

Participatory Monitoring and Assessment: The Case of the MLP project

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ABSTRACT

Historically, in Chile the monitoring and assessment of mining projects has been carried out by mining companies in response to the authorities requirements, by using standardized procedures and tools (with adequate techniques), but without the involvement of the community. Usually, this situation has generated mistrust within the population in the close areas, especially, associated to the results of the monitoring presented by the mining companies and the potential impacts involved.

In order to make the monitoring process more inclusive, and more responsive to the needs and aspirations of those most directly affected, Minera Los Pelambres has started a Participatory Monitoring and Assessment, associated with its projects.

Participatory monitoring and assessment is a process through which stakeholders at different levels engage in monitoring or evaluating a project, sharing the control over the content, the process and the results of this activity and engage in identifying or taking corrective actions.

In this sense, Minera Los Pelambres is developing a Participatory monitoring and assessment of the surface and groundwater monitoring network, in order to evaluate, in conjunction with the community and authorities, the water quality downstream their installations.

With this new paradigm, it is looked for an actively participation of the different stakeholders involved, in reflecting and assessing the progress of the project and the achievement of results (in this case, checking that the project is not affecting the water quality), building a transparency environment, and taking corrective actions opportunely to improve the performance of the project.

Keywords: Participatory Monitoring, Mining Projects, water, groundwater

INTRODUCTION

Participatory monitoring arises in working groups, between mining companies and community, in order to clarify the process of measuring variables and environmental components, especially those who are sensitive to the community, including the water quality.

Historically the participation of all stakeholders was not considered in the monitoring and evaluation of mining projects. In terms of Water Resources, the main concern of the community is related with possible impacts on the water quality, due to its importance in its use as a drinking water or in irrigation of crops.

The main objectives of participatory monitoring are the following:

- Involve the community in the process of measuring variables and environmental components, currently carried out by the mining companies.
- Analyze the behavior of environmental components, trends and variations, understanding its causes and consequences.
- Spread the results of the participatory environmental monitoring to the environmental board members and community representatives.

This paper presents the implementation of a participatory monitoring system, developed by Minera Los Pelambres in both the Choapa river basin (basin associated with the mining exploitation area), and in the Caimanes Area (area where is located the tailings dam), showing their mains results.

METHODOLOGY

Establishing Working Groups

A Working Group is a group formed by members who represent the different stakeholders interested in a specific topic and/or issue that is considered relevant to them, providing more focus to enhance the development of the issue and/or topic.

Working Groups, between mining companies and community, for the systematic monitoring of water quality in the areas of influence of mining activities are generated. In the formation of working groups, the participation of the following main agents should be considered:

- Private sector, composed by mining companies, along with other agents in the productive area, which use water in the basin (eg. agriculture),
- Public Sector, composed by government entities,
- Social Groups,
- Executing Entity, which corresponds to an impartial unit that executes and analyzes the results of the monitoring

In Figure 1 presents the various stakeholders with whom the working group is formed to develop the Participatory Monitoring

The main aspects of monitoring are agreed between the different stakeholders, including the following points:

- Definition of monitoring points (It should be take into account the particularities of the

various control points that can determine the monitoring protocol)

- Establishment the frequency of the measurements,
- Parameters of interest and reference values,
- Protocol for sampling (sampling, fill and seal packaging, transportation of samples, etc.)
- Quality control of the sampling process
- Definition of the Laboratory that will carry out the analyses
- Reports generation
- Communication of the main results to the community

The establishment of the points outlined above generates a process of traceable and coded Sampling, which is carried out by an independent entity (impartial), in which the community representatives act as attester of the process, participating in the monitoring by generating their own photographic records and sealing the samples.

It is noteworthy that applicable technical regulations associated to the monitoring, which regulate the types of containers, preservatives, minimal sample volumes, transport conditions, maximum storage times, are the following (depending to the type of water controlled):

- NCh 409/2 Of. 2004: Agua Potable. Muestreo
- Manual de Métodos SISS última edición 2007
- NCh 411/6-1998. Muestreo. Parte 6: Guía para el muestreo de ríos y cursos de agua
- NCh 411/11-1998. Muestreo. Parte 11: Guía para el muestreo de aguas subterráneas
- Standard Methods for the Examination of Water and Wastewater 21 th ed. 2005.

The labs in charge of the execution of the monitoring and analysis are selected by the community. To be selected, the labs must be registered by the Instituto Nacional de Normalización de Chile (INN) and must be INN-ISO 17.025 certificated.

The monitoring and the interpretation of the results obtained have allowed to modify the monitoring network and the monitoring frequency.

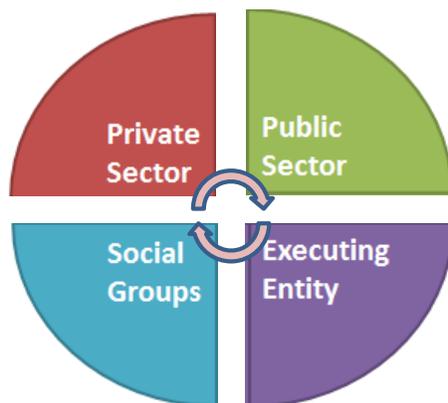


Figure 1 Working groups to develop the Participatory Monitoring

RESULTS AND DISCUSSION

Comprehensive Environmental Monitoring in the Choapa River Basin

The Comprehensive Environmental Monitoring in the Choapa River Basin corresponds to a product of the agreement between the water users of the Choapa river (grouped in the “Junta de Vigilancia del río Choapa –JVRCH–) and Minera Los Pelambres.

The Monitoring program has started in June 2011 and the main actors are presented in Figure 2.

It is noted that the organization in charge of the monitoring (including their analysis) correspond to the Instituto de Investigaciones Agropecuarias INIA, selected by the JVRCH, which is acting as an impartial entity.

The main objectives of this Participatory monitoring are the following:

- To study the status of water quality by applying a monitoring of the surface and groundwater and their environment, considering the evaluation of the composition of river sediments and agricultural soils in the Choapa river basin.
- To develop a training plan on environmental issues, addressed to members of the JVRCH, irrigation communities and water users in general in the area.
- To provide systematic environmental information to assess potential impacts due to contamination events.

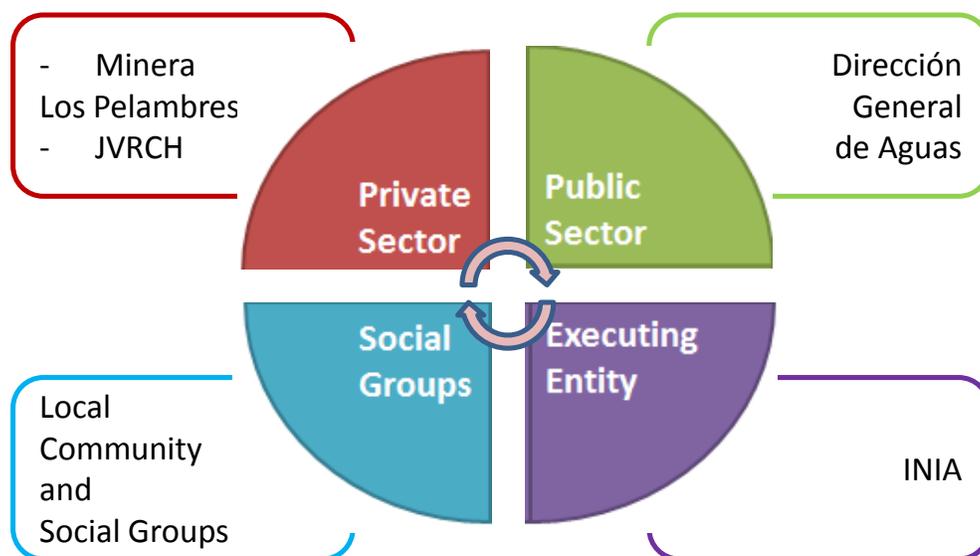


Figure 2 Formation of a Participatory Monitoring Group in the Choapa river basin.

The main activities carried out within the Participatory Monitoring are the following:

- Generation of simple reports about the water quality that is monitored, which is delivered to the local water suppliers involved in the initiative.
- Training and sampling campaigns with the participation of the community

- Visits to laboratories by the community
- The sampling campaigns last about a month, ranging from high part of the basin (Pelambres river) to its mouth (Huentelauquén). Figure 3 presents the location of monitoring points in the Choapa river basin (in total 32 points, divided in 17 wells and 15 river stations).
- The Frequency of these monitoring campaigns is seasonal (4 monitoring campaigns in a year).

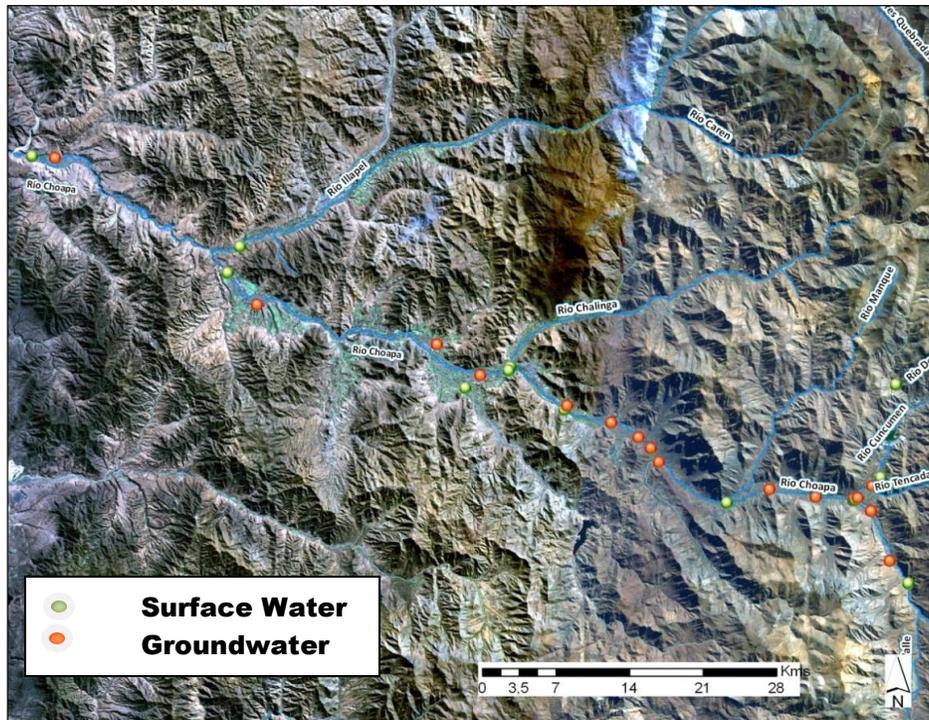


Figure 3 Monitoring points associated to surface water and groundwater in the Choapa basin.



Figure 4 Water resources monitoring at the Choapa basin – SAI Project

The main results of the Participatory Monitoring are the following:

- Surface Water
 - Surface water monitored in the Choapa river basin, presented a 59% of the parameters within normal levels to be used as irrigation water according to the Chilean regulation (NCh 1333).
 - Among the parameters determined in situ, the Illapel river in the El Peral area, presented very high electrical conductivities, unfit for irrigation purposes according to NCh 1333.
 - Considering anions and cations measured, anions chloride, fluoride, and sulfate indicate concentrations below the limits established in the NCh1333, without presenting a risk to be used for irrigation, at least in terms of these elements
 - During the year 2014, the results of the monitoring at the station located downstream the mining installations (MLP), called "Río Cuncumén antes de junta c/ Río Choapa", indicate concentrations below the limits established in the NCh1333, for all the parameters measured, suggesting that main dissolved ion concentrations come from Río Choapa and not from mining operations.
- Groundwater
 - The groundwater monitored in the Choapa river Basin presented a 79% of the parameters at normal levels for potable purposes (the Chilean standard corresponds to the NCh409).
 - Comparing the groundwater quality with the concentration limits indicated in the NCh1333 (irrigation purposes), only 17% of the parameters was found in concentrations greater than the limits established.
 - Groundwater table have remained very similar between campaigns. However, in Santa Rosa and Mincha Norte areas have registered in recent campaigns a diminution in the groundwater levels due to the drought conditions affecting these areas during last periods.
 - The concentrations of total copper were presented within the values regulated in both NCh1333 and NCh409 (irrigation and drinking water), indicating that there is no risk to be for these uses, at least in terms of this parameter.
 - The monitoring results are spread out to the community. As an examples, the following web pages are presented:
<http://riochoapa.com/pag17.html#>
http://www.mch.cl/noticias/index_neo_formacion.php?id=47749

Participatory Monitoring in the Caimanes area

The main goal of this participatory monitoring is to integrate the population of this location (Caimanes) and the authorities, in the monitoring of the water quality at the Pupío creek basin. The development of this Participatory monitoring has been carried out according to the following chronology:

- The Monitoring program has started in April 2011 in order to be a channel to capture the community concerns.

Initially the working group was formed by the Operator of the Caimanes water supply system (APR Caimanes), SGS Chile Lab and MLP.

- In June 2012 it was incorporated to the monitoring, the Chilean institution called CENMA, at the request of the board of the APR Caimanes and MLP.
- In October 2012, It joins to the monitoring activities the DGA (government entity).
- In June 2013, it is integrated the Municipality of Los Vilos. They rarely participate in the activities programmed.
- 8 points are monitored at this location (all close to the Caimanes area – groundwater, surface water and tap water-).
- The monitoring activities are carried out every month.
- Laboratories SGS Chile and CENMA (HIDROLAB), give directly to the board of the APR Caimanes, the results of their analysis of the water quality.
- Quarterly, it is carried out a meeting with the different members that compose this participatory monitoring (MLP, APR, DGA and municipality) where both laboratories independently present their results, so they could be contrasted over standards references and historical records.
- From the results of water quality presented by SGS and CENMA it is concluded that the concentrations measured by both laboratories are very similar each other. Also, the measurements are indicated that there is not alteration of the water quality and they are not exceeding the following references:
 - NCh 1333.Of78 "water quality requirements for different uses" P6 - Irrigation
 - NCh 409/1 Of 2005 Water - Part 1 - Requirements.
- The APR board and authorities agree with this initiative as it allows the integration of the community, authorities and private, through a participatory process that demonstrates that the MLP activities are not affecting the water quality.

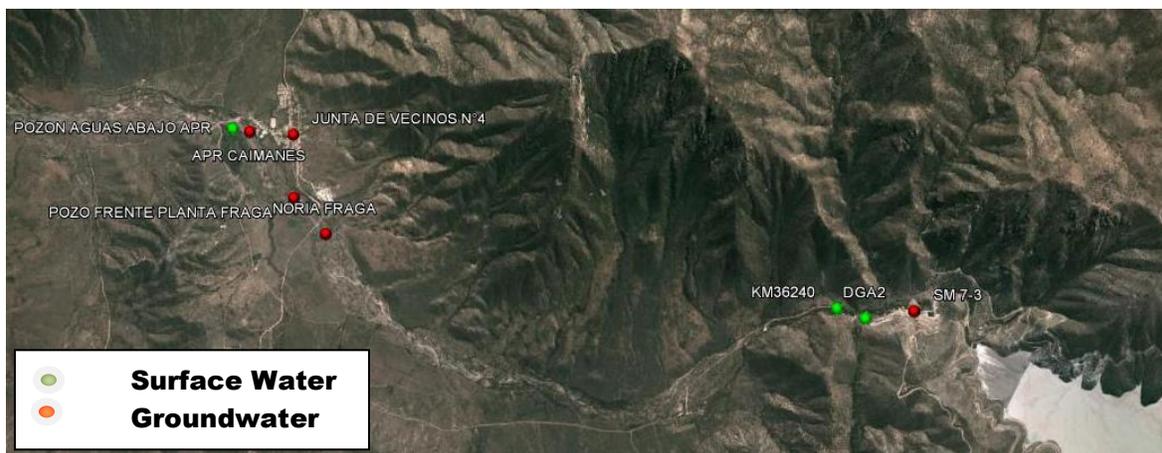


Figure 5 Sampling points (water resources) considered in the Caimanes area.



Figure 6 Water Sampling activities associated to the Participatory Monitoring in the Caimanes Area.

CONCLUSION

The development of the participatory monitoring, carried out by Minera Los Pelambres, has allowed to reach the following purposes:

- Generation of Information, which is known by the different stakeholders, and that it has been generated properly accordingly with the technical regulations
- It is been installed a collaborative process between MLP, the public sector and the communities, organized around a topic of common interest (water quality).
- All participants in the process have provided insights and information to minimize the gap of technical and social knowledge.
- The information has oriented options for improvement in the management of water resources and in the agricultural planning.

Major Challenges

- To create opportunities for participation with other important government entities in order to the enhancement of this program (SAG, MMA, etc.)

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SGS, Informe Mensual Monitoreo Participativo Caimanes, periodo 2011 -2014.