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## Sal de Vida: A risky lithium mining project in Argentina

This briefing was prepared by Asamblea Pueblos Catamarqueños en Resistencia y Autodeterminación (PUCARA), Fundación Ambiente y Recursos Naturales (FARN), Fundación Yuchan, and the Bank Information Center (BIC).

**Please note:** This is a living document, we are currently doing more research and field work to understand the (lack of) stakeholder engagement and information disclosure and the environmental and social risks and impacts of the project.

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### Introduction

Sal de Vida (SDV) is a lithium mining project located in the Salar del Hombre Muerto, Province of Catamarca, Argentina. If the project is approved, it would extract 600,000 tons of lithium carbonate (LCE) over the next forty years for export to Europe and the United States. The project plans to extract large amounts of brine from the Salar del Hombre Muerto aquifer through eight pumping wells, which is then sent to large evaporation pools. Using minimal processing, the operation will transform the mineral extracted into lithium carbonate.

Salar del Hombre Muerto is a high-altitude wetland located more than 4,000 meters above sea level in the north of the Province of Catamarca, an arid region characterized by lack of natural water resources. It is inhabited by different settlements, hamlets, and Indigenous communities.

The mining operation was originally owned by Galaxy Resources Ltd. However, on August 25, 2021, the company merged with Orocobre Ltd and created Allkem Ltd. [Allkem](#) is a lithium chemicals company, which has operations in Argentina and Australia and lithium hydroxide conversion facilities in Japan. Allkem owns 100% of the operation and has partnerships with Toyota Tsusho Corporation, the Province of Jujuy, and the Province of Catamarca, Argentina. The company has over \$3 billion USD in assets and after-tax profit of \$337 million USD for fiscal year end 6/30/22. It is listed on the Australian Securities Exchange and the Toronto Stock Exchange.

The IFC is considering a \$200 million USD loan to the [Sal de Vida project \(45668\)](#). The company has already issued two engineering, procurement, and construction management contracts: a) one for the evaporation ponds and the project infrastructure; and b) for the construction of the lithium carbonate plant. According to the IFC, the proposed investment will comprise a direct loan of \$100 million USD and mobilization from commercial banks of up to \$100 million USD. This investment will be used to produce 15,000 tons of LCE per year. The IFC's investment will allow Sal de Vida to develop its production, deepening the negative environmental and social impacts of lithium mining in the Salar del Hombre Muerto and impact communities living in the territory.

Although it is a Category A project, many of the environmental and social impacts and risks are not being properly analyzed and addressed, thus, the IFC is underestimating several potential risks in project appraisal.

## **Environmental concerns**

**1. Concerns regarding the technical determination of the area of direct and indirect influence.** The project's Environmental and Impact Assessment (EIA) designates the operational area as the only area of direct influence of the project. It is where the camp, the processing plant, the extraction wells, and the evaporation pools are located, covering 54 km<sup>2</sup>. The external area of the project was designated as the indirect influence area (Fig. 1.a, page 10); however, the EIA provides no justification or a technical explanation for this delimitation. Taking into consideration the hydrological and hydrogeological implications of the scale of brine and freshwater extraction (which are explained in the water pressure point), the area of direct influence is actually equal to or greater than the area of indirect influence indicated in the EIA (544 km<sup>2</sup>). The indirect area of influence should cover the entire basin of the Salar del Hombre Muerto, including the Los Patos river, 4316 km<sup>2</sup> (Fig. 1. b, page 10).

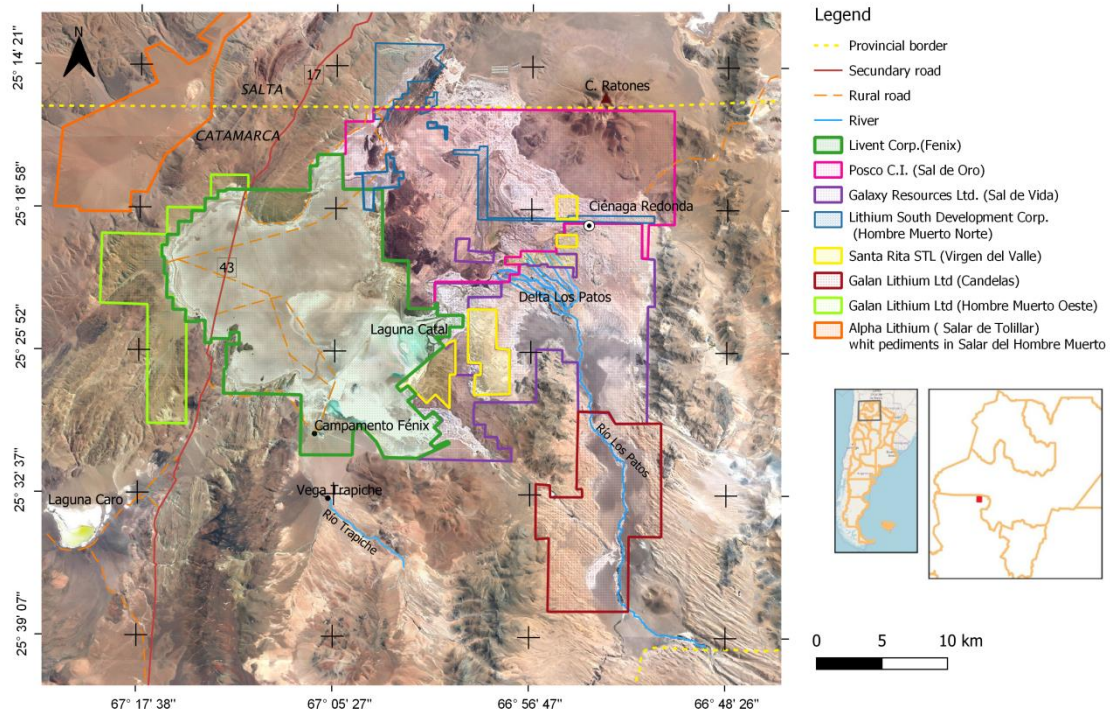
By underestimating the area of direct and indirect influence, the company and the IFC have failed to accurately identify and value the environmental and social impacts of the project. For example, the EIA underestimates the impact on hydrological and hydrogeological processes, biodiversity, and the location of critical habitats, including grasslands and riparian ecosystems. In short, the project has significantly more environmental impacts on the larger region than acknowledged in the EIA.

**2. Cumulative impacts.** Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an activity or project when added to the effects of other existing or planned ventures<sup>1</sup>. In the Salar del Hombre Muerto, eight lithium brine mining projects have been registered in different mining stages (Fig. 4). All existing mines are located in the same endorheic basin, using the same brine resource and fresh water for mineral processing. Sal de Vida is one of these 8 projects.

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<sup>1</sup> IFC 2013; Minerals Council of Australia 2015.

Fig.4



Two of the other projects (Alpha Lithium’s Tolillar expansion and Galan Lithium’s Hombre Muerto Oeste project) are in the prospecting stage (pre-exploration) and do not require an EIA. Of the remaining projects, we reviewed five EIAs for projects under consideration: two for exploration stage (Virgen del Valle, and Candelas projects) and three for exploitation stage (Fénix, Sal de Vida, and Sal de Oro projects). Although the most recent projects refer to the existence of projects in the basin to justify the high productivity and quality of the lithium reserves, none of the revised EIAs identify cumulative impacts from the use of the same brine and water resource, as required by the national guidelines developed by the Secretaria de Ambiente de la Nación in 2019 and the provincial mining authority (COFEMIN 2019).

Cumulative impacts have not been considered in the Mitigation Measures or in the Management and Contingency Plans in any of the EIAs of the eight mining projects in the region. The most notable example of the absence of a Cumulative Impact Assessment (CIA) is the extraction of fresh water from the Río Los Patos, which is a designated stewardship zone, for processing concentrated lithium brine. As mentioned above, extraction was approved for two companies (Minera del Altiplano, Galaxy Lithium Argentina) for a total of 3,416,000 m<sup>3</sup> /yr. This represents 15.6 times the volume of water consumed for domestic use in the town of Antofagasta de la Sierra, located in an adjacent basin.

**3. Evaporitic method and Water pressure.** The endorheic catchments in the high and arid Andean plateau have a negative hydrological balance because the mean annual evaporation exceeds that of precipitation, and rates of groundwater discharge often exceed modern recharge<sup>2</sup>. In these arid Andean wetlands, lithium in brine is extracted

<sup>2</sup> For example, Van Beek et al. 2011; Gleeson et al. 2012.

from saline deposits through slow and inefficient methods. Extraction requires large investment and use of natural resources in relation to the final product<sup>3</sup>. However, this is the method adopted by the Sal de Vida project, which will extract the brine from the Salar del Hombre Muerto salt flat, evaporating it in open pools where the different salts sequentially precipitate, and recovering the lithium carbonate from the concentrated brine in a treatment plant at the end of the process (which also will require copious volumes of fresh water during the next 40 years).

Because of the scale, lithium brine mining should be framed as large-scale or mega-mining<sup>4</sup> in relation to water consumption. According to the values provided by the Sal de Vida project, the estimated volume of water used in the mining project is estimated at 450 m<sup>3</sup>/tn of Li<sub>2</sub>CO<sub>3</sub> produced. Of this total, approximately 90% will be associated with brine evaporation, while the remaining 10% will be related to involved in freshwater consumption. These estimated values are similar to the water footprint measured at the Olaroz project in the province of Jujuy<sup>5</sup> (Arias Alvarado et al. 2022), also owned by Allkem.

The sustained extraction of groundwater brines and surface waters over decades is likely to affect these wetlands' hydrological balance, salinity, and unique biodiversity (Gajardo and Redón 2019). In this line, a study in the Salar de Atacama, Chile, has found that the fast expansion of lithium mining operations have a strong correlation with the ongoing environmental degradation in the area (Liu et al. 2019). Impacts of lithium mining water extraction are difficult to ascertain in the short term due to: a) historical climate patterns; b) variable climate conditions; c) the occurrence of extreme climatic events (Bennet et al. 2016; Pabón-Caicedo 2020; de la Fuente et al. 2021, Alam and Sepúlveda 2022); and d) times of response of natural environmental variables to complex hydrogeological processes. These hydrogeological processes involve the distribution and timing of groundwater recharge, long residence times (>100 years), deep water tables (>100 m), and groundwater flow paths - which often cross topographic boundaries before emerging at basin floors. Moreover, there is often insufficient data, which is an additional difficulty in properly ascertaining the impacts of water extraction (Frau et al. 2021; Moran et al. 2019b).

The EIA for the Sal de Vida project lacks accurate and appropriate hydrogeological information for the scale of the project. Regarding the impact of freshwater extraction from Los Patos River for several mining projects, including Sal de Vida, the baseline information used to prepare the water balance and the hydrogeological models is insufficient<sup>6</sup>. There are no records in the river catchments, and the hydrological data of Los Patos River and its main tributary were taken sporadically and at different points or sections of the stream (a major methodological mistake).

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<sup>3</sup> Flexer et al. 2018; Sticco 2018.

<sup>4</sup> Donadío, 2009

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<sup>6</sup> For more information see the independent study carried out by Consejo Federal de Inversiones (2021). Estudio hidrogeológico cuenca del río Los Patos-Salar del Hombre Muerto – 2da Etapa. Informe final.

The independent study carried out by the Consejo Federal de Inversiones on December 2021<sup>7</sup>, elaborated a conceptual hydrogeological model, in which the authors identified a dynamic interaction between the surface and groundwater of Los Patos River and its tributaries. In the numerical model, the authors simulate two freshwater extraction scenarios that include Sal de Vida and other mining projects. In relation to the freshwater wells of Sal de Vida, the authors show maximum projected declines for scenario 1 between 0.4 m to 1.2 m, while for scenario 2, they show depressions between 1.6 m to 3 m. However, the simulation does not analyze the reduction in superficial flow, and even less, the impacts on critical riparian habitats (hydrophilous grasslands, meadows, and wetlands). It should be noted that this independent study considers the cumulative effects of the simulated extraction of six mining projects within the same watershed. However, the Sal de Vida EIA does not acknowledge the existence of other projects in the identification and assessment of cumulative impacts (see cumulative impacts section).

Additionally, the complete and irreversible drying up of the Trapiche River floodplain has already occurred as a result of freshwater extraction by the Fénix project (Livent Inc.) in the Salar del Hombre Muerto basin. The viability of the Sal de Vida mining project is based on the externalization of water resource costs.

## **Social concerns**

**4. Social Conflict and Criminalization.** Local Indigenous communities around the project have been victims of criminalization as a direct consequence of their actions in defending their rights, territory, access to water, and cultural heritage. The Salar del Hombre Muerto and surrounding areas is a territory in constant conflict. For example, on October 31, 2019, several local family members, the Morales, were arrested in their own home. The Antofagasta police officers implemented an abusive and illegal use of force to arrest them before transferring the Morales family to the town of Belén. Mining companies struck an interest in using the ancestral land of the Morales family as a way of passage for mining trucks (commonly called “mining bypass”).

Also, on November 7, 2019, the residents of Antofagasta peacefully demonstrated in the main square to express their opposition to the lithium mining projects in the area. After this peaceful demonstration, a local leader received a police summons at his job, an example of the institutional violence and persecution those who oppose mining activity face. A few days later, members of the Atacameños del Altiplano Indigenous community (the main community affected by Sal de Vida), were arrested on their community lands for supposed "threats." Instead of being notified and summoned (as national legislation and international agreements established), they were deprived of their freedom in violation of national and international regulations on Indigenous communities (art. 75 inc. 17 of the National Constitution and art. 10 of ILO Convention 169).

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<sup>7</sup> Consejo Federal de Inversiones. (2021). Estudio hidrogeológico cuenca del río Los Patos-Salar del Hombre Muerto – 2da Etapa. Informe final.

On December 19, 2019, a new episode of institutional violence occurred. Mr. Román Guitian and his family (members of Atacameños del Altiplano community), were persecuted within their community territory (an area close to the mining company) by two police officers driving a private van that belongs to the mining company.

The repetition of these violent events show that these are not isolated cases. It is a contested territory, in which Atacameños del Altiplano and everyone who opposes the mining activity is subject to suffer criminalization and legal persecution.

Moreover, to speak about the company's track record, Allkem has not a good reputation in terms of compliance with environmental regulations and safeguarding of rights of project affected communities. An [investigation](#) carried out by Fundación Ambiente y Recursos Naturales identifies Orocobre company (Allkem) violated the right to participation and the free, prior, and informed consent of local indigenous communities, in its Olaroz project (a lithium mining project in Argentina, as Sal de Vida project).

**5. Lack of information and weak consultation process.** Since the beginning of Sal de Vida, there was a complete lack of access to information for local and project affected communities. Due to the absence of information provided by the company, several requests for public information were made to the provincial government, which were not answered or only partially resolved.

The lack of information disclosure about the Sal de Vida project violates access to information rights. It is worth noting that in October 2021, the company held informative talks and a supposed consultation in the town of Ciénaga Redonda. However, the consultation did not meet the regulatory and culturally appropriate standards for Indigenous and non-Indigenous communities. The notice of the consultations were distributed by QR codes, which requires a cell phone to access and is inaccessible to most of the Antofagasta de la Sierra population, who lack adequate cell phones and internet connectivity to access the information in the QR code. Thus, the use of a QR code system had limited participation from the community.

Secondly, it was only in that instance that Allkem, together with the Ministry of Mining, provided (for the first time) the complete Environmental Impact Assessment - despite the EIA having been requested by representatives of the Atacameños del Altiplano community several times. The population had only one month to read, analyze, share it with technicians, prepare their comments and questions, and participate in the consultation. Due to the report's length, language, and complexity, one month was not enough time to analyze the Environmental Impact Assessment and have informed participation in a consultation. The Atacameños del Altiplano felt they did not have enough time and information to have a strong and effective participation the day of the consultation.

Finally, according to the Environmental Impact Report presented by Allkem, the area of direct social impact is the community of Antofagasta de la Sierra; while the entire province of Catamarca is the area of indirect social impact. However, the company carried

out a weak consultation process only in the town of Ciénaga Redonda, despite the area's limited access to project information and internet connectivity problems. Thus, the entire population identified by Allkem in the area of social influence was not allowed to participate in the “consultation” carried out by the company. This violated their right to access project documents and information to know about the risks, impacts, and benefits of the project to be prepared to effectively engage in the consultation process.

Consequently, we highlight the seriousness of the absence of effective and meaningful participation of stakeholders and project affected communities throughout the Sal de Vida project stages - from the proposal to the IFC Board’s consideration.

**6. Lack of consideration of sacred ancestral sites.** The Environmental Impact Assessment presented by Allkem did not identify any sacred sites, but also doesn’t describe any dialogue with the Indigenous communities (Atacameños del Altiplano and Atacameños del Andiofaco) regarding the identification, location, and registration of cultural and sacred sites.

Despite the supposed absence of sacred sites according to the Environmental Impact Assessment, there are various sacred sites in the territory affected by the project. Two of the sites identified as sacred by Indigenous communities are: "Punta de la peña" and “Tumba del hombre muerto”.

Tumba del hombre muerto has a special cultural and spiritual significance for the community due to ancestors of the Guitian family resting there, an original family from the salt flat. This grave “Tumba del hombre muerto”, gave the name to the salt flat “Salar del Hombre Muerto”.

In the absence of identification and registration of ancestral cultural sites by the Environmental Impact Assessment, important areas are in danger of being partially or totally impacted, and even damaged, as a result of the Sal de Vida project. Further, this grave and spiritual site was threatened through the construction of the mining road.

**7. Legal actions at the national level against the company:** Due to violations of rights previously mentioned, the Indigenous community Atacameños del Altiplano, carried out administrative and judicial actions at the national level to denounce the behavior of the mining companies in the region and systematic violation of their human rights. Currently, judicial file No. 54/2022 is being processed by the Supreme Court of the province of Catamarca, which requests the urgent suspension of mining projects that request the extraction of water from Los Patos river (Sal de Vida and others). The suspension request is based on the lack of a corresponding, cumulative, and comprehensive EIA and disclosure of these documents. Further, this request is made due to the violation of the rights of the Indigenous communities that ancestrally inhabited the Salar del Hombre Muerto (National Constitution, National Law 21.160, National Law 25.657, Free Prior and Informed Consent regulated by ILO Convention 169, the United Nations Declaration on the Human Rights of Indigenous Peoples, and the American Declaration on the Rights of Indigenous Peoples).

## Recommendations

Considering the points raised above, we recommend that the IFC postpones the decision regarding the financing of this project until the following actions are taken:

### 1. Strengthen the Environmental Impact Assessment

- **Reassess the extent of the direct and indirect areas of influence of the project:** The IFC should require Allkem to review the current EIA and set a proper determination of the direct and indirect area of influence. As mentioned, the current EIA underestimates the direct and indirect areas of influence, thus reducing the scope of the project's environmental impacts and underestimating the hydrological and hydrogeological effects and the impacts on local biodiversity.
- **Strengthen the water pressure analysis:** The lack of accurate and appropriate hydrogeological information on the scale of the mining project in the EIA underestimates the water pressure. The baseline information about the water balance and hydrogeological models within the current EIA is insufficient. Also, the hydrological data collection presents methodological mistakes. The water pressure analysis should be strengthened to address the methodological mistakes and use proper and sufficient data pertaining to the project's scale.
- **Develop a cumulative impact assessment and make it public by sharing it with provincial authorities and project affected communities:** The current EIA does not include the assessment of cumulative impacts. Identifying cumulative impacts is key to understanding the water pressure in the Salar del Hombre Muerto where Sal de Vida is located, and IFC should consider this during project appraisal. Currently, eight lithium brine mining projects are registered in the Salar del Hombre Muerto. All of them are located in the same endorheic basin, using the same brine resource and the same fresh water for processing the mineral. In conversations with IFC management, they claimed that they required the client to develop a rapid cumulative impact assessment. However, the document is not public and has not been submitted to the relevant provincial authorities and project affected communities.

### 2. Strengthen the consultation process and engagement with Indigenous Peoples and local communities

- The IFC should require the company to carry out a consultation process not only open to Indigenous and non-Indigenous peoples, but also to inhabitants of the social impact area identified by the EIA. Also, the consultation process should be implemented according to PS 1 and national standards.
- The consultation process should be meaningful and robust to guarantee the participants' security and avoid criminalization, and harassment of local leaders and/or members of local communities who oppose or raise questions about the project. Allkem and its subsidiary Galaxy Lithium SA. must guarantee a safe environment to conduct consultations that are based on good faith and are

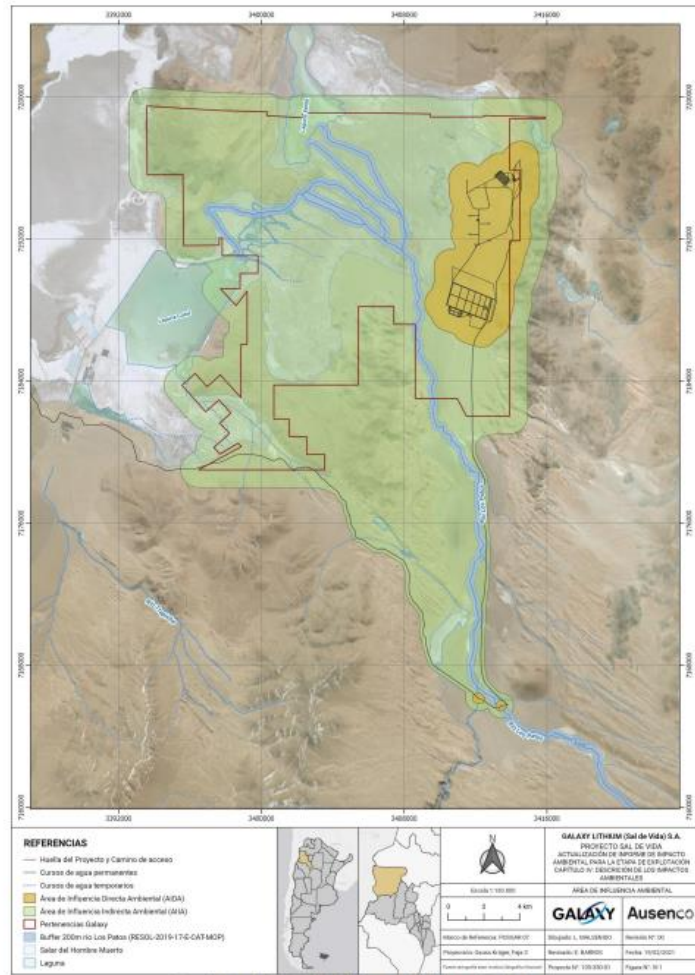


culturally appropriate, particularly addressing the concerns of those who oppose the project or have raised concerns about it.

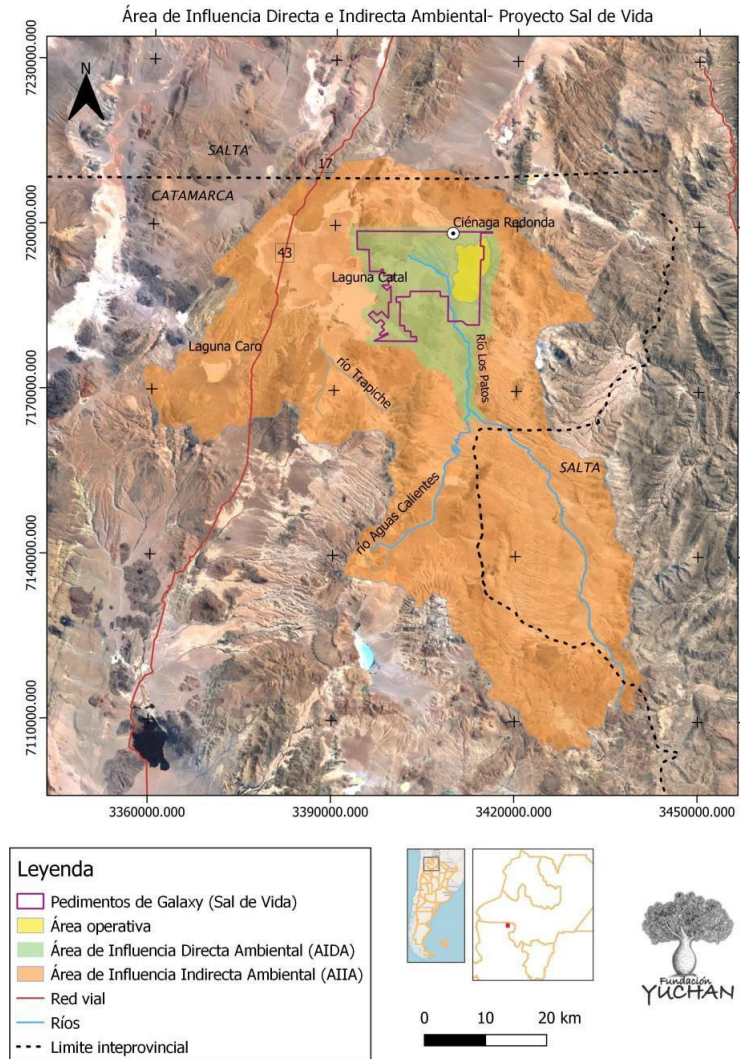
- IFC should supervise that the company is effectively disclosing complete information about the project risks, impacts, and benefits with project affected communities and stakeholders and that their views and perspectives are taken into account in the Environmental and Social Management Plan. The company should share information about risks and impacts in a timely and culturally appropriate manner with project affected communities. It also must be in a format that is accessible and that facilitates understanding for communities to be prepared to meaningfully participate and provide their input in consultations.
- The information provided by the company must be objective and account for the real impacts of the project within the territory, including negative impacts on cultural heritage and sacred sites, such as the Indigenous gravesite, Tumba del Hombre Muerto.

### **3. Develop a contextual risk Assessment**

- **Strengthen environmental and social appraisal and supervision:** The IFC should require the company to conduct a contextual risk assessment that evaluates external risks of the operating environment, such as legacy issues, unresolved land disputes, the role of private and public security forces, internal social conflict, etc. All these risks must be factored into decision-making and overall risk management, including potential unresolved legacy issues.



(a)



(b)

Fig. 1 Area of direct environmental influence and area of indirect environmental influence according to the Environmental Impact Assessment of Sal de Vida Project (a); and according to the national and international criteria and standards (b).