrive at “complex knowledge” or “complex thinking” for policy making of this issue in Peru.

Finally, the issue has been linked to theoretical dimensions grounded on political economy issues of access and control of mineral deposits, power imbalances and larger issues of sustainable development, resource curse, resource nationalism and collaborative resource governance, which makes the study relevant and useful for discussions on “wicked problems” and policy making to tackle these.

22 https://www.portafolio.co/economia/finanzas/santos-defiende-locomotora-minera-83728
This is the first QCA study for ASM in Peru and the first comprehensive study exclusively focused on this interface for the Peruvian case. It tackles a methodological research gap, since tackling *this amount of conditions and outcomes* for 20 cases is unusual within research on the ASM sector. This study’s “intermediate N” sample goes beyond a more typical case study and/or report format, which develops several cases very superficially and uses highly selective anecdotal information geared towards highlighting an example of a specific “good practice” carried out by a company or by a donor. The advantage of the QCA approach is the structure that it provides for managing data relating to 20 cases. Since most of the logic behind working through the cases keeps correlating back to the real data on cases, the researcher is still guiding the analysis and interpreting the data as in any other essentially qualitative study. However, the intermediate number of cases allow for stronger connections among conditions and outcomes. Smaller-N studies wouldn’t be able to draw those connections, while larger-N quantitative studies would have to overlook most of the detail.

However, one of QCA’s main challenges lies in conveying the detailed work that goes into producing the Truth Tables, which simplifies the empirical richness of 5 conditions for 20 cases behind an analysis of “solution formulas”. This study’s approach to conditions analysis, and the sheer number of cases, advance a much more solid point of theoretical and empirical departure to begin diagnosing the interface in Peru, and, thus, designing more refined public policies to deal with interface cases.

The study is a practical and a straightforward example of how to apply and discuss the QCA model to understand the political/economic and social processes behind the main policy bottleneck of the ASM formalization process in Peru. As indicated in the methodology, QCA analysis of the conditions generated interest and traction at the MINEM DGFM, who invited the author to present his research plan in December 2019. Moreover, MINEM DGFM collaborated in this study through providing data for the project, and they have expressed interest in continuing to make progress with the conditions’ analysis. Thus, it can be concluded that he agency has also recognized the value in analyzing this issue from a *complex point of view*, *acknowledging that there is no silver bullet to solve the interface*. Therefore, even if to a marginal degree, the study has contributed to build policy analysis capacity at the DGFM MINEM.
The database created during the course of this research (which was created prior to case selection) has already identified 137 overlap cases. This list has never previously been published. There may be an interesting opportunity for future research to undertake much more larger study that considers all of these 137 overlap cases to investigate whether the conclusions reached in this thesis can be generalized. The Truth Tables are already a research instrument for other researchers trying to approach several interface cases.

On the LSM front, global mining industry standards, practices and policies across different types of interfaces and realities, conditions and outcomes, and recipes and solution, are nascent and open to innovation. This is particularly true in Peru, since the ASM sector has been largely neglected both by the Central Government and the main formal LSM companies. This study has contributed directly to study 20 cases of companies which have already practiced or followed certain courses of action, and from which other mining companies can begin learning. The study will support bringing a greater focus on ASM/LSM interactions in Peru, while providing a set of preliminary actions and guidelines for LSM companies to navigate this complex territory.

From a policy perspective, the outcomes of this research find strong indications of two conditions that must be present for each one of the actors (LSM and ASM) in order to arrive at an EC. The solution formulas developed during the QCA analysis also group cases according to similarities in conditions, thereby proving particularly helpful to create typologies of cases. This systematization at the local level could certainly help to policy makers in the regions to “profile” companies and ASM groups, in order to better design, for instance, “business cases” for both actors, or in order to construct the much needed ASM and interface baselines.

6.2 Limitations and future applications of the method

A very clear opportunity for expanding this study in future is to analyze a larger sample “n” of cases (beyond 20), and/or a larger number of conditions (beyond 5). Conditions that could be explored in the future are: the role of mergers and acquisitions, price of gold, ASM being local or foreigner, among others. An additional opportunity is to apply fuzzy-set, rather than crisp set QCA, which would allow an even more refined measure regarding the “weight” of each factor in bringing about a positive or negative outcome. Such an analysis could certainly inform better policy making at the government, and promote better standards for good practice on the LSM front.
An additional expansion of this study would involve tracking the sustainability of these FA or EC throughout time, vis a vis the necessary and sufficient conditions identified. What happens with these arrangements after the price of gold increased significantly, or after a merger? How were these arrangements managed during these Coronavirus times ahead, or when the economic crisis starts, after the Coronavirus (UNDP 2020)? The current study has focused on conditions to reach an agreement, but has not dealt yet with the main issues after signing an agreement. How sustainable are, and, most importantly, will be, these agreements in time when all these factors interact? This is a critical line of research open for the future of the ASM interface in Peru, since these last years will see hundreds of these types of contracts between formal and informal sectors, and between different scales of mining.

\[23\] ASSM in Covid 19 Times. This is a MINEM, MINAM, Global Environmental Facility (GEF) and Planet Gold Peru publication.
Bibliography


Cano, Á. (2017a). Small-Scale Curse or Possibility for Inclusive Development? Comparing the politics of artisanal mining public policy in Peru and Chile. Presentation at the Latin American Studies Association (LASA) meeting in Lima, Peru.


MINEM (2020). REINFO Database.


Seeling, A. (2002). Report on field research into the socio-economic and social impact of artisanal and small-scale mining in Peru. GAMA, ITC.

SPDA. (2014). La realidad de la minería ilegal en países amazónicos. Lima: SPDA.


Regulations and legal documents


(1991). Ley de Promoción de Inversiones en el Sector Minero - delegó en el Poder Ejecutivo, la facultad de dictar decretos legislativos orientadas a crear las condiciones necesarias para el desarrollo de la inversión privada en los diversos sectores productivos.


(1996). Decreto Legislativo Nº851 - Otorga derecho preferencial para la formulación de petitorios de concesión minera en los departamentos de Madre de Dios, Puno y Cusco, a mineros artesanales que se encuentren explotando yacimientos auríferos aluviales.

(1996). Decreto Legislativo Nº868 - Modifican el Texto Único Ordenado de la Ley General de Minería aprobado por D.S. Nº 014-92-EM


(2010). Decreto de Urgencia 012-2010 - Declaran de interés nacional el ordenamiento minero en el Departamento de Madre de Dios.

(2012). Ley Nº29815 - Delégase en el Poder Ejecutivo la facultad de legislar en materias de minería ilegal. (Nota: Incluye los Decretos Legislativos 1099-1107, que incorporan el delito de minería ilegal al código penal y regulan la interdicción de la minería ilegal, entre otras medidas.)

(2014). Proyecto de Ley 3916-2014 - Reconoce a la minería artesanal ancestral como actividad minera y como forma de expresión auténtica y ancestral a través de sus diversas manifestaciones.
## Appendices

### Appendix A: Methodology and data supply

#### Table A.0.1. Data matrix of cases

<table>
<thead>
<tr>
<th>N°</th>
<th>Case</th>
<th>Conditions</th>
<th>Outcome:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ASM willingness</td>
<td>Geological competition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(A)</td>
<td>(B)</td>
</tr>
<tr>
<td>1</td>
<td>ANT</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>YNQ</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>ARES</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>BRCK</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>POD</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>INK</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>VIC</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>SMG</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>BMB</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>HRZ</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>SHA</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>CRV</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>ATE</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>14</td>
<td>LDO</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>IED</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>16</td>
<td>ANB</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>SPCC</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>ZFR</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>19</td>
<td>MRS</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>RB</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Cases</td>
<td>Conditions</td>
<td>Outcome:</td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------------------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ASM willingness</td>
<td>Geological competition</td>
<td>Corporate culture</td>
</tr>
<tr>
<td></td>
<td>(A)</td>
<td>(B)</td>
<td>(C)</td>
</tr>
<tr>
<td>INK</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>VIC, BMB, ANB, SPCC, RB</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>CRV</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>ANT, YNQ, ARES, BRCK, ATE, LDO, IED, ZFR</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>SHA</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>HRZ</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>SMG, MRS</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>POD</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Figure A.0.1. Truth table graph with parsimonious solution
Table A.0.3. Subset/Superset Analysis: Including Logical Remainders (positive outcome)

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Consistency</th>
<th>raw coverage</th>
<th>combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASM_WILL*CPR_CULT</td>
<td>1.000</td>
<td>1.000</td>
<td>0.995</td>
</tr>
<tr>
<td>ASM_WILL*CPR_INCENT</td>
<td>1.000</td>
<td>0.917</td>
<td>0.953</td>
</tr>
<tr>
<td>ASM_WILL<em>CPR_CULT</em>CPR_INCENT</td>
<td>1.000</td>
<td>0.917</td>
<td>0.953</td>
</tr>
<tr>
<td>ASM_WILL<em>CPR_INCENT</em>THIRD_ACT</td>
<td>1.000</td>
<td>0.833</td>
<td>0.908</td>
</tr>
<tr>
<td>ASM_WILL<em>CPR_CULT</em>CPR_INCENT*THIRD_ACT</td>
<td>1.000</td>
<td>0.750</td>
<td>0.862</td>
</tr>
<tr>
<td>ASM_WILL<em>CPR_CULT</em>THIRD_ACT</td>
<td>1.000</td>
<td>0.750</td>
<td>0.862</td>
</tr>
<tr>
<td>CPR_CULT<em>CPR_INCENT</em>THIRD_ACT</td>
<td>1.000</td>
<td>0.750</td>
<td>0.862</td>
</tr>
<tr>
<td>ASM_WILL<em>GEO_COMP</em>CPR_INCENT</td>
<td>1.000</td>
<td>0.333</td>
<td>0.574</td>
</tr>
<tr>
<td>ASM_WILL<em>GEO_COMP</em>CPR_CULT</td>
<td>1.000</td>
<td>0.250</td>
<td>0.497</td>
</tr>
<tr>
<td>ASM_WILL<em>GEO_COMP</em>CPR_CULT*CPR_INCENT</td>
<td>1.000</td>
<td>0.250</td>
<td>0.497</td>
</tr>
<tr>
<td>GEO_COMP*CPR_CULT</td>
<td>1.000</td>
<td>0.250</td>
<td>0.497</td>
</tr>
<tr>
<td>GEO_COMP<em>CPR_CULT</em>CPR_INCENT</td>
<td>1.000</td>
<td>0.250</td>
<td>0.497</td>
</tr>
<tr>
<td>ASM_WILL<em>GEO_COMP</em>CPR_INCENT*THIRD_ACT</td>
<td>1.000</td>
<td>0.167</td>
<td>0.406</td>
</tr>
<tr>
<td>ASM_WILL<em>GEO_COMP</em>CPR_CULT<em>CPR_INCENT</em>THIRD_ACT</td>
<td>1.000</td>
<td>0.083</td>
<td>0.287</td>
</tr>
<tr>
<td>ASM_WILL<em>GEO_COMP</em>CPR_CULT*THIRD_ACT</td>
<td>1.000</td>
<td>0.083</td>
<td>0.287</td>
</tr>
<tr>
<td>GEO_COMP<em>CPR_CULT</em>GEO_COMP*THIRD_ACT</td>
<td>1.000</td>
<td>0.083</td>
<td>0.287</td>
</tr>
<tr>
<td>GEO_COMP<em>CPR_CULT</em>THIRD_ACT</td>
<td>1.000</td>
<td>0.083</td>
<td>0.287</td>
</tr>
<tr>
<td>ASM_WILL</td>
<td>0.923</td>
<td>1.000</td>
<td>0.985</td>
</tr>
<tr>
<td>CPR_CULT</td>
<td>0.917</td>
<td>0.917</td>
<td>0.943</td>
</tr>
<tr>
<td>CPR_CULT*CPR_INCENT</td>
<td>0.917</td>
<td>0.917</td>
<td>0.943</td>
</tr>
<tr>
<td>ASM_WILL*THIRD_ACT</td>
<td>0.909</td>
<td>0.833</td>
<td>0.894</td>
</tr>
<tr>
<td>CPR_INCENT*THIRD_ACT</td>
<td>0.909</td>
<td>0.833</td>
<td>0.894</td>
</tr>
<tr>
<td>CPR_INCENT</td>
<td>0.857</td>
<td>1.000</td>
<td>0.954</td>
</tr>
<tr>
<td>THIRD_ACT</td>
<td>0.833</td>
<td>0.833</td>
<td>0.851</td>
</tr>
<tr>
<td>ASM_WILL*GEO_COMP</td>
<td>0.800</td>
<td>0.333</td>
<td>0.516</td>
</tr>
<tr>
<td>GEO_COMP*CPR_INCENT</td>
<td>0.800</td>
<td>0.333</td>
<td>0.516</td>
</tr>
<tr>
<td>ASM_WILL<em>GEO_COMP</em>THIRD_ACT</td>
<td>0.667</td>
<td>0.167</td>
<td>0.242</td>
</tr>
<tr>
<td>GEO_COMP<em>CPR_INCENT</em>THIRD_ACT</td>
<td>0.667</td>
<td>0.167</td>
<td>0.242</td>
</tr>
<tr>
<td>GEO_COMP*THIRD_ACT</td>
<td>0.500</td>
<td>0.167</td>
<td>0.091</td>
</tr>
<tr>
<td>GEO_COMP</td>
<td>0.364</td>
<td>0.333</td>
<td>0.082</td>
</tr>
</tbody>
</table>
The Parsimonious solution for agreement

The inclusion of logical remainders in the csQCA allows us to make more parsimonious explanations including those combinations that do not contain cases but are still consistent. In this sense, the formula solution obtained is as follows. This solution formula has an optimal consistency (1.00) and explains all the cases with a positive outcome.24

<table>
<thead>
<tr>
<th>ASM willingness * Corporate incentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solution formula</td>
</tr>
<tr>
<td>ASM_WILL*CORP_INCENT</td>
</tr>
</tbody>
</table>

solution coverage: 1.000; solution consistency: 1.000

Simplifying Assumptions: 4

The Parsimonious solution for the no agreement

Including logical remainders, the Solution Formula indicates that the absence of ASM willingness or the absence of a Corporate Incentive explains why the agreement is not reached. In other words, the absence of one of these two conditions is sufficient for the agreement not to be reached. As a result, the number of theoretical combinations for the non-agreement (20) are much greater than for the agreement (4).

<table>
<thead>
<tr>
<th>No ASM willingness + No Corporate incentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solution formula</td>
</tr>
<tr>
<td>~ASM_WILL + ~CORP_INCENT</td>
</tr>
</tbody>
</table>

solution coverage: 1.000; solution consistency: 1.000

Simplifying Assumptions: 20

---

24 As indicated in the methodology: “For sufficiency relations, the parameter of consistency expresses “the proportion of cases with the condition X where we also find the Outcome Y, relative to all cases with X” (Ragin, 2006). The higher the consistency, the closer is to be a consistently sufficient condition. Thus, 100% percent consistency is, strictly speaking, a sufficient condition. The second parameter, coverage, only makes sense when it is applied to conditions that are "consistent enough" to be regarded as sufficient for Y. “It is the number of cases with Y where we also find X, relative to all cases with Y (Ragin 2006). The higher the coverage score for X, the more cases displaying Y are covered, and thus are explained by these sufficient conditions (Grofman, 2009). Accordingly, the Solution Formula’s coverage indicates the overall coverage of all sufficient conjunctions combined.
<table>
<thead>
<tr>
<th>Interfaces type</th>
<th>Outcome</th>
<th>Solution formulas</th>
<th>Title Holders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type *</td>
<td>Positive</td>
<td>ASM willingness* Corporate culture * Corporate incentive * Third actor</td>
<td>Consorcio Minero ATE S.A.C. and Minera Leona de Oro S.A.C.</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>NO ASM willingness* Geological competition* NO Corporate culture * Corporate incentive * Third actor</td>
<td>Inca One Gold Corp.</td>
</tr>
<tr>
<td>Type 1</td>
<td>Positive</td>
<td>ASM willingness* Corporate culture * Corporate incentive * Third actor</td>
<td>Minera Barrick Misquichilca S.A.</td>
</tr>
<tr>
<td>Type 3</td>
<td>Positive</td>
<td>ASM willingness* Corporate culture * Corporate incentive * Third actor</td>
<td>Oban S.A.C., Minera Yanaquihuia S.A.C., Compañía Minera Ares S.A.C., IED Mining, and Compañía Minera Poderosa S.A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ASM willingness * Geological competition * Corporate culture * Corporate incentive</td>
<td>Compañía Minera Poderosa S.A. and Minera Aurífera Retamas S.A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ASM willingness * Geological competition * Corporate incentive * Third actor</td>
<td>Compañía Minera Poderosa S.A.</td>
</tr>
<tr>
<td>Type 4</td>
<td>Positive</td>
<td>ASM willingness* Corporate culture * Corporate incentive * Third actor</td>
<td>Compañía Minera Zafranal S.A.C.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ASM willingness * Geological competition * Corporate culture * Corporate incentive</td>
<td>Summa Gold Corporation S.A.C.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ASM willingness * Geological competition * Corporate incentive * Third actor</td>
<td>Consorcio Minero Horizonte S.A.</td>
</tr>
<tr>
<td>Negative</td>
<td></td>
<td>NO ASM willingness* Geological competition* NO Corporate culture * NO Corporate incentive * NO Third actor</td>
<td>Minera Vicuñita S.A.C., Minera Las Bambas S.A.C., Empresa Anabi S.A.C., Southern Peru Copper Corporation and Rio Blanco Copper S.A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ASM willingness* Geological competition*NO Corporate culture * NO Corporate incentive * Third actor</td>
<td>Shahuindo S.A.C.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NO ASM willingness* NO Geological competition* Corporate culture * Corporate incentive * NO Third actor</td>
<td>Compañía Minera Caravel S.A.C.</td>
</tr>
</tbody>
</table>
## Appendix B: List of consulted experts and actors

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Organization / Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alejandro Arones Castro</td>
<td>Director</td>
<td>Regional Directorate of Energy and Mines of Apurímac</td>
</tr>
<tr>
<td>Aquiles Domingo Portal Tafur</td>
<td>Director</td>
<td>Regional Directorate of Energy and Mines of Piura</td>
</tr>
<tr>
<td>Edwin Loayza</td>
<td>Mineral and Energy Resources</td>
<td>INGEMMET</td>
</tr>
<tr>
<td>Franco Arista</td>
<td>National Coordinator</td>
<td>PlanetGOLD Proyect</td>
</tr>
<tr>
<td>Lenin Valencia</td>
<td>Director</td>
<td>General Directorate of Mining Formalization of MINEM</td>
</tr>
<tr>
<td>Leónidas Wiener</td>
<td>Legal Specialist</td>
<td>CooperAcción</td>
</tr>
<tr>
<td>Manuel Reinoso</td>
<td>President</td>
<td>National Society for Small Scale Mining (SONAMIPE)</td>
</tr>
<tr>
<td>Miguel Incháustegui</td>
<td>Former Vice-Minister of Mines</td>
<td>Ministry of Energy and Mines (MINEM)</td>
</tr>
<tr>
<td>Olinda Orozco</td>
<td>CEO</td>
<td>RED SOCIAL Institute</td>
</tr>
</tbody>
</table>
### Appendix C: Number of REINFO registrations in MSM and LSM concession

<table>
<thead>
<tr>
<th>Holders</th>
<th>Number of registrations in REINFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPAÑIA MINERA CARAVELI S.A.C.</td>
<td>3511</td>
</tr>
<tr>
<td>COMPAÑIA MINERA PODEROSA S.A.</td>
<td>1168</td>
</tr>
<tr>
<td>MINERA YANAHUAYA S.A.C.</td>
<td>473</td>
</tr>
<tr>
<td>MINERA LAS BAMBAS S.A.</td>
<td>507</td>
</tr>
<tr>
<td>COMPAÑIA MINERA ARES S.A.C.</td>
<td>449</td>
</tr>
<tr>
<td>MINERA COLIBRI S.A.C.</td>
<td>379</td>
</tr>
<tr>
<td>CONSORCIO MINERO HORIZONTE S.A.</td>
<td>413</td>
</tr>
<tr>
<td>MINERA PEÑOLES DE PERU S.A.</td>
<td>324</td>
</tr>
<tr>
<td>MINERA BARRICK MISQUICHILCA S.A.</td>
<td>292</td>
</tr>
<tr>
<td>PANORO APURIMAC S.A.</td>
<td>242</td>
</tr>
<tr>
<td>INTIGOLD MINING S.A.</td>
<td>209</td>
</tr>
<tr>
<td>COMPAÑIA MINERA SAYAPULLO S.A.</td>
<td>248</td>
</tr>
<tr>
<td>SHAHUINDO S.A.C.</td>
<td>194</td>
</tr>
<tr>
<td>SOUTHERN PERU COPPER CORPORATION, SUCURSAL DEL PERU</td>
<td>163</td>
</tr>
<tr>
<td>SIERRA ANTAPITE S.A.C.</td>
<td>167</td>
</tr>
<tr>
<td>APURIMAC FERRUM S.A.</td>
<td>161</td>
</tr>
<tr>
<td>FRENSILLO PERU S.A.C.</td>
<td>156</td>
</tr>
<tr>
<td>MINERA AURIFERA RITAMAS S.A.</td>
<td>138</td>
</tr>
<tr>
<td>DOE RUN PERU S.R.L.</td>
<td>89</td>
</tr>
<tr>
<td>TINKA RESOURCES S.A.C.</td>
<td>88</td>
</tr>
<tr>
<td>COMPAÑIA MINERA KURI KULLU S.A.</td>
<td>88</td>
</tr>
<tr>
<td>SIENNA MINERALS S.A.C.</td>
<td>87</td>
</tr>
<tr>
<td>SUMITOMO METAL MINING PERU S.A.</td>
<td>73</td>
</tr>
<tr>
<td>GLENCORE PERU HOLDING S.A.</td>
<td>61</td>
</tr>
<tr>
<td>VALE EXPLORATION PERU S.A.C.</td>
<td>135</td>
</tr>
<tr>
<td>HUBDABY PERU S.A.C.</td>
<td>64</td>
</tr>
<tr>
<td>MISKI AYACUCHO S.A.C.</td>
<td>54</td>
</tr>
<tr>
<td>COMPAÑIA MINERA ZAFRANAL S.A.C.</td>
<td>64</td>
</tr>
<tr>
<td>COMPAÑIA MINERA AURIFERA DEL SUR S.A.</td>
<td>39</td>
</tr>
<tr>
<td>COMPAÑIA MINERA LINCUNA S.A.C.</td>
<td>36</td>
</tr>
<tr>
<td>COMPAÑIA MINERA SAN SIMON S.A.</td>
<td>34</td>
</tr>
<tr>
<td>ARUNTANI S.A.C.</td>
<td>34</td>
</tr>
<tr>
<td>COMPAÑIA MINERA MILPO S.A.A.</td>
<td>34</td>
</tr>
<tr>
<td>MINERA MAPSA S.A.</td>
<td>32</td>
</tr>
<tr>
<td>MINERA ANDINA DE EXPLORACIONES S.A.A.</td>
<td>31</td>
</tr>
<tr>
<td>CEMENTOS PACASMAYO S.A.A.</td>
<td>29</td>
</tr>
<tr>
<td>MINERA BATEAS S.A.C.</td>
<td>25</td>
</tr>
<tr>
<td>PANORO GOLD S.A.</td>
<td>25</td>
</tr>
<tr>
<td>Holders</td>
<td>Number of registrations in REINFO</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA CHUNGAR S.A.C.</td>
<td>23</td>
</tr>
<tr>
<td>COMPAÑÍA AURIFERA HUAYLLILLAS S.A.C.</td>
<td>23</td>
</tr>
<tr>
<td>YURA S.A.</td>
<td>22</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA VICHAYCOCHA S.A.C.</td>
<td>21</td>
</tr>
<tr>
<td>LA ARENA S.A.</td>
<td>21</td>
</tr>
<tr>
<td>CENTRO DE INVESTIGACION Y ESTUDIOS MINERO AMBIENTAL S.A.C.</td>
<td>20</td>
</tr>
<tr>
<td>MINERA ANTARES PERU S.A.C.</td>
<td>20</td>
</tr>
<tr>
<td>MINSUR S.A.</td>
<td>19</td>
</tr>
<tr>
<td>SOCIEDAD MINERA EL BROCAL S.A.A.</td>
<td>18</td>
</tr>
<tr>
<td>SOUTH METALLURGICAL RESOURCES INC</td>
<td>17</td>
</tr>
<tr>
<td>NEXA RESOURCES PERU S.A.A.</td>
<td>17</td>
</tr>
<tr>
<td>O TUZO COPPER MINING S.A.C.</td>
<td>16</td>
</tr>
<tr>
<td>BHP BILLITON WORLD EXPLORATION INC. SUCURSAL DEL PERU</td>
<td>16</td>
</tr>
<tr>
<td>MARCOBRE S.A.C.</td>
<td>16</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA ARGOS S.A.C.</td>
<td>15</td>
</tr>
<tr>
<td>CEMENTOS SELVA S.A.</td>
<td>13</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA SANTA LUISA S.A.</td>
<td>13</td>
</tr>
<tr>
<td>COMPAÑÍA DE MINAS BUENAVENTURA S.A.A.</td>
<td>13</td>
</tr>
<tr>
<td>CENTURY MINING PERU S.A.C.</td>
<td>13</td>
</tr>
<tr>
<td>ACTIVOS MINEROS S.A.C.</td>
<td>13</td>
</tr>
<tr>
<td>VOLCAN COMPAÑÍA MINERA S.A.A.</td>
<td>12</td>
</tr>
<tr>
<td>UNION ANDINA DE CEMENTOS S.A.A.-UNACEM S.A.A.</td>
<td>11</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA ARGENTUM S.A.</td>
<td>11</td>
</tr>
<tr>
<td>EMPRESA MINERA LOS CUENUALES S.A.</td>
<td>11</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA CHACHANI S.A.C.</td>
<td>10</td>
</tr>
<tr>
<td>PAN AMERICAN SILVER PERU S.A.C.</td>
<td>8</td>
</tr>
<tr>
<td>EMPRESA MINERA PARAGSHA S.A.C.</td>
<td>8</td>
</tr>
<tr>
<td>ANDES EXPLORATION OF PERU NUMERO DOS S.A.C.</td>
<td>8</td>
</tr>
<tr>
<td>TECK PERU S.A.</td>
<td>8</td>
</tr>
<tr>
<td>CASTROVIRREYNA COMPAÑÍA MINERA S.A.</td>
<td>7</td>
</tr>
<tr>
<td>BREXIA GOLDPLATA PERU S.A.C.</td>
<td>7</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA CONDESTABLE S.A.</td>
<td>6</td>
</tr>
<tr>
<td>VOTORANTIM METAIS - CAJAMARQUILLA S.A.</td>
<td>6</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA ANTAMINA S.A.</td>
<td>5</td>
</tr>
<tr>
<td>VERDE RESOURCES S.A.C</td>
<td>5</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA ATACOCHA S.A.A.</td>
<td>5</td>
</tr>
<tr>
<td>MINERA AURIFERA CHIMU S.A.C.</td>
<td>4</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA CONDESTABLE S.A.A.</td>
<td>4</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA CASAPALCA S.A.</td>
<td>4</td>
</tr>
<tr>
<td>MINERA YANACOCHA S.R.L.</td>
<td>4</td>
</tr>
<tr>
<td>Holders</td>
<td>Number of registrations in REINFO</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>NEXA RESOURCES ATACOCHA S.A.A</td>
<td>4</td>
</tr>
<tr>
<td>ARCHEAN ANDEAN ANTHRACITE S.A.</td>
<td>3</td>
</tr>
<tr>
<td>COBRE AZTECA S.A.C.</td>
<td>3</td>
</tr>
<tr>
<td>CATALINA HUANCA SOCIEDAD MINERA S.A.C.</td>
<td>3</td>
</tr>
<tr>
<td>APURIMAC COPPER S.A.</td>
<td>3</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA LINCUNA S.A.</td>
<td>3</td>
</tr>
<tr>
<td>MINERA FREEPORT MCMORAN SOUTH AMERICA S.A.C.</td>
<td>2</td>
</tr>
<tr>
<td>CAL &amp; CEMENTO SUR S.A.</td>
<td>2</td>
</tr>
<tr>
<td>CORI PUNO S.A.C.</td>
<td>2</td>
</tr>
<tr>
<td>NEWMONT PERU S.R.L.</td>
<td>2</td>
</tr>
<tr>
<td>SHOUGANG HIERRO PERU S.A.A.</td>
<td>2</td>
</tr>
<tr>
<td>BLUE ROCK MINING S.A.C.</td>
<td>2</td>
</tr>
<tr>
<td>CONSORCIO DE INGENIEROS EJECUTORES MINEROS S.A.</td>
<td>2</td>
</tr>
<tr>
<td>VERICA INVERSIONES E.I.R.L.</td>
<td>2</td>
</tr>
<tr>
<td>SOCIEDAD MINERA CORONA S.A.</td>
<td>2</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA SAN HILARION S.A.C.</td>
<td>2</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA KOLPA S.A.</td>
<td>2</td>
</tr>
<tr>
<td>PAN AMERICAN SILVER HUARON S.A.</td>
<td>2</td>
</tr>
<tr>
<td>BANYAN BASE METALS S.A.C.</td>
<td>1</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA QUIRUVILCA S.A.</td>
<td>1</td>
</tr>
<tr>
<td>BRYNAJOM S.R.L.</td>
<td>1</td>
</tr>
<tr>
<td>ICSA CONSTRUCTORES S.R.L.</td>
<td>1</td>
</tr>
<tr>
<td>SOCIEDAD MINERA AUSTRIA DUVAZ S.A.C.</td>
<td>1</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA COIMOLACHE S.A.</td>
<td>1</td>
</tr>
<tr>
<td>CEMENTO YAULI S.A.C.</td>
<td>1</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA ARGENTO S.R.L.</td>
<td>1</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA COLQUIRRUMI S.A.</td>
<td>1</td>
</tr>
<tr>
<td>PAN PACIFIC COPPER EXPLORATION PERU S.A.C.</td>
<td>1</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA ANTAPACCAY S.A.</td>
<td>1</td>
</tr>
<tr>
<td>TAHOE RESOURCES PERU S.A.C.</td>
<td>1</td>
</tr>
<tr>
<td>CEMENTOS INTEROCEANICOS SAC</td>
<td>1</td>
</tr>
<tr>
<td>COMPAÑÍA MINERA SAN IGNACIO DE MOROCocha S.A.A.</td>
<td>1</td>
</tr>
<tr>
<td>CANDELABRA RESOURCES S.A.C.</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10867</strong></td>
</tr>
</tbody>
</table>

Source: REINFO database
Appendix D: Descriptive Sheets

Compañía Minera Poderosa

General information

Project’s Name: Poderosa

Location: La Libertad Department, Pataz Province, Pataz District.

Type of agreement: Operating contracts based on ore stockpiling for processing

Project status: In operation

Main mineral: Gold

Regime type: Medium mining

Number of miners registered in the REINFO base: 1168 (1166 are in La Libertad Department)

Project description

The Mining Company Poderosa (Poderosa) was founded on May 5, 1980, and began its activities in 1982. Since then, the mining company has engaged in the exploitation and smelting of gold. Currently, Poderosa continues with its growth-oriented strategies, through the development of new productive units, as well as the constant search for new exploration, infrastructure, plant and equipment projects. From the beginning of operations until the end of 2017, an extraction of 3,293,446 ounces of gold and the processing of 7'867,246 tons of ore has been estimated. To date, the historical ore grade is 14.05 grams of gold per metric ton (g/t). Poderosa estimates activities at least until 2029 in its two ore processing plants (Santa María and Marañón), as well as exploration work in the Pataz gold batholith, in order to increase gold production levels. The project shows a potential of 7 million ounces of gold in the batholith, which would ensure its gold production until 2050.
Description of the agreement

Poderosa agreed to sign exploitation contracts with artisanal miners through its local mining formalization initiative as part of a Corporate Social Responsibility (CSR) program. By 2013, Poderosa had signed 234 contracts with artisanal miners, largely based on the sole consideration of the delivery of the extracted ore, for which the international value of gold is paid according to the approved marketing protocol. That same year, after several technical meetings between artisanal miners and Poderosa, the Marketing Protocol for the Marañón and Santa María Plantsl was signed. This protocol was made official by the Regional Government of La Libertad on June 20, along with the delivery of 28 Authorizations to Initiate Activities to the country’s first artisanal miners completing the formalization process. On July 1st of the same year, the Pataz Protocol began enforcement for all miners who had signed the “Exploitation Contract” with Poderosa. At the time of its creation, the Protocol was largely acknowledged by the national authorities as an innovative and useful resource for similar cases, as it helps to strengthen the process of Formalization of Artisanal Miners. The exploitation contract requires the artisanal miner to be a recognized resident of the local area and that he/she carries out activities in the concessions of Poderosa, delivers the extracted ore to Poderosa (explicitly prohibiting individual processing), and assumes responsibility for the Occupational Safety and Health of its workers and Environmental Obligations of the designated area.

Truth table

A. ASM producer willingness and ability to associate themselves into a formal mining business

Artisanal miners in the area have expressed a certain willingness to initiate and complete the formalization process. In fact, the formation of the Association of Artisanal Miners of Pataz (AMA-Pataz) is an example of a highly organized group of miners, who have established relationships with Poderosa and the State for purposes of training in the formalization process. In fact, the AMA Pataz shows a close relationship with the district municipality, whose current mayor was the leader of AMA Pataz. On multiple occasions, the mayor and AMA Pataz have shown their
intention to strengthen the formalization process in coordination with Poderosa and the State, in addition to conducting training workshops aimed at all artisanal miners. It is important to highlight that in the concessions of Poderosa there are also artisanal miners who are closer to illegality and that nowadays pose a great challenge for the mining company.

B. Geological component (Competition for the mineral)
Artisanal miners are within the concessions and exploit the same metal (gold) as Poderosa. Although there are certain limits defined by the exploitation contracts, in some cases, in the context of a complete lack of authorities’ oversight, artisanal miners who have not yet completed the process cross the limits by competing directly with Poderosa in exploiting different veins.

C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM
Poderosa develops the Artisanal Mining Formalization Program in the district of Pataz since 2002, in order to promote the formalization of artisanal miners, under the incentive that, once enrolled in the process they can work with Poderosa through the ore stockpiling model, that is, delivering the ore they extract from the company’s concessions, for processing. The program has completed the formalization process with 32 miners. This effort has been recognized by the National Mining, Petroleum and Energy Society (SNMPE), the most important formal mining guild in the country, and by Peru 2021 -another visible sustainability network- on different occasions. However, it is important to note that the relationship between Poderosa and artisanal miners tends to become tense and conflicting, mainly due to the breach of agreements on exploitation limits by artisanal workers, as well as discomfort with regards to the purchasing price paid by Poderosa.

D. Commercial incentive for the formal company
Despite the complications raised in the formalization process of artisanal miners, Poderosa has several incentives to continue with the process. On the one hand, the recognition at national and international level as a pioneer company supporting formalization as part of its CSR policy gives Poderosa an important position in the market, including various awards from the SNMPE and the National Society of Industries (SNI). On the other hand, through exploitation contracts and the stockpiling mechanism, artisanal miners contribute substantially to the production of Poderosa. For example, in 2018 alone, artisanal miners provided 116,590 ™ of treated ore for the processing plant - which produced 80,249 ounces? of fine gold. In 2016, the production breakdown according to different veins was: Samy (17%), Guadalupe (16%), Gloria (5%), Lola (5%), Jimena and Julie
(both with 3%), other veins (9%), while the contribution of Artisanal Mining significantly contributed with 42% of the total production\textsuperscript{25}.

\textbf{E. Presence of a third actor (Broker)}

The State’s intervention to arrive at exploitation contracts between Poderosa and the artisanal miners was mainly carried out as a supervisor of the process, collaborating at specific times, especially in cases of potential violence. For example, in 2017 more than 400 artisanal miners held a technical meeting led by the General Director of Mining Formalization of MINEM, with the purpose of monitoring the administrative processes and to offer training. Poderosa and artisanal miners have recognized the participation of the State as a neutral observer of the negotiation process. An important milestone in the State-company-artisanal miners relationship dates back to 2013, when there was a conflict between AMA-Pataz and Poderosa to demand improvements in contracts. This led to a negotiating platform sponsored by and with the intervention of Congress, the Presidency of the Council of Ministers and the Office of the Ombudsman, which brought about changes to the contracts.

Minera Barrick Misquichilca S.A.

General information

Project's Name: Lagunas Norte and Alto Chicama

Location: La Libertad Department, Santiago de Chuco Province, Quiruvilca District

Type of agreement: Operating contracts

Project status: In operation

Main mineral: Gold and coal

Regime type: Large-Scale Mining (LSM)

Number of miners registered in the REINFO base: 292 (198 are in La Libertad Department)

Project description

Minera Barrick Misquichilca S.A. (Barrick) began its open pit operations in 2005 with an investment of USD$ 340 million to construct the mining project. The project’s concessions cover a large territory that includes important overlapping of both gold and coal deposits, although much of the coal is outside of the mine’s pit. The production of Lagunas Norte reached a production of more than 1 million ounces of gold annually at its peak. However, after 13 years of exploitation, it has declined, although at a rate foreseen by the company's geologists. Only between June 2018 and 2019 the production fell more than 30%. At the end of 2018, after analyzing the feasibility studies, Barrick suspended the expansion of Lagunas Norte due to the low profitability of the project, losing relevance in its project portfolio, since it only produced 2% of the total global production. According to company sources, at the end of 2017, Lagunas Norte had a reserve of 4 million ounces and will continue to produce leaching material until 2023.

http://stakeholders.com.pe/noticias-sh/barrick-apoya-formalizacion-de-mineros-artesanales-de-la-libertad/
Description of the agreement

In 2014, Barrick and the Alto Chicama Artisanal Miners Association (AMACHIC) signed a five-year, renewable, operating contract for the exploration and exploitation of coal in certain areas of the mining concession Acumulación Alto, a large area that includes the “footprint” of the Lagunas Norte mine. The formalization of AMACHIC was approved in 2015 under Barrick’s sponsorship and in its first year it managed to formalize more than 400 artisanal miners in about 76 areas of coal mines. The Association of Carboneros de La Libertad, another mining association in the area, is now beginning the formalization process, also with Barrick's support.

Truth table

A. ASM producer willingness and ability to associate themselves into a formal mining business
AMACHIC has shown willingness to begin the formalization process as a communal entity of Alto Chicama. Its leaders support the formalization process and demand legal advice and schedules to meet the deadlines. Likewise, Barrick’s approach has been fundamental in achieving formalization objectives.

B. Geological component (Competition for the mineral)
As part of the agreement, AMACHIC and Barrick do not compete for the ore since the former extracts coal while the latter extracts gold from an open pit. In the agreement, they define spatially the areas of exploitation of each and so far, no serious incidents of conflict have been reported.

C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM
Barrick has explicitly stated since 2013 his intention to support the process to formalize artisanal and small-scale mining given that he considers MAPE as a fundamental stakeholder in his community relationship. In the negotiation process Barrick has expressed his support to the miners for their incorporation into the market and compliance with health, safety and environmental standards. Barrick has also implemented months of work to ensure that miners fully understood the design and structure of their wells and tunnels, and to help them organize into more efficient operating groups. The company also provided support with the technical documentation and mapping required for the application process.
D. Commercial incentive for the formal company

Barrick has a double commercial incentive for the agreement. On the one hand, in the reputational aspect, Barrick is trying to consolidate a business-case for integration with artisanal mining, recognizing in them an important stakeholder to reach some of the SDGs as in the health and well-being of the community (SDG3); improve working conditions and efficiency (SDG8); and remedy the local environmental legacy of artisanal mining (SDG 15). Thus, Barrick is positioned as a case-model of integration in the ICMM.27 On the other hand, given the possibilities of expanding other projects, Barrick hopes to present itself as a “good neighbor” in the Area of Direct Influence (ADI), and to boost the formalization process.

E. Presence of a third actor (Broker)

In the negotiation process between Barrick and AMACHIC, both actors recognize the presence of the State as a relevant actor, since it has been conducting the mediation space. In particular, the participation of the Vice-Minister of Mines and the Regional Government have been key to establishing a channel for dialogue and mediation between the parties.28

28 http://stakeholders.com.pe/noticias-sh/barrick-apoya-formalizacion-de-mineros-artesanales-de-la-libertad/
Map of the presence of artisanal miners in the project concessions

Source: INGEMMET (2020)
Consorcio Minero Horizonte

General information

**Project's name:** Unidad de producción Parcoy

Location: La Libertad Department, Pataz Province, Parcoy District.

Type of agreement: Operating contracts for the collection of ore

Project status: In operation

Main mineral: Gold

Regime type: Medium mining

Number of miners registered in the REINFO base: 413 (375 are in La Libertad Department).

Number of miners in the formalization process: 413

Project description

The company begins in 1978 when partners Rafael Navarro Grau and Jaime Uranga acquired the rights of the Parcoy Mining Union (SINPAR) with the aim of processing the abandoned gold tailings since 1963. However, the results of the operation were not as expected, which is why which changed strategy and in 1980 reopened the Fernandini mine, finding large veins in the following years as the Rose Orchid in 1986, which had 0.5kg of gold per ton processed. Currently, CMH has its two main units in the province of Pataz, the Administrative Economic Unit of Parcoy and the Administrative Unit Los Zambos. At the beginning of its operations in 1990, production reached 150 tons per day, in 2003 it reached 800 tons per day, in 2004, 1,000 tons per day and finally in 2017, it achieved a production of 2,000 tons per day.\(^\text{29}\)

---

Over the province of Pataz, it is located at an average height of 2780 m.a.s.l., the capital city of Tambayapa being the highest at 3202 m.a.s.l. Likewise, mining is the main economic activity, especially gold, which is exploited both at the level of large and medium-sized mining and at the artisanal level. On major mining, the main companies are Minera Aurífera Retamas S.A., Consorcio Minero Horizonte S.A. and Compañía Aurífera Real Aventura S.A.C. It is worth mentioning that in general the La Libertad region has one of its main economic activities in gold mining, being the first national producer in the first quarter of 2018.30

**Description of the agreement**

Currently, the mining company has signed operating agreements with various groups of informal miners, through the promotion of the creation of communal companies, among which are the CCA Community Company, Nuevo Amanecer de Curaumbamba Community Company and the Artisanal Miners Company United of Huariracra Esperanza Parcoy, which are operating in a formal way.31 The specific details of each agreement are described below.

- **Empresa comunalCCA:** The community company and the mining company have signed a mining agreement whereby the latter grants an area of its concession to the miners so that they can carry out artisanal mining activities. However, until 2017 no deliveries of ore had been made by the communal company because the project was still under exploration.

- **Empresa communal Nuevo Amanecer de Curabamba:** The communal company and the mining company have signed an agreement whereby the latter grants an area called “Cachica” to the miners so that they develop artisanal mining activities in exchange for selling the ore to the business. In that sense, by 2015, the community company had a turnover of S / 22 million soles, and by 2017, 150 community members were already working, who are also partners of the community company.

- **Empresa de mineros artesanales unidos de Huariracra Esperanza Parcoy:** The communal company and the mining company have signed an agreement whereby the latter grants the communal company for the areas of Huariracra, Esperanza and Parcoy for the development of artisanal mining activities. In addition, this agreement establishes that artisanal miners have to pay a fee for the exploitation contract and must exclusively sell the mineral obtained to the Consorcio Minero Horizonte company.

---


Truth Table

A. ASM producer willingness and ability to associate themselves into a formal mining business

Historically there had been no significant presence of artisanal miners in the Paracoy district area, especially in the mining company’s concessions. However, following the increase in the price of gold and the existence of this mineral in the area is that many artisanal miners from other areas, and also local, begin to enter the areas of operation of the company. In that sense, these miners (local and foreign) were people who were constantly engaged in this activity, that is, although they had decided to enter the area due to a temporary issue such as the rise in the price of gold in the international market, these did have a long history in the artisanal mining sector.

Likewise, this group showed a willingness to dialogue with both the company and the regional government authorities, which was evident in the achievement of results since the beginning of 2013.

B. Geological component (Competition for the mineral)

The artisanal miners had not had an important presence within the concession of the mining company until 2013, peak year of the gold price in the international market, which evidently attracted both local and foreign miners, who invaded the “La Bonita” mine. This put the entire mining operation at risk, since this mine was one of the main sources of water. In that sense, there was a competition for the mineral in which artisanal miners invaded the area of operation of the mining company.

C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM

The company has not had a corporate opening towards artisanal mining of an organic and preventive nature, that is, it did not develop a relationship policy focused on preventing conflict situations. On the contrary, its formalization support policy arises in response to the invasion suffered in one of its main mines in 2013. Therefore, although its policy has achieved some important results in terms of the creation of communal companies, it is convenient clarify that its origin was a reaction to a particular event and not on the company’s own initiative.

33 https://www.regionallibertad.gob.pe/noticias/regionales/4352-formalizacion-de-mineria-artesanal-comienzo-a-dar-primeros-frutos
D. Commercial incentive for the formal company

The mining company has as main corporate incentive to develop its activities in a normal way and avoid economic losses similar to those of 2013. In that sense, the incentive is fundamentally economic, which does not prevent that, from the results obtained with its policy formalization, the incentive can evolve and acquire a strategy, in addition, reputational, where the company is positioned as a reference in Community Relations.

E. Presence of a third actor (Broker)

Within the negotiation process between the mining company and artisanal miners, the State participated as a mediator through the DREM La Libertad.35 This entity was responsible for providing negotiation spaces recognized by both parties as impartial and resolving their doubts regarding the formalization process.36

---


Map of the presence of artisanal miners in the project concessions

Source: INGEMMET (2020)
Summa Gold Corporation S.A.C.

General information

Project’s name: Operación Isabelita

Location: La Libertad Department, Sánchez Carrión Province, Huamachuco District.

Type of agreement: Contracts for “labor conversion” to illegal artisanal miners.\(^{37}\)

Project status: In operation.

Main mineral: Gold.

Regime type: Medium mining.\(^{38}\)

Project description

Summa Gold is developing the project called “Operation Isabelita”, which is a high sulfur gold deposit located in the “El Toro” mine. In this area there is the presence of a large number of illegal miners, who perform work without any supervision by any of the State institutions. Likewise, this project will involve an investment of 145 million dollars between the beginning of its operations in 2019 and the end in 2026, estimated date on which it is considered that all the ore has already been exploited.\(^{39}\)

On the hill “El Toro” it is important to mention that this is located in the province of Sánchez Carrión, which has as one of its main economic pillars to mining due to the economic benefits that it entails thanks to the mining fee and the Alto Chicama Social Fund.\(^{40}\) On the other hand, it is worth mentioning that the La Libertad region has historically been one of the main mining

\(^{37}\) [https://www.horizonteminero.com/summa-gold-la-nueva-mina-de-oro-del-peru/](https://www.horizonteminero.com/summa-gold-la-nueva-mina-de-oro-del-peru/)

\(^{38}\) The type of regime is estimated from the estimated annual production, which is between 100 and 150 thousand ounces of gold.


areas of the country, being for 2018 the main gold product nationwide with a production of 8.8 tons for the first quarter of that year.\footnote{RPP Noticias. (May 04, 2018). La Libertad lidera producción de oro. Recovered from https://rpp.pe/peru/la-libertad/la-libertad-lidera-produccion-de-or-noticia-1120639}

**Description of the agreement**

The hill “El Toro” was invaded by illegal miners, against which the company carried out a relationship with this group, reaching agreements with some groups of miners to incorporate them into the company and receive the corresponding benefits in accordance with the labor law. It also worked on the remediation of environmental liabilities that had been generated by the activity of informal miners.\footnote{Minera Andina Comunicaciones (September 26, 2019). Summa Gold pone en marcha nueva mina de oro en el Perú. Recovered from http://minerandina.com/es/suma-gold-pone-en-marcha-nueva-mina-de-oro-en-el-peru/}

**Truth table**

**A. ASM producer willingness and ability to associate themselves into a formal mining business**

Historically, the area where the company operates has had the presence of a large number of artisanal, small-scale and informal miners, due to the well-known presence of gold. In this sense, when the company began the relationship work, a considerable group was interested in learning about the formalization process, resulting in the achievement of agreements with which they were incorporated as company workers.\footnote{Minera Andina Comunicaciones (September 26, 2019). Summa Gold pone en marcha nueva mina de oro en el Perú. Recovered from http://minerandina.com/es/suma-gold-pone-en-marcha-nueva-mina-de-oro-en-el-peru/}

**B. Geological component (Competition for the mineral)**

The miners and the company have competed and continue to compete for the ore, as the first group continues to operate in the company's concession area. This despite the fact that with a significant number of miners, agreements have been reached that clearly establish the areas of operation of each one. In this sense, the central government is considering carrying out inspection operations in the area to try to solve this situation\footnote{Diario La República. (February 23, 2020). Mineros ilegales abandonan socavones ante alerta de operativos en cerro El Toro. Recovered from https://larepublica.pe/sociedad/2020/02/23/mineros-illegales-abandonan-socavones-ante-alerta-de-operativos-en-cerro-el-toro-lmd/} mainly due to the environmental damages generated among which the destruction of skirts and the central part of the hill stand out.\footnote{Basombrio, C; Valdés, R y Vera, D., (2019). \textit{Mineria no Formal en el Perú}. Lima, Perú: Luzazul gráfica S.A.C.}
C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM
The mining company has shown to have a preventive corporate opening in relation to artisanal mining, since it decided to coordinate with them, or at least with a group of important ones, to find a way to formalize their work.46 Once this issue was resolved, the company has just started operating activities. Nevertheless; It is interesting to note that while public statements in Perumin seem to denote a proclive attitude to support formalization through labor conversion programs, their corporate web speech makes no mention of this program, despite the presence of illegal miners in some of its concessions.47

D. Commercial incentive for the formal company
The mining company has as its main commercial incentive to prevent any conflict situation that affects its operations, generates economic losses and damages the reputation against future investors. Therefore, he sought to interact with the miners in the area and reach an agreement with them.

E. Presence of a third actor (Broker)
Within the investigation the presence of a third state or private actor that could fulfill the role of mediator between the parties has not been identified. On the contrary, the State is considering carrying out some type of intervention in the area, but of a supervisory and punitive nature.48

47https://summagold.com/
Minera Auífera RETAMAS S.A.

General information

Project’s name: El Gigante

Location of the concession: La Libertad Department, Pataz Province, Parcoy District.

Type of contract: Operating contracts for the collection of ore.

Project status: In operation

Main mineral: Gold

Regime type: Medium mining

Number of miners registered in the REINFO base: 138 (136 are in La Libertad Department)

Project description

The company has been operating in the mining deposit called “Cerro El Gigante” for approximately 30 years. It is located in the “Batolito de Pataz” at a height of 3,900 meters above sea level. Likewise, at the beginning of its operations in 1981 the treatment plant produced 50 TMS / day, while currently production reaches 1800 TMS / day.\(^{49}\)

Over the province of Pataz, it is located at an average height of 2780 m.a.s.l., the capital city of Tambayapa being the highest at 3202 m.a.s.l. Likewise, mining is the main economic activity, especially gold, which is exploited both at the level of large and medium-sized mining and at the artisanal level. On major mining, the main companies are Minera Aurífera Retamas S.A., Consorcio Minero Horizonte S.A. and Compañía Aurífera Real Aventura S.A.C. It is worth mentioning that in general the La Libertad region has one of its main economic activities in gold mining, being the first national producer in the first quarter of 2018.\(^{50}\)


\(^{50}\) RPP Noticias. (May 4, 2018). La Libertad lidera producción de oro. Recovered from [https://rpp.pe/peru/la-libertad/la-libertad-lidera-produccion-de-oro-noticia-1120639](https://rpp.pe/peru/la-libertad/la-libertad-lidera-produccion-de-oro-noticia-1120639)
Description of the agreement

In 2011, the mining company signed an agreement with the artisanal miners of the Campesino Community of Llacaubamba, located in the Province of Pataz. The agreement established that the residents of the community had to deliver in favor of the company the right of mining surface over 153 hectares for the construction of waste rock dumps and tailings fields, in exchange the residents of the community could carry out artisanal mining activities in certain areas within MARSA's concessions, as long as legal and environmental requirements are met.  

Truth table

A. ASM producer willingness and ability to associate themselves into a formal mining business
Artisanal miners have been working in the area for many years and are organized around the Campesino Community of Llacaubamba, which was interested, from the beginning, in the process of mining formalization and its economic benefits. This was because they had an interest in being able to continue operating in the company's concession area and the company needed to have the surface right that was owned by the community.

B. Geological component (Competition for the mineral)
The mining company and artisanal miners have competed for the mineral from the beginning, all of which the area in general has always been exploited by both formal companies and artisanal miners. In this sense, the miners work informally within the mining company's concessions.

C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM
The company showed a corporate openness towards preventive artisanal mining, that is, it sought to coordinate with the artisanal miners present in its concessions with the aim of reaching a beneficial agreement for both parties, this considering that both the miners and the company had something to offer the other party.

51 https://issuu.com/sociedadmineroenergetica/docs/snmpe-marsa-y-la-comunidad-campesin
D. Commercial incentive for the formal company
The main commercial incentive of the company to reach an agreement with artisanal miners has been to have the right to a mining area of 153 hectares that were located in the area of the Campesino Community of Llacuamaba. However, this does not deny that there are other secondary incentives, but no less important, such as preventing future conflict situations that in turn will generate economic losses.

E. Presence of a third actor (Broker)
The presence of any State institution, or organizations such as NGOs, specialized consultants or independent consultants, who may have fulfilled a mediation role between the parties, has not been identified.

53 https://issuu.com/sociedadmineroenergetica/docs/snmpe-marsa-y-la-comunidad-campesin
Consorcio Minero ATE

General information

Project’s name: Consorcio Minero ATE

Location: Piura Department, Ayabaca Province, Sapillica District.

Type of agreement: Operating contracts for the collection of ore

Project status: In operation

Main mineral: Gold

Regime type: Medium mining

Project description

The ATE Mining Consortium is a Peruvian mining company with Canadian capital, which has a 99.9% stake while that of the Peruvian investor is 0.01%. It also has several concessions, one of the most important being located in the district of Sapillica, province of Ayabaca, Piura Region.

On the province of Ayabaca, this has as its main economic activities agriculture and livestock. In the case of the first, the most important products are corn, coffee, peanuts and tare, which are traded in the regional, national and international markets. On the other hand, on the second activity, this focuses mainly on the production of sheep and cattle.

Description of the agreement

Currently, the mining company has signed operating agreements with artisanal miners located within its concessions\(^{56}\), these agreements basically establish that miners can extract the existing ore in the area in exchange for selling it exclusively to the mining company.\(^{57}\)

True Table

A. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM

Most of the artisanal miners present in the area have been working as such for approximately 15 years, regardless of conjunctural factors such as the increase in the price of metals in the international market or the presence of relatively simple veins to exploit. Likewise, they have shown interest in learning about the formalization process and its benefits since from the beginning they have been open to dialogue with the company that owns the concession. For its part, the company has offered individual contracts to artisanal miners so that they can operate in the areas where their concessions are, in exchange for exclusively selling the mined ore.\(^{58}\)

However, it is important to mention that there is also a group of miners who do not want to sign any agreement with the company since it considers that the State will continue to extend the formalization process, which is why they just have to be registered within the base of the Integral Registry of Mining Formalization to continue its activities in a normal way without the company or any authority can avoid it.

B. Geological component (Competition for the mineral)

There has been no competition for the mineral between the company and artisanal miners, since the former has “idle concessions”, that is, it has the concession from the government, but does not carry out exploitation activities.\(^{59}\) On the contrary, it has chosen to reach agreements with artisanal miners present in its concessions so that they extract the ore and sell it exclusively, which is then processed elsewhere.

\(^{56}\) [https://www.regionpiura.gob.pe/noticias/18883](https://www.regionpiura.gob.pe/noticias/18883)

\(^{57}\) A. Vásquez, personal communication (February 22, 2020).

\(^{58}\) A. Vásquez, personal communication (February 22, 2020).

\(^{59}\) A. Vásquez, personal communication (February 22, 2020).
C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM
The company has shown to have a preventive corporate opening regarding artisanal mining, and in general with the entire community. In that sense, it has developed a policy of listening to the needs of its stakeholders with the aim of evaluating the issues on which it can support, always in coordination with the corresponding authorities.\textsuperscript{60} In this way, it has built an effective communication relationship with the population, which has given it legitimacy against it.

D. Commercial incentive for the formal company
The main commercial incentive that the mining company has been of an economic nature, that is to say, the company, having idle concessions, has chosen to allow artisanal miners to work in them and in return receive an economic revenue.\textsuperscript{61} Likewise, this strategy allows them to avoid a potential situation of conflict in the future that puts the normal development of their operations at risk and generates economic losses.

E. Presence of a third actor (Broker)
The State, through the Regional Directorate of Energy and Mines of Piura (DREM Piura), has intervened in the process of negotiating an operating agreement between the company and artisanal miners.\textsuperscript{62} In that sense, he has fulfilled the role of mediator, in which he provided negotiation spaces recognized as legitimate by both parties, and where they could reach the corresponding agreements.\textsuperscript{63}

\textsuperscript{60} A. Vásquez, personal communication (February 22, 2020).
\textsuperscript{61} A. Vásquez, personal communication (February 22, 2020).
\textsuperscript{62} A. Vásquez, personal communication (February 22, 2020).
\textsuperscript{63} https://www.regionpiura.gob.pe/noticias/18883
Minera Leona de Oro S.A.C.

General information

Project’s name: Leona de Oro

Location: Piura Department, Ayabaca Province, Suyo District.

Type of agreement: Operating contracts for the collection of ore

Project status: In operation

Main mineral: Gold

Regime type: Medium mining.

Project description

The company Minera Leona de Oro has its concessions in the district of Suyo, Ayabaca Province. Likewise, its operations are expected to last approximately 8 years, counting from 2018. On the province of Ayabaca, this has as its main economic activities agriculture and livestock. In the case of the first, the most important products are corn, coffee and peanuts, which are traded in the regional, national and international markets. On the other hand, on the second activity, this focuses mainly on the production of sheep and cattle.

---

Description of the agreement

Currently, the mining company has signed operating agreements with artisanal miners located within its concessions, these agreements basically establish that miners can extract the existing ore in the area in exchange for selling it, not necessarily exclusively, to the mining company.66

Truth table

A. ASM producer willingness and ability to associate themselves into a formal mining business

Most artisanal miners have worked in the area for approximately 15 years without interruption and without considering short-term aspects such as the price of miners in the international market. Likewise, this group of miners has shown an interest in knowing the formalization process and the benefits and obligations that it entails, especially with regard to the procedures and control actions carried out by public institutions such as the Ministry of Energy and Mines (MINEM), Prosecutor and / or National Police.67

B. Geological component (Competition for the mineral)

There has been no competition for the mineral, in this case gold, between the company and the artisanal miners, since the former only has the concessions, but does not carry out exploitation activities.68 On the contrary, the company has chosen to reach agreements with artisanal miners present in its concessions so that they extract the ore and sell it, not necessarily exclusively.

C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM

The company has shown an opening of support for the mining formalization process of a preventive nature, that is, it has decided to support the formalization of artisanal miners in order to have a good relationship with them and avoid conflict situations that affect the normal development of Your activities.69

66 A. Vásquez, personal communication (February 22, 2020).
67 A. Vásquez, personal communication (February 22, 2020).
68 A. Vásquez, personal communication (February 22, 2020).
69 A. Vásquez, personal communication (February 22, 2020).
D. Commercial incentive for the formal company
The main commercial incentive that the mining company has had to support artisanal miners in the formalization process has been to be able to continue with its operations in a normal way and avoid any conflict situation that in turn could generate economic losses.\textsuperscript{70}

E. Presence of a third actor (Broker)
The State, through the Regional Directorate of Energy and Mines of Piura (DREM Piura), has intervened in the process of negotiating an operating agreement between the company and artisanal miners.\textsuperscript{71} In that sense, he has fulfilled the role of mediator, in which he provided negotiation spaces recognized as legitimate by both parties.

\textsuperscript{70} A. Vásquez, personal communication (February 22, 2020).
\textsuperscript{71} A. Vásquez, personal communication (February 22, 2020).
**General information**

Project’s name: Río Blanco

Location: Piura Department, Huancabamba Province, El Carmen de la Frontera District.

Type of agreement: There is no agreement.

Project status: In operation.

Main mineral: Gold.

Regime type: Medium mining

**Project description**

The company has its operations in the Henry’s Hill hill located in the El Carmen de la Frontera district, Huancabamba Province, Piura Region. Likewise, it is located between 2,200 and 2,800 meters above sea level, and it is estimated that it has an annual production of 200,000 tons of fine copper and 3,000 tons of molybdenum in concentrates.

On the province of Huancabamba, this has agriculture and mining as its main economic activities. In the case of agriculture, the main products are wheat, starchy corn, papa and coffee; while in the case of tourism there are several attractions such as the Black Lagoon, the Chulucanitas Ruins, the Huancabamba River and the Pasapampa Andenería.

---

72 [https://rioblanco.com.pe/ubicacion/](https://rioblanco.com.pe/ubicacion/)
Description of the agreement

At present, the mining company has not signed operating agreements with the groups of informal miners in its concessions. On the contrary, the population of the El Carmen de la Frontera district has opposed the completion of the mining project in its entirety, which was evidenced in the popular consultation carried out in 2007.

Truth table

A. ASM producer willingness and ability to associate themselves into a formal mining business

The artisanal miners present in the project's operation area, together with the rest of the population in the provinces of Huancabamba and Ayabaca, have directly opposed the mining activity of the company. In this sense, they have not attempted to contact the mining company or regional government authorities to discuss the mining formalization process, despite the fact that they themselves carry out small artisanal mining activities.

B. Geological component (Competition for the mineral)

The mining company and artisanal miners compete for the mineral, since the latter operate without authorization and certainly in a small way, in the concession area of the formal mineral company.

---

C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM
The mining company has not shown an organic and preventive corporate openness in relation to artisanal miners and in general with the population of the provinces where it has its operations, this being one of the reasons why there is such strong opposition to the project.80

D. Commercial incentive for the formal company
The mining company has no commercial incentive to support the mining formalization process, considering that the number of artisanal crafts in the area is small and, in addition, the project in general is rejected by the population of the provinces, where it is located.

E. Presence of a third actor (Broker)
The presence of any State institution, or organizations such as NGOs, specialized consultants or independent consultants, who may have fulfilled a mediation role between the parties, has not been identified.

Shahuindo S.A.C.

General information

Project’s name: Shahuindo

Location: Cajamarca Department, Cajabamba Province, Cachachi District.

Type of agreement: There is no agreement.

Project status: In operation

Main mineral: Gold

Regime type: Medium mining

Number of miners registered in the REINFO base: 194 (169 are in Cajamarca Department)

Number of miners in the formalization process: 194

Project description

The area of the Centro Poblado de Algamarca, where Shahuindo S.A.C. operates, has been exploited since approximately 1940 when Compañía Minera Algamarca S.A. it exploited tunnels, its main production being silver and copper. However, in 1987 the company expanded and began to exploit the holes located in San José and Shahuindo, although three years later in 1990 it closed its operations without providing further explanations. Likewise, in 2000 the company Shahuindo S.A.C. acquired 26 mining concessions among which were “Accumulation Algamarca”, which covers 796 hectares. Finally, in 2016 the company

---

Sulliden, owner of the project, decides to sell it to the Pan American Silver company, which continues operations to this day.

Above the Cajambamba province, it is located at an average height of 2,654 m.a.s.l. and it is characterized by having a varied climate, being cold in the heights and warm in the area of the valleys. As for its main economic activities, these are agriculture and mining. In the case of agriculture, it has approximately 34,500 hectares, which allow them to have a varied production, among which wheat, cereals of various types, wood, sugar cane and potatoes stand out. For its part, in the case of mining, it has been developed in a complementary way to agriculture, having the Cachachi district as its main area of exploitation, which has considerable reserves of gold and silver.\footnote{https://www.peru.gob.pe/docs/PLANES/11882/PLAN_11882_Plan_Provincial_de_Desarrollo_Concertado_2017_2011.pdf}

**Description of the agreement**

Currently, the mining company has not signed exploitation agreements with the artisanal miners groups present in its concessions, nor has it shown any intention of reaching any agreement with this group in the future.

**Truth table**

**A. ASM producer willingness and ability to associate themselves into a formal mining business**

Artisanal miners have been working as such for more than 10 years and have a consolidated organization, which was evidenced by the foundation in 2006 of the “Association of Artisanal Miners of San Blas” (AMASBA), which brought together miners who work in the Cerro Anticlinal Algarmarca area. Likewise, in 2012 the change of members of the Board of Directors of the association was made, which included within its objectives the strengthening of communications and coordination with both the company Shahuingo S.A.C. as with authorities of the Ministry of Energy and Mines (MINEM) and the Regional Government of Cajamarca in order to comply with the formalization process.\footnote{O, Orozco, personal communication (February 26, 2020).}
B. Geological component (Competition for the mineral)
Currently, AMASBA artisanal miners continue their artisanal gold mining activities, although they are waiting to reach an agreement with the mining company to avoid having problems with State institutions such as the Prosecutor's Office and the National Police. However, the achievement of this agreement would not imply in any way that they would abandon their exploitation activities, but would work alongside the company, evidently each one of the parties in its corresponding scale.\(^4\) Therefore, if there is a competition for the mineral while both parties exploit the same mineral, in this case gold.

C. LSM Corporate “attitude”/“mentality”/“approach” towards ASM
The Pan American Silver company, owner of Shahuindo since it acquired the concession in 2016, showed no interest in including artisanal miners present in the area within the production chain, contrary to previous management that had carried out communication work at dialogue tables.\(^5\) In this sense, the current company considers that it can carry out the exploitation of the mineral on its own without the need to resort to artisanal miners, which indicates that it does not have an opening towards ASM.

D. Commercial incentive for the formal company
The Pan American Silver company has no greater commercial incentive to interact with artisanal miners in the area, especially those who belong to AMASBA, since it considers that carrying out the exploitation on its own would generate higher economic returns than those obtained by working with artisanal miners.\(^6\)

E. Presence of a third actor (Broker)
The owner company prior to Pan American Silver contracted consulting services to promote dialogue between artisanal miners present in the area and the company through the development of workshops that had as main result the development of identification and diagnosis studies of groups of interest, among which were artisanal miners.

However, since the change of ownership in 2016, relations between artisanal miners and the new company that owns the concession have been paralyzed and there is currently no


\(^5\) O. Orozco, personal communication (February 26, 2020).

communication between the parties. Although, it is known that the Regional Government of Cajamarca is carrying out work to retake these work tables, through the Regional Directorate of Energy and Mines.\(^8\) Therefore, there is the presence of a third actor (Broker), which in this case is the Peruvian State, although it still does not obtain the expected results.

\(^8\) [https://www.regioncajamarca.gob.pe/portal/noticias/det/108](https://www.regioncajamarca.gob.pe/portal/noticias/det/108)
Oban S.A.C.

**General information**

**Project's name:** Antamayo

**Location:** Ancash Department, Antonio Raimondi Province.

**Type of agreement:** Operating contracts for the collection of ore.

**Project status:** In operation

**Main mineral:** Gold

**Regime type:** Medium mining

**Project description**

The mining company has an "Antamayo" project which is located in the Antonio Raimondi province, Ancash department. In the province of Antonio Raimondi, it is characterized by having agriculture as its main economic activity, the most important products being "corn choclo", which is destined for the city of Lima. For their part, districts of the province such as Mirgas and Chacccho have self-consumption production.\(^{88}\)

**Description of the agreement**

The company and artisanal miners signed an exploitation agreement through which they will be able to carry out artisanal mining activities within the concession of the mining company.

\(^{88}\) Stakeholder mapping and situational diagnosis Antamayo Project (2013)
Truth table

A. ASM producer willingness and ability to associate themselves into a formal mining business

The artisanal miners showed that they were willing to continue the formalization process, since they were already organizing through a communal company. In this sense, those who belonged to the Flor de Cantú Peasant Community were more interested in dialoguing with the company, which they even expressed in the study of identification and diagnosis of their stakeholders that the company carried out. This interest was due to the fact that the mineral they exploited, copper, was deeper than 50 meters, which is why they had to use explosives and they did not expect the life of the vein to be greater than 7 years.\textsuperscript{89} Therefore, they preferred to reach an agreement with the company that owns the concession to obtain more resources and to analyze the possibility of continuing their activities in other veins.

B. Geological component (Competition for the mineral)

There was no competition for the mineral between the artisanal miners and the mining company, since they are not yet starting operations in the area, and, on the contrary, first intended to build a harmonious relationship with their stakeholders.\textsuperscript{90}

C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM

The mining company showed a general and preventive corporate openness, thanks to which it develops an identification and diagnosis strategy for its stakeholders, including artisanal miners. Once their presence was known, the company chose to build a relationship with them and analyze the possibility of supporting them in the formalization process.\textsuperscript{91}

D. Commercial incentive for the formal company

According to the study carried out on interest groups, members of the Cantú peasant community indicated that they wanted an agreement with the mining company, since otherwise they would not allow it to operate and they would not carry out artisanal mining activities either. In this sense, the main incentive of the company was to be able to carry out its activities in a normal way.\textsuperscript{92}

\textsuperscript{89} Stakeholder mapping and situational diagnosis Antamayo Project (2013)
\textsuperscript{90} Stakeholder mapping and situational diagnosis Antamayo Project (2013)
\textsuperscript{91} Stakeholder mapping and situational diagnosis Antamayo Project (2013)
\textsuperscript{92} Stakeholder mapping and situational diagnosis Antamayo Project (2013)
E. Presence of a third actor (Broker)
The mining company hired the services of the independent consultant Álvaro Cano so that he is responsible for carrying out both the identification and diagnosis study of the interest groups, as well as carrying out the relationship process with the population, especially with artisanal miners and achieving sign an exploitation agreement with them.
Minera Vicuña S.A.C.

General information

Project's name: Vicuña

Location: Lima Department, Huaura Province, Leoncio Prado District

Type of agreement: There is no agreement.

Project status: In operation

Main mineral: Gold

Regime type: Small- Scale Mining (SSM)

Project description

The mining company Vicuña S.A.C., acquired the concession between the months of February and August 2019 due to the high profitability of the mine, and despite the fact that since October 2018 it was invaded by the Parán community.

On the province of Huaura, this has fisheries and agriculture as its main economic activities. In the case of the first, the main products are fishmeal and canned fish, while in the case of the second activity, the main products are sugar cane, yellow corn and fruits such as orange trees, the tangerine and the peach, the latter especially in the community of Parán, where the project is also located.93

Description of the agreement

Currently, the mining company has not signed operating agreements with the groups of informal miners present in its concessions. On the contrary, the company intends to expel them from their concessions since they are generating economic losses.94

Truth table

A. ASM producer willingness and ability to associate themselves into a formal mining business

The Parán community invaded the concessions and expelled the owner company in October 2018, months before Minera Vicuña became the new owner. In this sense, the community has not developed artisanal mining activities, since they are eminently agricultural, and, on the contrary, has limited itself to negotiating with foreign informal miners to allow them to operate in the area in exchange for a certain amount of money and has shown no interest in relating to the mining company. Likewise, both the community and informal miners have not shown greater interest in communicating with the mining company or with representatives of the regional government, regarding the formalization process.95

B. Geological component (Competition for the mineral)

Informal miners and the mining company compete for the ore, since the first group with the permission of the Parán community operate in the mining company's concession area, which cannot even carry out its own operations for fear of community reaction.96

C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM

The mining company has not shown greater corporate openness towards the ASM, on the contrary, it intends to expel them from its concession area and not reach any exploitation agreement. In this sense, it states that development projects can be carried out around other economic activities, but not in the case of mining.

Likewise, the company indicates that due to the investment it has already made in the area to carry out studies and hiring personnel, it is not profitable to share the operation with other

94 R, Chicaril, personal communication, December 11, 2019.
95 R, Chicaril, personal communication, December 11, 2019.
96 R, Chicaril, personal communication, December 11, 2019.
groups, since the mineral is highly concentrated in one area of the concession and not
distributed throughout this.

D. Commercial incentive for the formal company
The company has not shown a greater commercial incentive to support the formalization
process, and, on the contrary, it is analyzing the best option to expel artisanal miners and
be able to continue with its operations. In this sense, it does not consider it profitable to
include them within its production chain.  

E. Presence of a third actor (Broker)
The presence of any State institution, or organizations such as NGOs, specialized
consultants or independent consultants, who may have fulfilled a mediation role between
the parties, has not been identified.

---

Minera Yanaquihua

General Information

Project's Name: Yanaquihua

Location: Arequipa Department, Chuquibamba Province, Yanaquihua District

Type of agreement: Operating contracts and Framework Agreement (“Acuerdo Marco”)

Project status: In operation

Main mineral: Gold

Regime type: Small- Scale Mining (SSM)

Number of miners registered in the REINFO base: 473 (All of them are in Arequipa Department)

Project description

The project area has a long tradition of artisanal miners with experience collecting and extracting narrow veins. In 2000, the mining company CEDEMIN, a sub-company operated by Buenaventura, which did not have a good community relationship with the locals, entered into serious conflicts and violent threats on behalf of artisanal miners. CEDEMIN opted to withdraw from the area and Minera Yanaquihua SAC (MYSAC) entered with the leadership of Antonio Samaniego as the main shareholder. From then onwards, the dialogue with the local artisanal miners was resumed and a process of local community relations began, allowing the company and artisanal miners to operate peacefully. In particular, MYSAC concessions do not show high concentrations of ore, which does not make it particularly attractive for LSM operations.
Description of the agreement:

After a negotiation process between mining company and community, in 2008 the Framework Agreement for mining exploitation and coexistence was signed. Through this agreement, MYSAC delimits a space within its concessions so that artisanal miners in the process of formalization, under a format of “microcontractors” can exploit veins under the technical and legal support of MYSAC. Among its main points are:

- The requirement that artisanal miners are registered in the formalization process.
- The transfer of a specified area so that artisanal miners can extract ore independently, following minimum safety standards
- The signing of contracts with microcontractors for exploitation
- The full amount of ore does not have to be sold exclusively to MYSAC
- Technical support provided as requested by artisanal miners

Truth table

A. ASM producer willingness and ability to associate themselves into a formal mining business

Initially, artisanal miners were reluctant to enter the formalization process. However, once consolidated as a communal organization, they showed a willingness to initiate the formalization process under the supervision and assistance provided by MYSAC. Artisanal miners even began to form small local businesses or microcontractors to be able to sign contracts with MYSAC and enter the formalization process.

B. Geological component (Competition for the mineral)

The artisanal miners operate within the concessions and exploit the same metal (gold) as MYSAC, although they only exploit narrow veins ceded by the company, due to insufficient economic value. In addition, by signing the Framework Agreement, further areas were established to differentiate between the work of artisanal miners in the process of formalization and that of the microcontractors working directly for the company. According to the interviewees, there have been no serious conflicts over invasions of spaces.

C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM

In 2003, with the arrival of Antonio Samaniego and his board of directors, several of the previous managers linked to CEDEMIN left the company. The new board was sincerely open to reactivate the communication with the local informal miners and chose to avoid direct
confrontation and zero-sum game, especially knowing in advance of the social challenges. Thus, MYSAC provided legal advice to artisanal miners with the lawsuits in which they were involved after burning the previous campsite and plant, and created “Technical Roundtables” for greater involvement of the company with the local population. It is worth noting that MYSAC company’s vision is to become the national leader of the formalization of ASM producers, and thus it aims at establishing dynamic strategies to accelerate the formalization process of artisanal miners working within their concession. Likewise, MYSAC began to build its Formalization Office, providing operational support to the miners in the process, through training in security, finance, social benefits, among others, in order to monitor compliance with their obligations as artisanal miners or microcontractors.

D. Commercial incentive for the formal company

The Framework Agreement and the ore stockpiling business model represents a high business incentive for MYSAC. On the one hand, the Framework Agreement to support the local formalization process has allowed the company their treatment plant’s reactivation, as well as access areas previously blocked by artisanal miners. Now, they have the local population’s trust. On the other hand, this business model is an important and productive incentive, since the production of artisanal miners and microcontractors represents a significant percentage of MYSAC’s production, considering that artisanal miners rescue ore from narrow veins, but with a consistent ore grade. The company has signed to the Standard RJC (Responsible Jewelry Council), a code for managing cyanide, but which also entails greater scrutiny of the ore’s origin. It also provides a reputational advantage and membership in the face of select international markets and gold trading networks.

E. Presence of a third actor (Broker)

After signing the Framework Agreement, MYSAC entered a strategic partnership with Solidaridad Network (SN), an international NGO specialized in local value chains in the mining sector. Under its advice, MYSAC promoted the mining formalization process in the area more broadly. Likewise, SN was instrumental in helping MYSAC incorporate good practices and reach the international RJC certification (Responsible Jewelery Council), which recognizes good practices in gold production and the formalization of artisanal miners.
Map of the presence of artisanal miners in the project concessions

Source: (INGEMMET, 2020)
Compañía Minera Ares S.A.C.

General information

Project’s Name: Pallancata

Location: Apurimac Department, Aymaraes Province, Cotaruse District

Type of agreement: Development of agreement for exploitation contracts

Project status: Closure / reclamation with new exploration plans

Main mineral: Gold and silver

Regime type: Medium mining

Number of miners registered in the REINFO base: 449 (333 are in Apurimac Department).

Project description

Pallancata is a precious metals site of epithermal veins, of low to intermediate sulfurization, surrounded by areas with similar systems of high-grade silver and gold veins. Pallancata ore is transported approximately 22 kilometers to the Selene plant for processing and is then sold in the form of silver/gold concentrate. In 2018, the total production of silver in Pallancata was 9,403 thousand ounces (7,449 thousand ounces of silver and 26.4 thousand ounces of gold). The project is in the closure stages, although the company shows clear intentions of expansion. Ares belongs to the Hochschild group, a group listed on the London Stock Exchange (LSE).

Description of the agreement

There is a pre-agreement established for the exploitation contract, as two formal companies, for the purchase and sale of the mineral. According to the mining company, the agreement will divide the concession into a space already occupied by the communal mining company
of the Pepas de Oro Association of Pampamarca (AMAPOP) so that they can complete the formalization process and subsequently establish commercial relations with Ares. The core of the agreement indicates that Ares will assign operating contracts for certain specific areas of its concessions and support AMAPOP in its formalization process, while AMAPOP would have to intercede for Ares in renewing the contract for accessing communal land and obtaining the needed social license to explore and operate in the Huachuhuillca area. In areas close to the project, it has also established agreements for the use of surface land for mining activities with the peasant community of Huancabamba\textsuperscript{98}.

**Truth table**

A. **ASM producer willingness and ability to associate into a formal mining business**

Initially, the relationship between Ares and local artisanal miners eroded the trust to start the negotiation process due to previous experiences with the mining company (work accidents and breach of agreements). However, the dialogue channels were restored and the AMAPOP community company was created to start the formalization process. This company has approximately 250 members, more than half of the total community members where the concession is located.

B. **Geological component (Competition for the mineral)**

The pre-agreement and the negotiations carried out will ensure the respect of the limits defined for the exploitation of the areas assigned to AMAPOP. That is, Ares and AMAPOP will be considered as autonomous companies, although with commercial links.

C. **LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM**

Ares lost interest in the mining project when it reached the closure stage. However, potential explorations near the area reignited the company’s interest. The Public Relations office of Ares has launched a strategy of community relations with AMAPOP given that it has significant community support. In this sense, the initial resistance to engage with artisanal miners is changing and has developed a “shared value” and “good coexistence”.

D. Commercial incentive for the formal company
Ares requires the social license and is expecting a formal and commercial relationship with AMAPOP. For this, the formalization process of AMAPOP is required. Also, the rights of the mining concession and the contract for land surface use of the peasant community must be renovated. In sum, the agreement with AMAPOP is essential to achieve these objectives.

E. Presence of a third actor (Broker)
Two important actors have been identified in the negotiations between AMAPOP and Ares. On one hand, Solidaridad Network (SN) has mediated between the parties, providing technical and legal advice to AMAPOP to continue its formalization process.\(^9\) On the other hand, the participation of the State has been mainly as a neutral observer of the process. The MINEM assisted the DREM-Apurímac in the establishment of an inter-institutional agreement between the peasant community of Pampamarca, the mining company Ares and the Regional Government of Apurímac. This agreement states commitments to community development projects on behalf of Ares, including workshops on environmental and mining legislation, artisanal mining, citizen participation in mining, as well as negotiation and agreement establishment.\(^10\)

\(^9\) https://www.plataformaintegraldemineria.org/es/noticias/peru-140-mineros-artesanales-de-apurímac-recibieron-equipos-de-proteccion-personal
\(^10\) https://www.minem.gob.pe/minem/archivos/Informe%20Trimestral%20Octubre%20-%20Diciembre%202020%20_2web_(2).pdf
Map of the presence of artisanal miners in the project concessions

Source: (INGEMMET, 2020)
General Information

Project’s name: Chala One and Kori One

Location: Arequipa Department, Caravelí Province, Chala District.

Type of agreement: There is no agreement.

Project status: In operation (Mineral Processing Plant)

Main mineral: Gold

Regime type: Medium mining

Project description

Inka One Gold Corp., is developing two operations called “Chala One” and “Kori One”, both located in the province of Caravelí, Arequipa Region. In the case of Chala One, it has a processing capacity of between 100 to 150 tons per day\textsuperscript{101} and while in the case of Kori this has a processing capacity of 350 tons per day\textsuperscript{102}. Also, the facilities of both have all the necessary equipment, including metallurgical and chemical laboratories, desorption and smelting facilities.

About the province of Caravelí it is important to mention that it is located at an average height of 1000 m.a.s.l. and it is characterized by being a rocky territory with semi-warm climate in the coastal and temperate zone in the sierra area. Likewise, the main economic activities of the province are agriculture and mining, the first has as its main product corn and has been benefited by the diversity of land existing in the area between which are the

\textsuperscript{101} https://www.incaone.com/operations/chala-one/
\textsuperscript{102} https://www.incaone.com/operations/kori-one/
lands for clean cultivation, for permanent and pasture cultivation, in this last one the cattle ranch has been developed.

On the province of Caravelí, it is located at an average height of 1000 m.a.s.l. and the main economic activities of the province are agriculture and mining. The first has as its main product corn and has been benefited by the diversity of land for clean cultivation, for permanent cultivation and for pastures (livestock). According to the Artisanal Mining Program for the province of Caravelí, by 2010, approximately 1788 people (700 children, 250 women and 838 men) work in activities directly or indirectly related to mining.\textsuperscript{103}

\textbf{Description of the agreement}

At present, the mining company has not signed operating agreements with the groups of informal miners present in its concessions. However, the company does recognize that it works with small-scale miners who sell the ore they extract exclusively, even indicating that it covers 50\% of their demand.\textsuperscript{104} However, these agreements or contracts are not related to the promotion of the mining formalization process.

\textbf{Truth table}

\textbf{A. ASM producer willingness and ability to associate themselves into a formal mining business}

Within the company's business model, in which it is only dedicated to mineral processing, but not to exploitation activities, it is possible to consider that it does not enter into formal contracts with artisanal and small-scale miners that arrive with ore to be processed. Although the company states that it only works with miners following current legislation, that is, with miners who are registered at the base of REINFO\textsuperscript{105}, it is known that monitoring the traceability of the ore in this business model, based primarily on processing plants, is extremely difficult for the formal buyer.

Likewise, no attempt has been identified by artisanal miners to communicate with company representatives or with the regional government regarding the mining formalization process.

\textsuperscript{103} \url{http://geco.mineroparque.com/tiki-download_wiki_attachment.php?attId=1276}
\textsuperscript{104} \url{https://www.incaone.com/operations/chala-one/}
\textsuperscript{105} \url{https://www.incaone.com/operations/chala-one/}
B. Geological component (Competition for the mineral)
There is no competition for the mineral between the company and artisanal miners, since
the mining company is dedicated to processing ore, but not to carry out exploitation activities
in its concessions. On the contrary, it hires the services of artisanal miners so that they are
the ones that cover part of its demand, approximately 50%, while the other half acquires it
in the market.106

C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM
The mining company has shown to have a “progressive” corporate opening in relation to
artisanal mining, since it decided to coordinate with them and include them within its
production chain as one of its most important mineral suppliers. In that sense, their corporate
discourse, and their presentations to investors indicate that they are working only with small-
scale and artisanal producers, being this the strategy with the company builds a mining
relationship that can help prevent future situations, which in turn they could generate
economic losses.

D. Commercial incentive for the formal company
The mining company has as its main commercial incentive to meet its demand for ore, which
is 50% covered by these MAPE producers. However, the company may also have
secondary incentives such as building a strong relationship with these groups of artisanal
miners, which in turn allows it to prevent conflict situations that result in economic losses.

E. Presence of a third actor (Broker)
Within the investigation the presence of State or private actor that could fulfill the role of
mediator between the parties has not been identified. On the contrary, it seems that
negotiations have taken place exclusively between the parties without the intervention of
any external actor.

106 https://www.incaone.com/operations/chala-one/
Compañía Minera Caravelí

General information

Project’s name: Caravelí

Location of the concession: Arequipa Department, Caravelí Province, Huanu Huanu District.

Type of contract: There is no agreement.

Project status: In operation

Main mineral: Gold

Regime type: Medium mining

Number of miners registered in the REINFO base: 3511 (2482 are in Arequipa Department).

Number of miners in the formalization process: 3511

Project description

The company has its operations in the district of Huanuhuanu, an area that from 1940 was operated by the Gold Mines Captain Company until 1961, the year in which the company left the area arguing economic reasons. This event led to the abandonment of mining rights until 1978, when the Chala Gold Company took possession of the concessions and began a new exploitation period that lasted until 1990, when terrorist members entered the area and completely destroyed the company. Finally, in 1991 after the expulsion of the terrorist members, Compañía Minera Caravelí S.A.C. acquired the mining rights and installed a Pilot Plant of Cyanurization of activated carbon of 20 MT / day, starting operations that continue until today. 107

On the province of Caravelí, it is located at an average height of 1000 m.a.s.l. and the main economic activities of the province are agriculture and mining. The first has as its main product corn and has been benefited by the diversity of land for clean cultivation, for permanent cultivation and for pastures (livestock). According to the Artisanal Mining Program for the province of Caravelí, by 2010, approximately 1788 people (700 children, 250 women and 838 men) work in activities directly or indirectly related to mining.\textsuperscript{108} In addition, due to the presence of gold, mining has developed in the Huanuhuanu district, where the majority of the population is engaged in mining.

**Description of the agreement**

At present, the mining company has not signed operating agreements with the groups of informal miners in its concessions. On the contrary, Wiener (2019: 54) indicates that according to various testimonies the company makes verbal agreements with some artisanal miners to collect the ore in exchange for royalties.\textsuperscript{109}

**Truth table**

**A. ASM producer willingness and ability to associate themselves into a formal mining business**

Artisanal miners have not attempted to contact regional government authorities or company representatives to discuss the formalization process. This is largely due to the fact that, at least for the most part, they do not have this job as their main livelihood. On the contrary, they only engage in this activity when the favorable context, especially if the price of metals in the international market rises.

Likewise, the existence of an institutionalized organization that groups and directs them in relation to the mining business has not been identified. In this sense, the socio-productive fabric is weak, since exploitation can occur when an individual finds a relatively simple vein to exploit and summons the rest, generally friends and / or acquaintances to work it. Once the grain is exhausted; these “swallow” miners return to their daily activities.\textsuperscript{110}

\textsuperscript{108} \url{http://geco.mineroartesanal.com/tiki-download_wiki_attachment.php?attId=1276}
\textsuperscript{110} L. Wiener, comunicación personal, 03 de marzo de 2020.
B. Geological component (Competition for the mineral)
Artisanal miners have invaded and work in the areas of the formal enterprise, an issue that has generated some conflict situations around the control of the exploitation of the resource. In that sense, there is a competition for clear ore.\(^{111}\)

C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM
The company has not shown to have a corporate opening of an organic and preventive nature in relation to artisanal miners. On the contrary, since its arrival in 1991 the relations between the parties have been extremely tense because the miners occupied the units of Lieutenant, Captain, Chino Viejo, Chinito and Tambojasa, from which they extracted minerals with high laws from the pillars of old labors and mineralized structures found on the surface.\(^{112}\) In that sense, the company was accused of developing a policy of harassment and labor exploitation of artisanal miners in Mollehuaca and Relave.\(^{113}\)

However, the company claims to have developed a mining formalization process, precisely because of the invasions they suffered. This process aims to promote the formalization of informal miners in the district of Huanuhuanu and its surroundings, with the incentive that once the process is completed they can work as micro-contractors.\(^{114}\)

D. Commercial incentive for the formal company
The company has two commercial incentives to support the formalization of artisanal miners. First, obtain economic benefits from the concessions that under its ownership are unexploited, through the work of artisanal miners, who sell the ore extracted exclusively depending on the type of agreement reached.\(^{115}\) Second, avoid conflict situations with artisanal miners that will affect the normal development of their activities, and, therefore, will generate future economic losses.\(^{116}\)

E. Presence of a third actor (Broker)

The State, through the General Directorate of Mining Formalization, has promoted the formalization of artisanal miners throughout the province of Caravelí. In that sense, the State has fulfilled an articulating role for the achievement of agreements between the different mining companies located in the area, including the Caravelí Mining Company, and artisanal miners.¹¹⁷

Map of the presence of artisanal miners in the project concessions.

Source: INGEMMET (2020)
IED Mining S.A.C.

General information

Project's name: Esperanza 21

Location: Arequipa Department, Condesuyos Province, Yanaquihua District.

Type of agreement: Operating contracts for the collection of ore.

Project status: In operation

Main mineral: Gold

Regime type: Small Mining

Project description

The IED Mining company has its operations in the “Esperanza 21” concession, which is located in the province of Condesuyos, Arequipa Department.118 About the province it is important to mention that it has agriculture and mining as its main economic activities, in the case of the first one of the most important products is quinoa, which has the advantage of not requiring crop rotation. In the case of the second, the mining activity has been artisanal and informal, but organized through associations such as the San Cristóbal Association of Miners.

Description of the agreement

The mining company and artisanal miners grouped in the San Cristóbal Association of Miners, which has approximately 500 miners, signed an exploitation agreement in 2016,

---

through which artisanal miners obtained authorization to use the surface land, which is one of the requirements to complete the formalization process.\textsuperscript{119}

\textbf{Truth table}

\textbf{A. ASM producer willingness and ability to associate themselves into a formal mining business}
Artisanal miners are grouped in the San Cristóbal Miners Association, which groups approximately 500 miners. In this sense, these miners are engaged in this activity uninterruptedly and without considering conjunctural aspects such as the price of minerals. In other words, these miners do not work only when the price is high in the international market, but they have mining as their main economic activity, being miners by profession and not by chance.

Likewise, as an association they showed their willingness to dialogue with the mining company, which was expressed in the signing of the mining exploitation contract, which is a fundamental step in the formalization process.\textsuperscript{120}

\textbf{B. Geological component (Competition for the mineral)}
There has been no competition for the mineral since each party has shown no intention of entering the other's area of operation. On the contrary, the company has chosen to reach an agreement with artisanal miners with the objective of granting them an area where they can operate without affecting the company's own operations.\textsuperscript{121}

\textbf{C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM}
The company has shown to have a preventive corporate opening with artisanal miners, since it has chosen to reach an exploitation agreement with artisanal miners in which the areas where each of them must operate are clearly established.\textsuperscript{122} In this sense, this attitude of the company has allowed it to build an environment of communication with its stakeholders,

\textsuperscript{119} Ministerio de Energía y Minas (March 1, 2016). Recovered from \url{http://www.minem.gob.pe/_detallenoticia.php?idSector=20&idTItular=7239}
\textsuperscript{120} Ministerio de Energía y Minas (March 1, 2016). Recovered from \url{http://www.minem.gob.pe/_detallenoticia.php?idSector=20&idTItular=7239}
\textsuperscript{121} Wiener, L (2019). La gobernanza de la minería en pequeña escala en el Perú. Lima, Perú: CooperAcción.
\textsuperscript{122} Ministerio de Energía y Minas (March 1, 2016). Recovered from \url{http://www.minem.gob.pe/_detallenoticia.php?idSector=20&idTItular=7239}
which can serve it in the future to resolve certain conflicts and prevent them from turning into violent situations.

D. Commercial incentive for the formal company
The main commercial incentive that the mining company has had to support artisanal miners in the formalization process has been to build and maintain an adequate relationship with this group to avoid any conflict situation in the future that would affect the normal development of their activities and generating economic losses.

E. Presence of a third actor (Broker)
The State, through the General Directorate for Mining Formalization has intervened in the negotiation process of an exploitation agreement between the company and artisanal miners, fulfilling a mediator role, offering neutral negotiation spaces, and solving doubts that each of the parties could have around the formalization process.\(^\text{123}\)

Compañía Minera Zafranal S.A.C.

Project’s name: Zafranal

Location: Arequipa Department, Provinces of Castilla and Caylloma, districts of Hancarqui and Lluta, respectively.

Type of agreement: Operating contracts for the collection of ore

Project status: In studies

Main mineral: Gold

Regime type: Large- Scale Mining (LSM)

Number of miners registered in the REINFO base: 64 (53 are in Arequipa Department).

Number of miners in the formalization process: 64

Project description

The Zafranal Mining Company is developing the “Zafranal Project” in the districts of Caylloma and Castilla, in the Arequipa region. Also, this project is in the process of preparing environmental impact studies, but assuming that it is carried out, it will involve the construction of an open pit and a concentrator plant to produce copper concentrates. On the other hand, geographically it is located far from the population and water sources, at an altitude of between 1700 and 2900 meters.\(^{124}\)

On the province of Castile of the province, this has as main activities agriculture and tourism, especially in the district of Aplao, which one of the main producers of vine, rice and fruits such as avocado, pacay and marco, and also has great tourist attractions that attract a

significant number of visitors.\textsuperscript{125} For its part, in the case of the province of Caylloma, its main economic activity is livestock, especially the raising of camelids and sheep, being one of the most important alpaca because it can trade both its fiber in the national and international market at considerable prices, such as meat and leather.\textsuperscript{126}

**Description of the agreement**

Currently, the mining company has signed an agreement with artisanal miners, which states that they will be relocated outside the company's area of operation and the costs of both transportation and installation will be covered by the mining company. Likewise, the area where they will be transferred will have the same characteristics as regards the mineral.\textsuperscript{127}

**Truth table**

**A. ASM producer willingness and ability to associate themselves into a formal mining business**

Artisanal miners have been working in the area for a long time, even since before the concession was formally awarded to the company. In this sense, they are not circumstantial miners, that is, they have not begun to engage in this activity only with the increase in the price of metals. Likewise, most of the miners have shown an interest in being formalized and in its benefits, since from the beginning most of them showed a willingness to dialogue with the mining company and listen to their proposal regarding their relocation and support in the formalization process.\textsuperscript{128}

**B. Geological component (Competition for the mineral)**

There was no competition for the ore between the company and artisanal miners, since the former reached an agreement to relocate the miners before even starting operations. This is precisely in order to prevent any conflict situation that affects their operations and, consequently, generates economic losses.

**C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM**

\textsuperscript{125} RPP Noticias. (November 29, 2013). Recovered from https://rpp.pe/peru/actualidad/el-festival-del-camaron-pisco-y-vino-en-arequipa-noticia-649832
\textsuperscript{126} http://www.fao.org/3/a1927s/a1927s00.pdf
The company showed a corporate opening towards MAPE that was characterized as being preventive, that is, it identified early the presence of artisanal miners in its concession area and decided to implement a community relationship strategy before beginning its operations.\textsuperscript{129} In that sense, this agreement allowed relocating artisanal miners in an area with the same ore grade and supporting them with the expenses of both transportation and installation of their operations.

D. Commercial incentive for the formal company

The main commercial incentive that the mining company has had has been economic, since by building a relatively positive relationship with artisanal miners it has been able to prevent a potential future conflict that would have affected its operations, generating economic losses.\textsuperscript{130} However, this does not deny that the company may have secondary incentives related to business reputation and the intention to be a reference in terms of community relations.

E. Presence of a third actor (Broker)

The mining company hired consulting services of the company “Construyendo Fortalezas” to develop the strategy of community relations with artisanal miners, which included the generation of spaces for dialogue between the parties involved where the doubts that each one had could be resolved. Likewise, the State, through the Regional Directorate of Energy and Mines of Arequipa (DREM - Arequipa) participated in these spaces, fulfilling a role of mediator and resolving the doubts of the parties regarding the formalization process.\textsuperscript{131}

\textsuperscript{129} Wiener, L (2019). La gobernanza de la minería en pequeña escala en el Perú. Lima, Perú: CooperAcción.
\textsuperscript{130} L. Wiener, personal communication, March 3, 2020.
Minera Las Bambas S.A.C.

General information

Project’s name: Las Bambas

Location: Apurímac Department, Cotabambas and Grau Provinces.

Type of agreement: There is no agreement.

Project status: In operation

Main mineral: Copper

Regime type: Large- Scale Mining (LSM)

Number of miners registered in the REINFO base: 507 (All of them are in Apurímac Department).

Number of miners in the formalization process: 507

Project description

The “Las Bambas” project officially started in 2004 when the Xstrata Copper company acquired the right to explore Las Bambas through an international public tender, although it was not until 2009 that the feasibility studies were completed. Then, in 2010, the transfer of ownership of the Las Bambas mining concessions was signed with the State with an expected investment of more than S/ 4,200 million. Following this line, in 2011 the State approved the Environmental Impact Study. 132

However, in 2013 the company Glencore Peru Holding became the new owner of the concession in the framework of the acquisition of Xstrata. It is worth mentioning that the

132 http://www.lasbambas.com/historia
latter carried out a pre-purchase evaluation and that it was handed over to the new owner, in which the presence of artisanal miners was reported. In 2014, the second modification of the EIA (MEIA) was presented and approved to allow the concentrated transport of copper by road. However, that same year there was a new change in the ownership of the concession, which ended up being the consortium made up of MMG Limited, Guaxin International Invesment Co. Ltd., and CITIC Metal Co. Ltd., which initiated the physical resettlement of Fuerabamba community. Finally, in 2018 the third MEIA was approved and exploratory studies began in the western area of the concession.133

The provinces of Cotabambas and Grau have agriculture and mining as their main economic activities. Agriculture is developed thanks to the large existing agricultural area, which allows it to produce potatoes, corn, barley, among other products. However, this activity still continues to develop in a traditional way, that is, without implementing improvements at the technological level and in road infrastructure. In the case of mining, this is basically concentrated on the exploitation of large copper deposits, with the most important project being “Las Bambas”, which represents about 9% of the region's GDP.

Description of the agreement

Currently, the mining company has not signed operating agreements with the groups of informal miners present in its concessions, nor has it shown any intention of reaching any agreement with this group in the future.

133 http://www.lasbambas.com/historia
Truth table

A. ASM producer willingness and ability to associate themselves into a formal mining business

The artisanal miners present in the company’s concession began to carry out mining work when they learned of the existence of the mineral in the area due to the studies carried out by the company.\textsuperscript{134} In this sense, these miners have not been dedicated to mining in a constant way and having it as their main activity, but chose to enter it due to conjunctural factors unrelated to their own initial development objectives. Also, since they are already included in the REINFO base, and this guarantees that they can continue working normally, they do not need to reach an agreement with the company to operate.

On this point, it is important to mention the participation of the communal board of directors, which has organized the miners to carry out artisanal mining work in the company concessions\textsuperscript{135}, this has been named as “Non-formal community artisanal mining” (Valdés, Basombrio y Vera, 2019:58-59). Therefore, they have organized themselves precisely to continue their artisanal mining activities in the same way that they have been doing it and not to comply with the mining formalization process.

B. Geological component (Competition for the mineral)

Artisanal miners began operating in the mining company’s concession area once they learned of the existence of ore (copper), due to the studies carried out. In this sense, the company allowed the miners to invade its concessions because there was still a long time to go before the expansion of the open pit in the area. However, they are currently in need of expelling them in order to continue expanding their operation. Therefore, a competition for the mineral is taking place as the miners invaded the company’s concession to extract copper, precisely where the company plans to open a pit to extract copper.\textsuperscript{136,137}

\textsuperscript{134} Wiener, L (2019). La gobernanza de la minería en pequeña escala en el Perú. Lima, Perú: CooperAcción.
\textsuperscript{135} Basombrio, C; Valdés, R y Vera, D., (2019).  
Minería no Formal en el Perú. Lima, Perú: Luzazul gráfica S.A.C.
C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM
The mining company does not recognize artisanal and small-scale miners within its stakeholders as it does with other actors such as its shareholders, public opinion, its employees, the government at its different levels (national, regional and local), contractors and mining sector.\textsuperscript{138} In this sense, it does not consider that it should include them within its productive chain, on the contrary, it seeks to expel them from the area they occupy, since they plan to expand their operations in that direction.

D. Commercial incentive for the formal company
The company does not show major commercial incentives to support the formalization process of artisanal miners in its concessions because this group is precisely in an area that the company intends to exploit on its own.\textsuperscript{139}

E. Presence of a third actor (Broker)
The presence of a third actor or mediator between the parties has not been identified because, mainly, the mining company does not show any type of willingness to negotiate an agreement with artisanal miners.

\textsuperscript{139} L. Wiener, personal communication, March 3, 2020.
Map of the presence of artisanal miners in the project concessions

Source: (INGEMMET, 2020)
Empresa Anabi S.A.C.

General information

Project’s name: Proyecto Anama

Location: Apurímac Department, Antabamba Province, Huarquirca District.

Type of agreement: There is no agreement.

Project status: In operation

Main mineral: Gold

Regime type: Medium mining

Project description

The Anabi company was incorporated in March 2000 with the objective of developing exploration and exploitation activities, and it has been operating the “Anama Project” since 2015, which is located in the province of Antabamba, Apurímac region. Likewise, this project is expected to have a total investment of 90 million dollars and have a production of 60,000 ounces of gold.¹⁴⁰

Regarding the province, it should be said that its main economic activities are livestock, agriculture and mining. In the case of the first two activities, you are part of several economic corridors among which the Abancay - Aymaraes (Santa Rosa) - Antabamba (Huachullu) and Aymaraes (Chalhuanca) - Caraybamba - Antabamba, which have more products alpaca fibers and potatoes are important. For its part, in the case of mining, the main minerals are gold and copper exploited by the Anama and Las Bambas projects, respectively.¹⁴¹

Description of the agreement

Currently, the mining company has not signed operating agreements with the groups of informal miners present in its concessions. On the contrary, the company has denounced the artisanal miners to the Apurímac environmental prosecutor, which were dismissed because the miners are at the REINFO base and, therefore, cannot be expelled from the area.142

Truth table

A. ASM producer willingness and ability to associate themselves into a formal mining business
Artisanal miners have only started working in the area because they now know about the existence of gold, but without being miners by profession, that is, this group does not have the mining company as their main economic activity, nor do they exercise it for long periods of time. periods of time, but they do it according to conjunctural factors such as the price of this mineral in the international market.143 Likewise, no attempt has been identified to communicate with representatives of the company or the regional government regarding the mining formalization process.

B. Geological component (Competition for the mineral)
There is competition for gold between artisanal miners and the company, since both exploit the same mineral and in the same area, which has generated conflict situations, and even complaints by the company to the Apurímac environmental prosecutor.

C. LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM
The company has not shown greater corporate openness towards ASM, either proactively or reactively. On the contrary, it has limited itself to carrying out actions to expel the miners present in its concessions, especially by denouncing them to the Apurímac environmental prosecutor’s office, and has not sought to create any space for dialogue with them.144

---

D. Commercial incentive for the formal company
The company has not shown a greater commercial incentive to support the formalization of artisanal miners. On the contrary, it considers that it can exploit the mineral on its own account, without the need to count the work of the miners.

E. Presence of a third actor (Broker)
The presence of any State institution, or organizations such as NGOs, specialized consultants or independent consultants, who may have fulfilled a mediation role between the parties, has not been identified.  

General information

Project’s name: Los Chancas

Location: Apurímac Department, Aymaraes Province, Tapairihuia District.

Type of agreement: There is no agreement.

Project status: In operation

Main mineral: Gold

Regime type: Medium mining

Number of miners registered in the REINFO base: 163 (159 are in Apurímac Department)

Project description

Southern Peru Copper Corporation has various projects developing in Peru, one of the most important being the “Los Chancas” project located in the Aymaraes province, Apurímac region. This project has an estimated investment of $ 2.8 billion and is planned to begin operating in 2022, after completing feasibility and environmental impact studies.146

In the Aymara province, this is characterized by having agriculture and livestock as the main economic activities. In the case of agriculture, the most important products are potatoes, corn, olluco and wheat, although production continues to be subsistence and not linked to the national and international market. In the case of livestock, this is carried out as a complementary activity and its main products are cattle and sheep.147

Description of the agreement

147 http://www.muniaymaraes.gob.pe/pdf/PlanDesarrollo.pdf
Currently, the mining company has not signed operating agreements with the groups of informal miners present in its concessions. On the contrary, the company has denounced the artisanal miners to the Apurímac environmental prosecutor, which were dismissed because the miners are at the REINFO base and, therefore, cannot be expelled from the area.\(^{148}\)

**Truth table**

A. **ASM producer willingness and ability to associate themselves into a formal mining business**

Artisanal miners have come to work in the area from the knowledge of the existence of gold, that is, they are not miners by profession, but they dedicate themselves to this activity when the context is favorable, for example: when the price of minerals, in this case gold,\(^{149}\) Likewise, this group has not attempted to communicate with company representatives or with regional government authorities to discuss the mining formalization process.

B. **Geological component (Competition for the mineral)**

There is a competition for gold between artisanal miners and the company, since the former entered the company's concession area to work, which has led to conflict situations as the company denounces them to the environmental prosecutor's office of Hurry up.\(^{150}\)

C. **LSM Corporate “attitude”/ “mentality”/ “approach” towards ASM**

The company has not shown greater corporate openness towards ASM, either proactively or reactively. On the contrary, it has limited itself to carrying out actions to expel the miners present in its concessions and has not sought to create any space for dialogue with them. This is largely because the company believes that it does not need artisanal miners, as it can mine the ore on its own.\(^{151}\)

D. **Commercial incentive for the formal company**

The company has not shown a greater commercial incentive to support the formalization of artisanal miners. On the contrary, it considers that the economic benefits of exploiting the mineral by itself are greater than if it included artisanal miners in its production chain.\(^{152}\)


E. Presence of a third actor (Broker)

The presence of any State institution, or organizations such as NGOs, specialized consultants or independent consultants, who may have fulfilled a mediation role between the parties, has not been identified.