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UNIVERSIDAD
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DE CHILE

Data Governance Advancing Green Mining: Environmental Observatory 2.0

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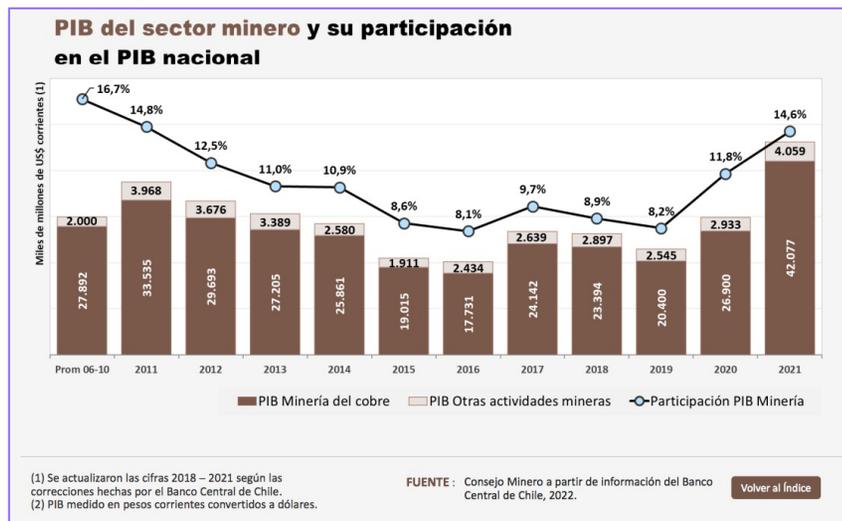
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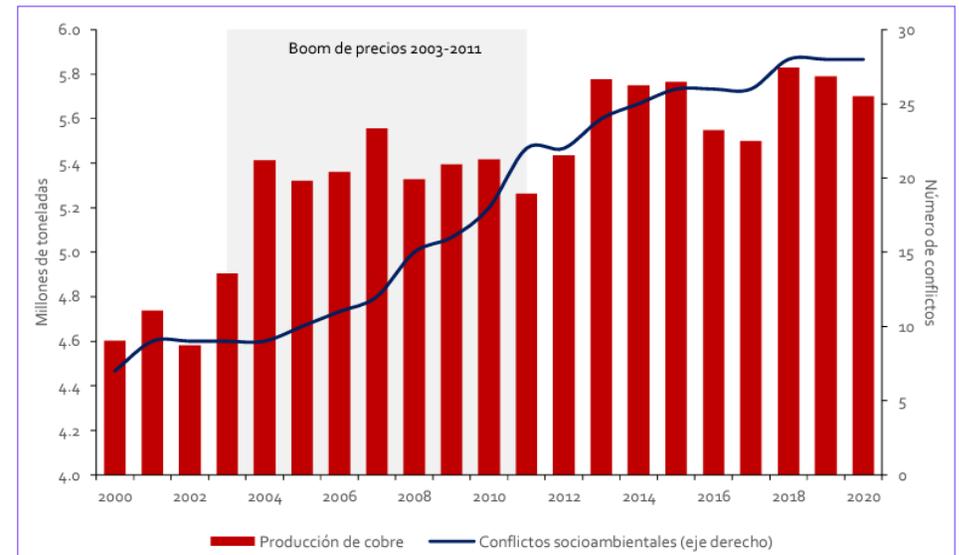
Chile: a mining country

Chile is the leading copper producer in the world, with an output exceeding 5.7 million tons (2020), accounting for 30% of the global total. This is more than three times the production of the second-largest producer.

These figures also translate into a **significant impact on employment, GDP, and fiscal revenues, among others.**



According to Schorr (2018), more mining investments lead to more conflicts over mining:



Between 2013 and 2019, the Environmental Enforcement Authority audited 32% of the existing Environmental Compliance Resolutions (ECR). **The most penalized productive sector is mining.** In environmental courts, the most cited cause of **environmental damage is the impact on water availability and ecosystems associated with the extraction of fresh water by mining projects.**

Global Challenge for Climate Change

Minerals such as:

Copper

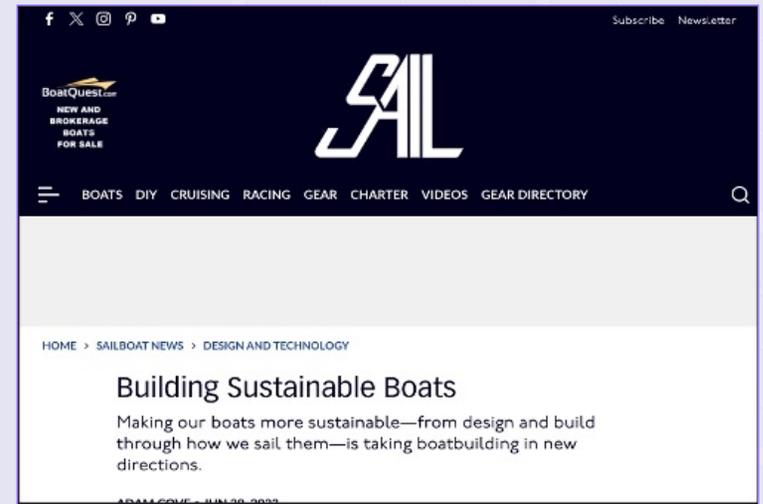
Nickel

Molybdenum

Lithium

are fundamental for the energy transition and the decarbonization of the global economy.

965% The World Bank projects increase in lithium demand.

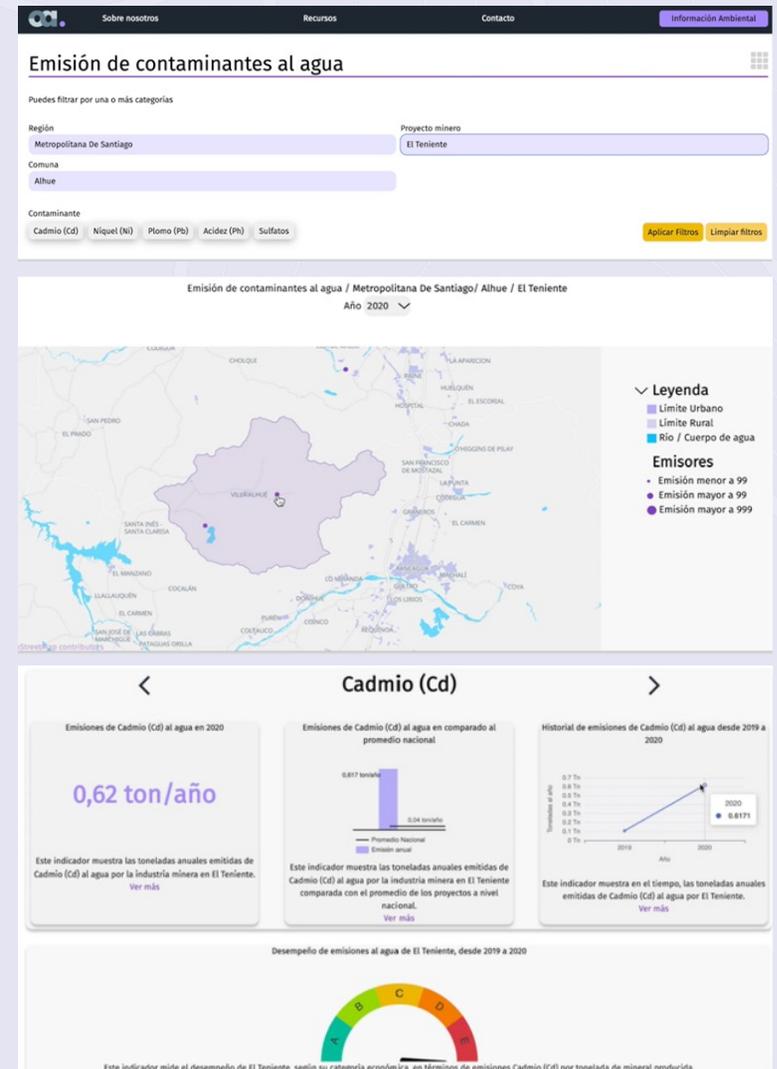
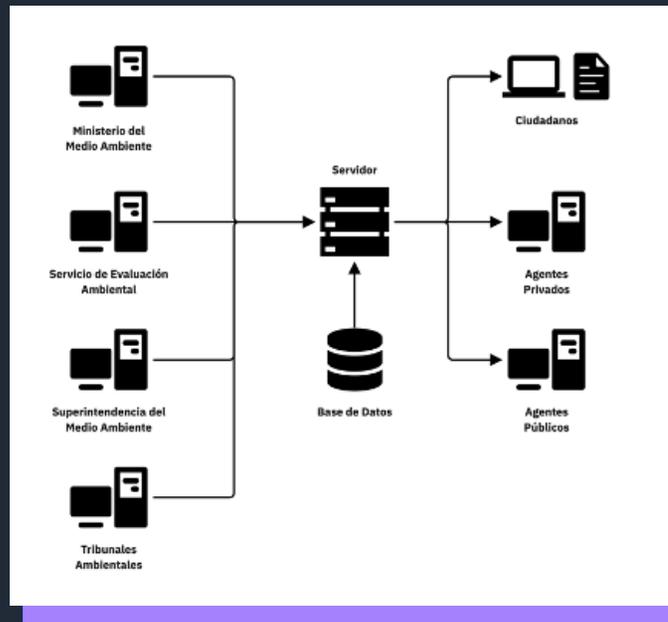


Jay presses his battery suppliers to use metallic lithium from Australia, where labor practices and environmental impacts can be monitored and measured.

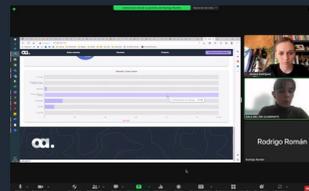
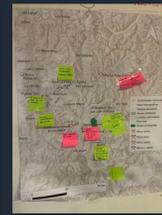
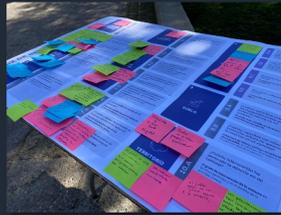
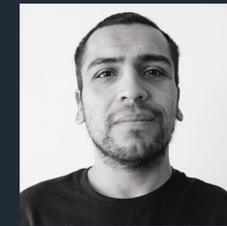
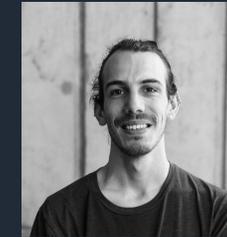
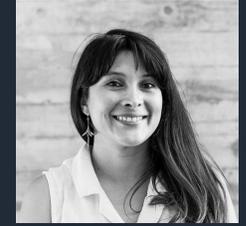
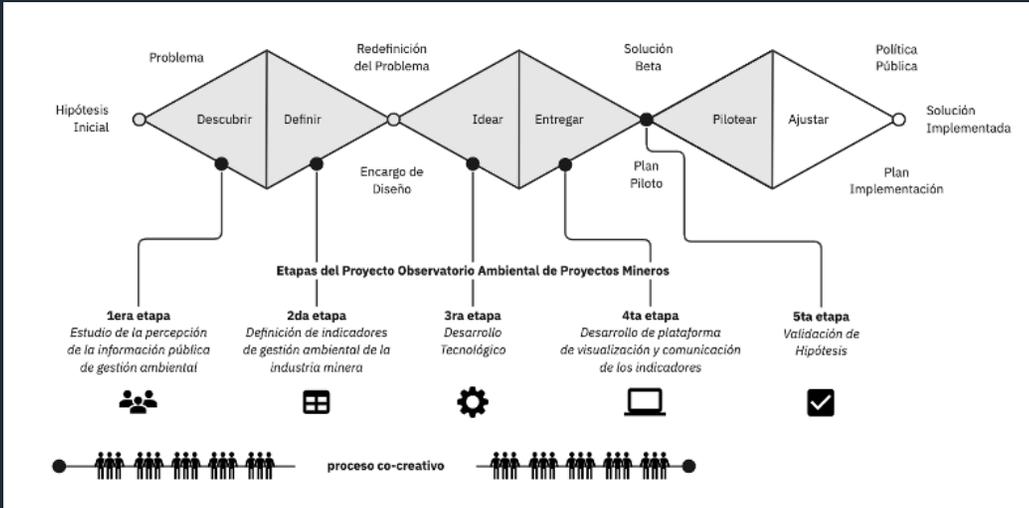
There are only three main sources of lithium: Australia, Chile, and China, and it is recognized that the supply chain is difficult to verify. A barrel of lithium carbonate cannot easily be subjected to tests to determine its origin.

What is Environmental Observatory?

An environmental management information system that integrates information and reduces access gaps for users, through the generation of indicators that can be understood by citizens, public agents, and private agents.



How we work?

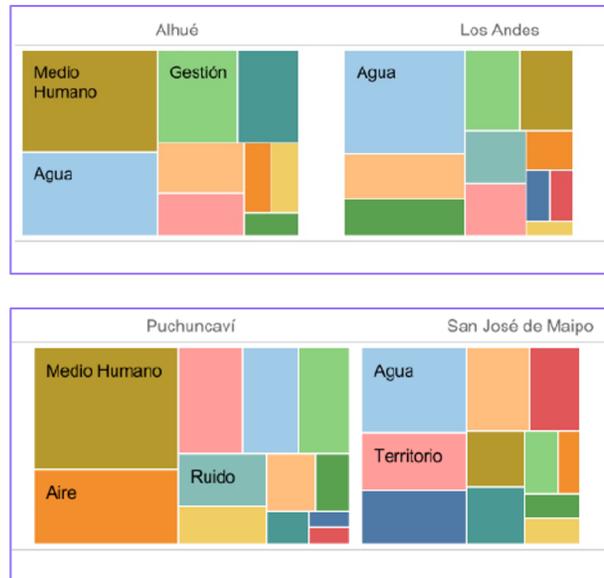


Outcome 1: Diagnosis of Information Gaps

1. High dispersion of public environmental information in Chile:



2. Environmental Information of Interest Based on Territorial Issues and Contexts:



3. User motivations vary by type:



Committed to service, justice, and sustainable renewal



Actively seeking partnerships and enforcing citizen engagement



Focused on environmental safeguarding, citizen empowerment, national environmental prestige, and promoting corporate best practices

Outcome 2: Environmental Management Indicators for the Mining Industry

25 indicators have been identified that are feasible to implement:

Indicator	Ranking
Water emissions	1
Local air emissions from mining	2
Climate change	3
Water usage	4
Environmental compliance	5
Hazardous waste	6
Total area and location of tailings	7
Conflict levels in mining projects	8
Area impacted by mining activity	9
Environmental management activities in the area	10

Indicator	Ranking
Jobs associated with the mining sector in the municipality	11
Non-hazardous waste	12
Jobs associated with projects in the SEA (Environmental Assessment System)	13
Average approval times for projects	14
Protected or conservation interest areas	15
Water demand	16
Occupational safety	17
Environmental management complexity of projects	18
Mining patents	19
Operational mining projects in the area	20
Approved investment	21
Projects in a state of abandonment	22
Investment in evaluation	23
Mine closure	24
Projects entered into the Environmental Assessment System"	25



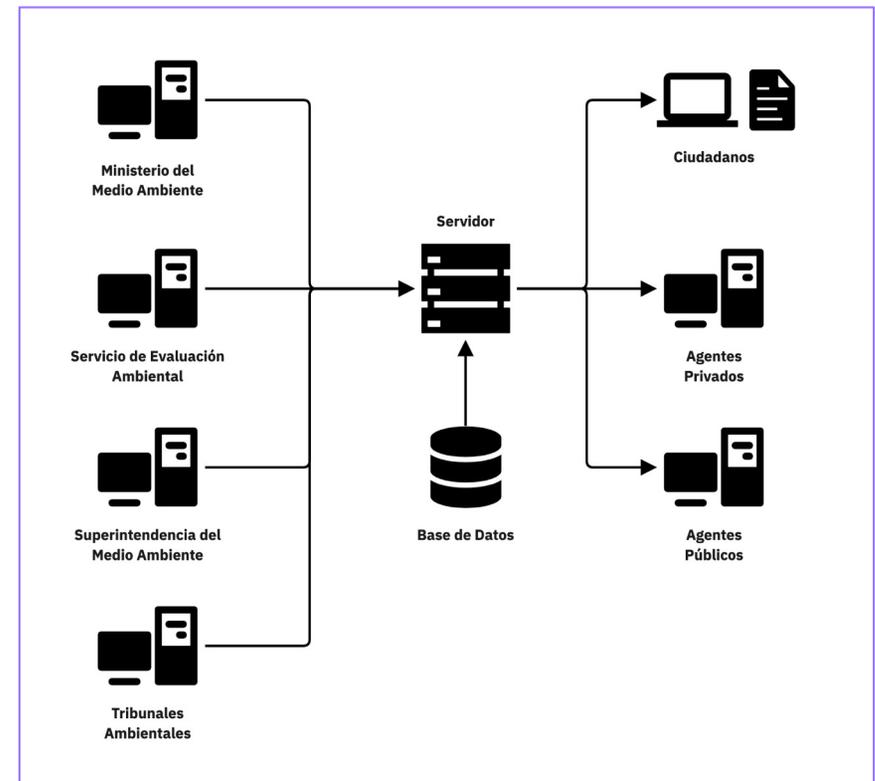
Outcome 3: Software for Data Capture and Normalization

Successful capture and integration of information:

Design and development of software stored on a server programmed to capture public environmental information from public service websites through web services and web scraping.

Challenges:

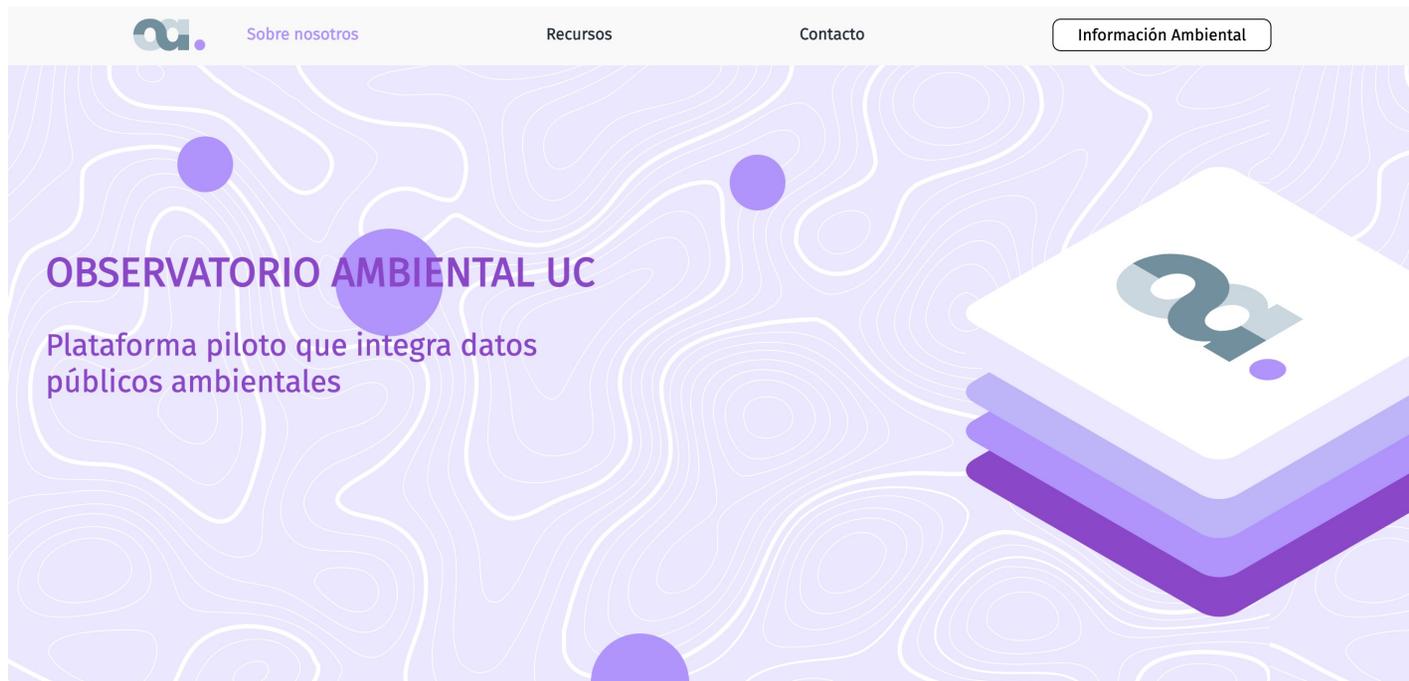
- The information available from various public services is in different file formats and content types.
- The information contains typographical errors.
- Existence of incomplete and unstructured databases.
- Difficulties in the processes of data standardization and integration



Fuente: Observatorio Ambiental UC, 2023

Outcome 4: Platform Environmental Observatory

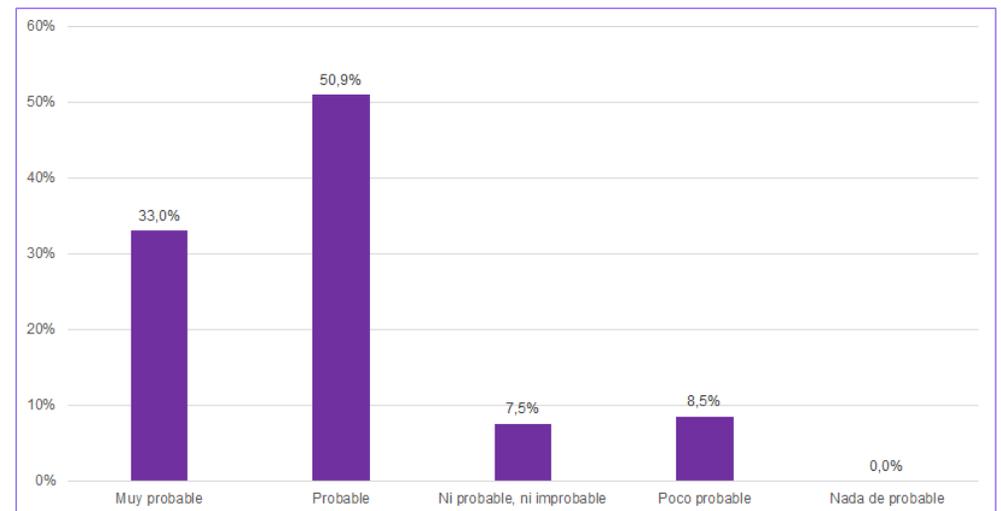
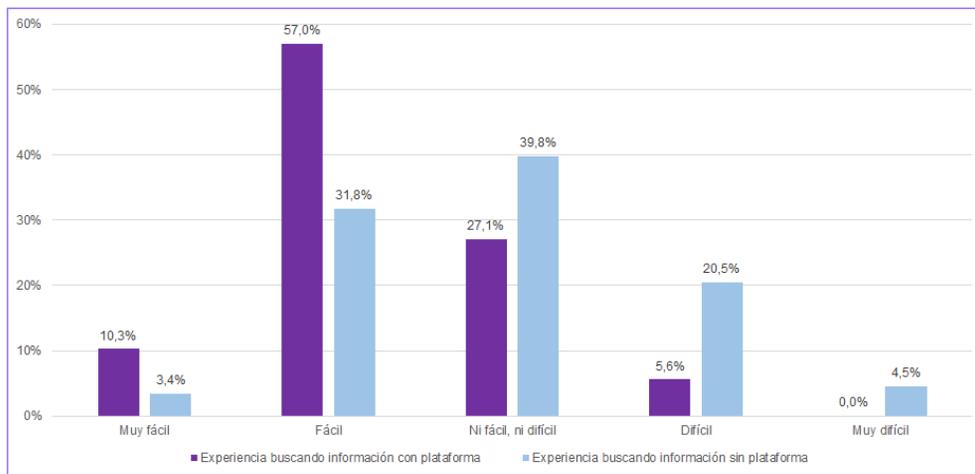
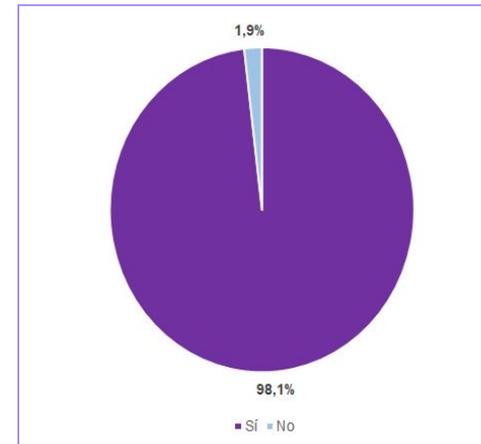
<https://observatorioambientaluc.cl/>



Outcome 4: Platform Environmental Observatory

The platform is constructed with user validation:

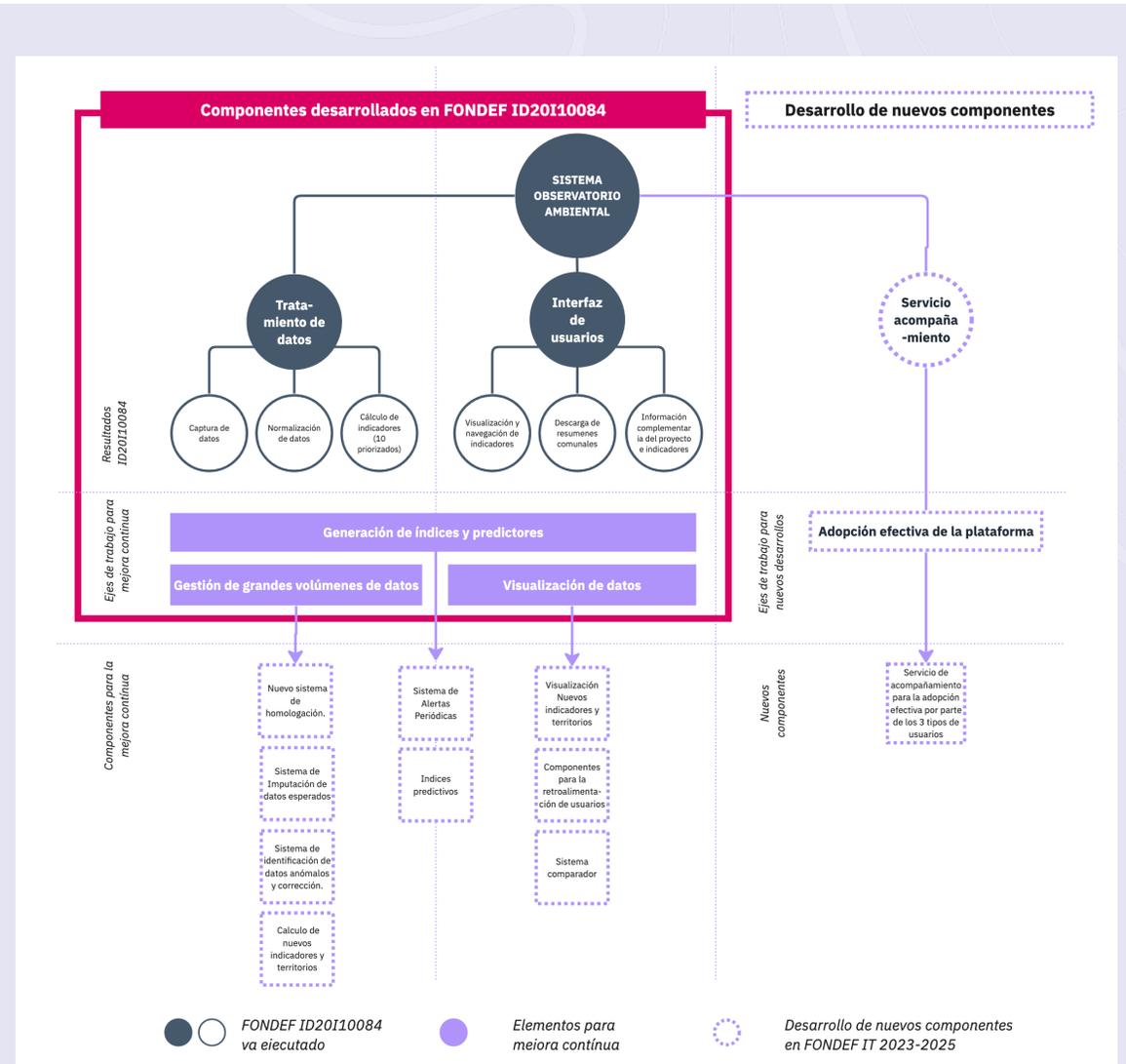
The model explained **95%** of the probability of platform use (dependent variable) and is attributed to the four previously mentioned independent variables



Fuente: Observatorio Ambiental UC, 2023

¿What are we going to do in the current project?

- Analyze and enrich environmental management indicators with the cooperation of all sectors, reviewing literature and using evaluation methodologies to reflect the environmental reality of mining.
- Create and test algorithms that improve the structure and quality of mining environmental data, ensuring their reliability and facilitating the generation of automated reports.
- Revamp the Environmental Observatory platform, optimizing indicators and adding new elements to enhance user experience and tool utility, in collaboration with end users.
- Implement a sustainable massification model for the Environmental Observatory, validating it with stakeholders and developing financing, communication, and adoption strategies that meet user needs and expectations.



First Results: Indicator Update

New considerations arise such as:

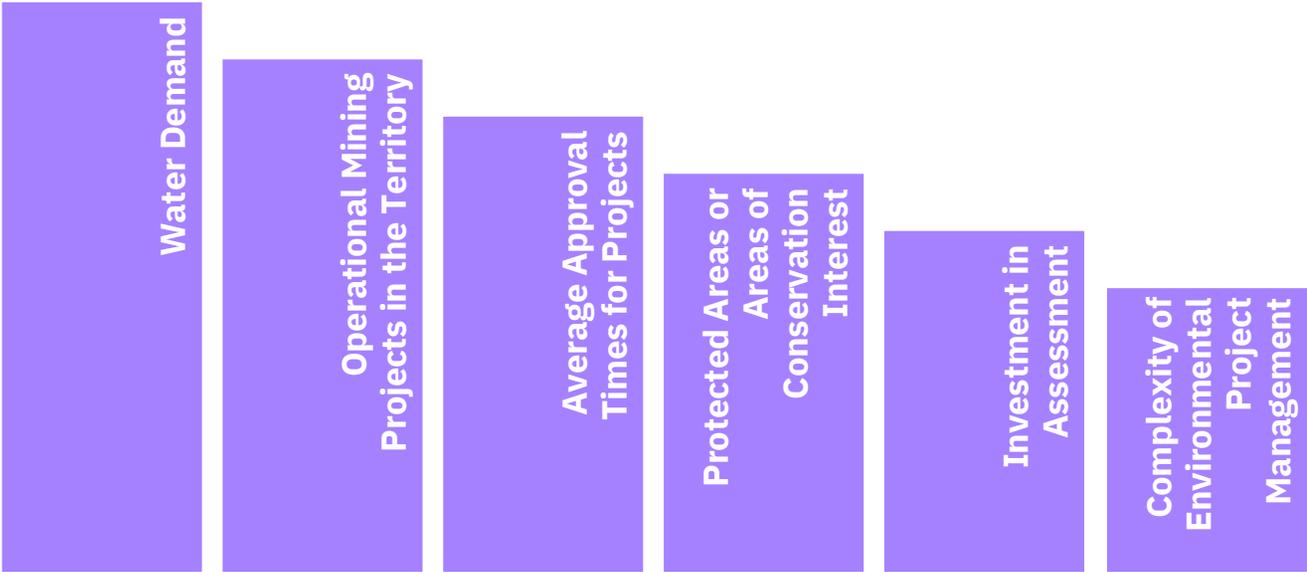
Use of desalinated or recycled water.

Approval times considering all permits.

Proportion of investment allocated to the environment

Complexity due to the number of environmental licenses.

New prioritized indicators:



Final Reflection

- **The platform pilot is now open and can be navigated (in Spanish), but we have been producing academic articles that provide more details.**
- **We are very pleased with the journey we have undertaken and the learning that has been generated, both from an interdisciplinary perspective, which allows us to address current challenges, and through the training we have conducted with various professionals, enabling them to become agents of change.**
- **We hope that in the future, there will be more interest in improving the quality, availability and accessibility of environmental information, mainly because we consider it a key element in managing socio-environmental conflicts, which allows for a better exercise of democracy and ultimately for taking more active participation from the public sector, the private sector, and citizens to improve our planet.**
- **Finally, we believe that the world needs Chilean minerals for the decarbonization process, but it is essential that this is done correctly and does not leave us in the future with a deteriorating environment, but instead helps us advance in sustainability and development**



Observatorio Ambiental de Proyectos

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