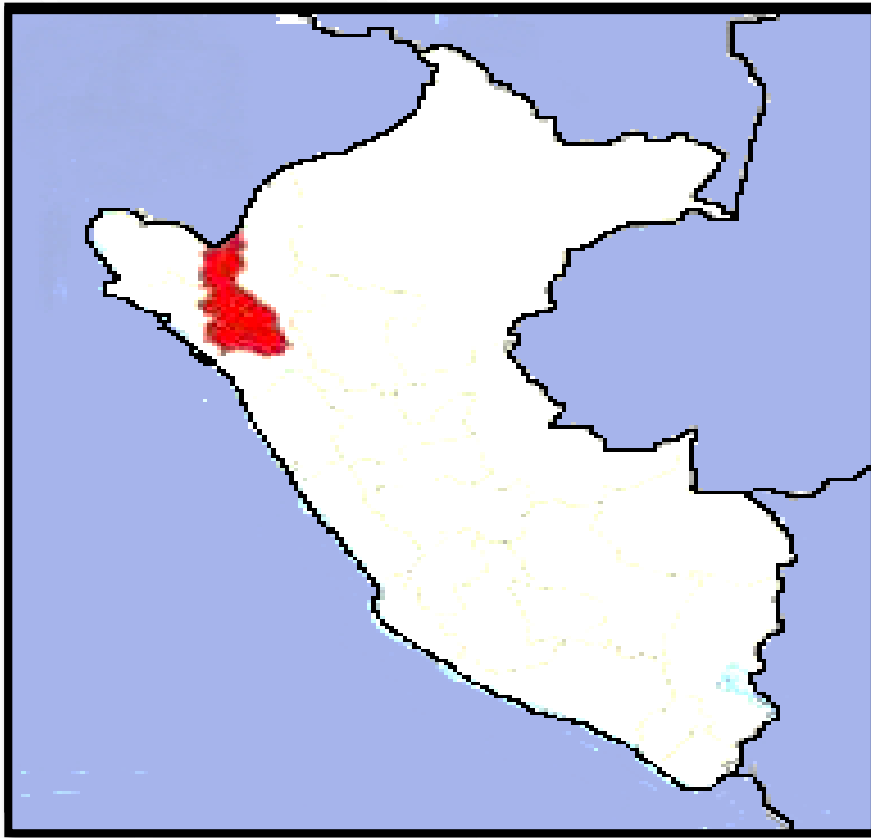




INTEGRATED APPROACHES OF WATER AND SOLID WASTE MANAGEMENT IN MINING RECLAMATION

***Engineer Alfredo Angulo Sagástegui
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Location



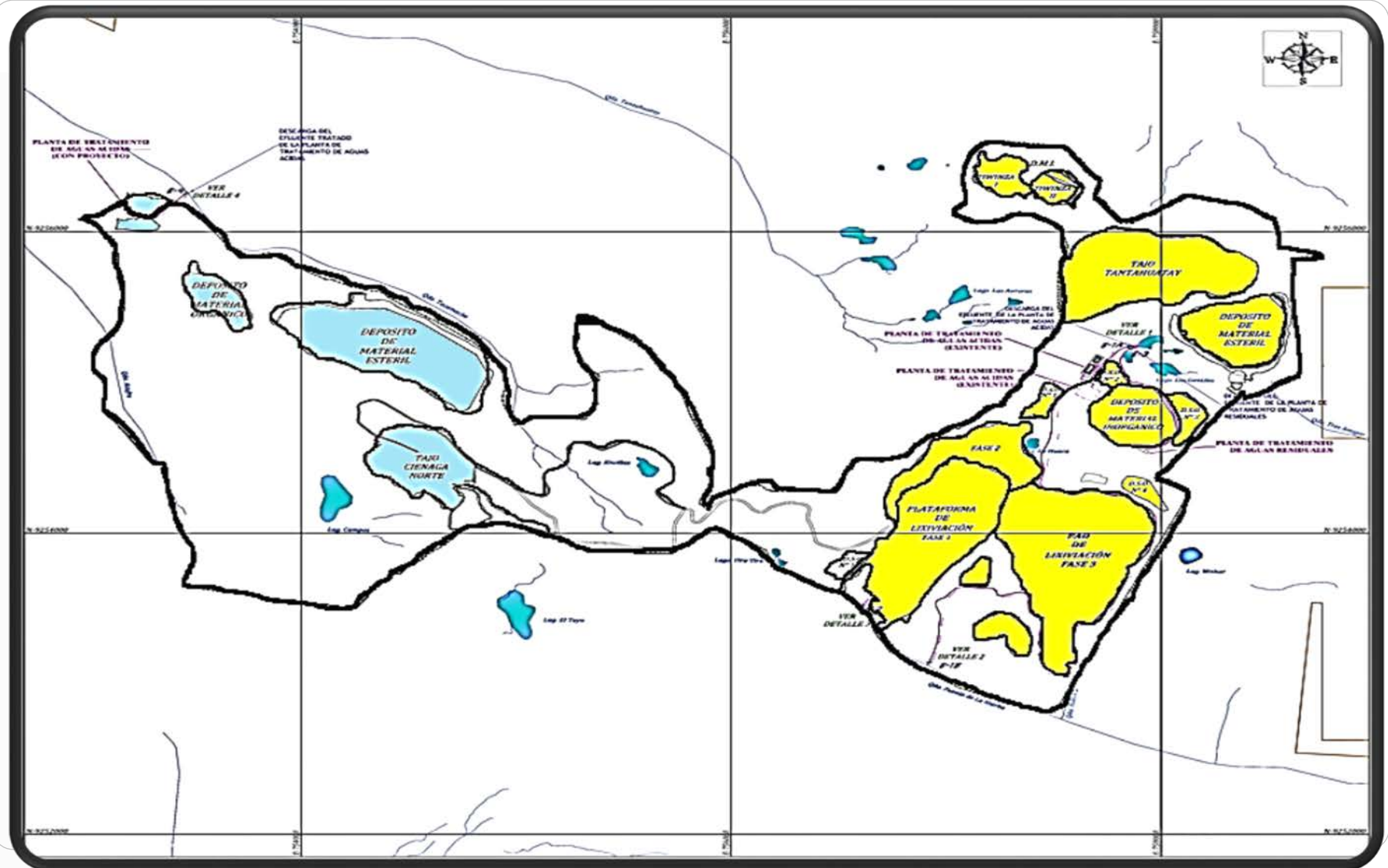
Introduction



- Southern Copper Corporation (44.2 %), Buenaventura Mining Company SA (40.1), and Espro SAC(15.7)
- Peruvian Andes between 11,400 to 13,000 feet asl (900 mm/year of rain)
- Started operations in 2011 (open pit mine)
- Produces gold and silver ores
- Capacity of 36,000 TMD

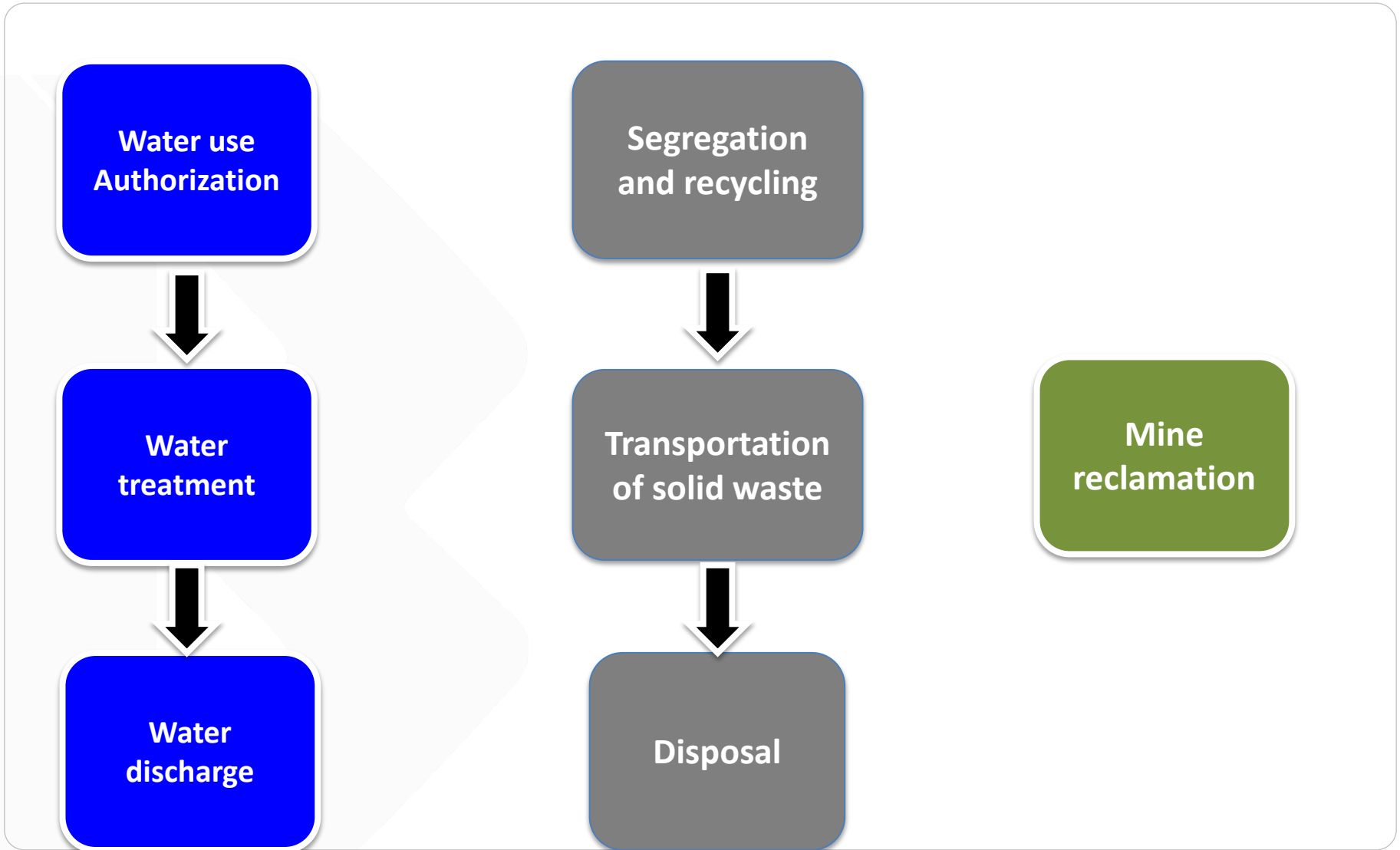


Project Components

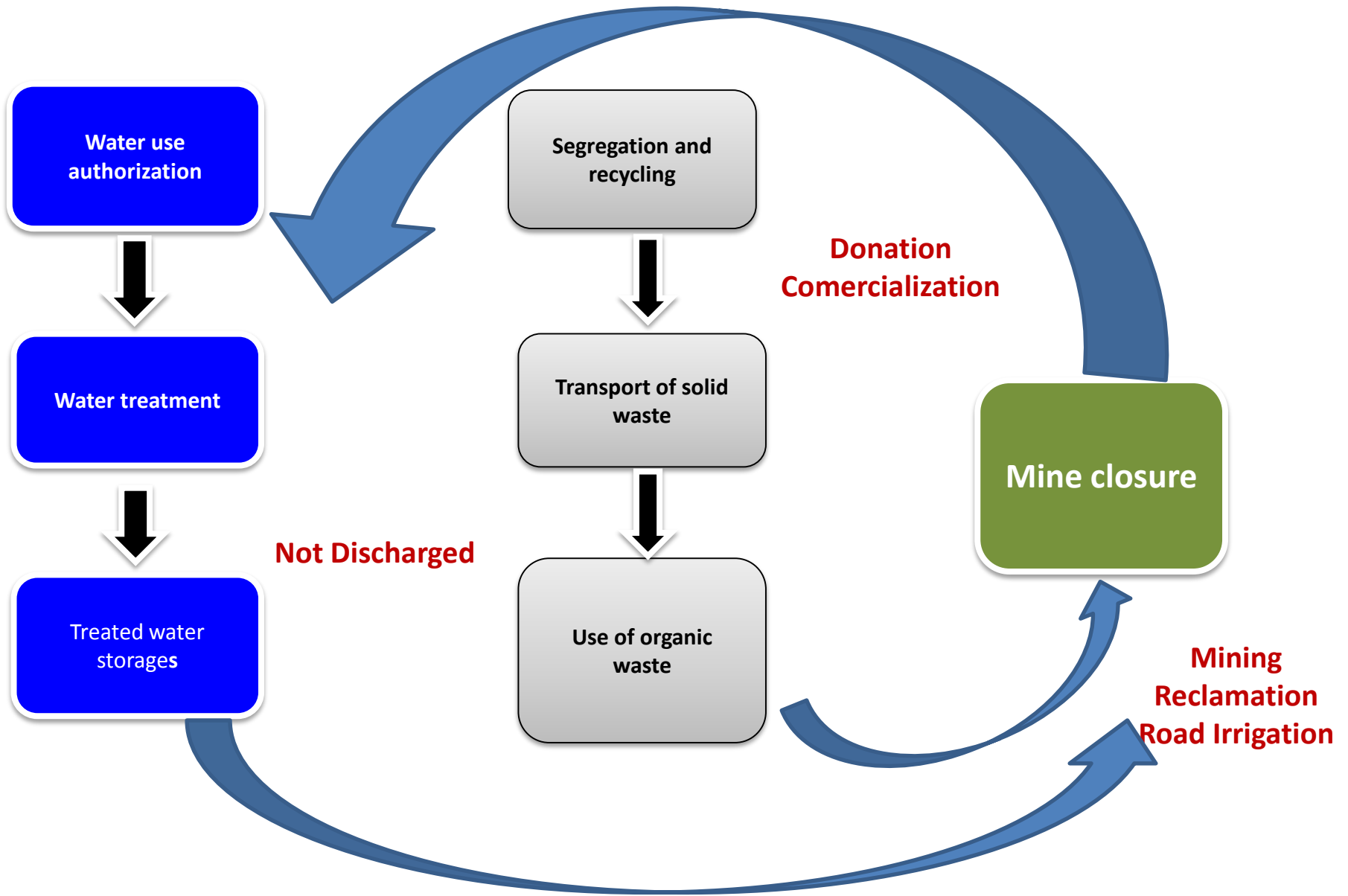




Peruvian Regulatory Scheme



CMC Improvement Approach





Water Contact

- All water is treated in the Acid Water Treatment Plant, Sewage Treatment Plant and Cyanide Destruction Plant.
- 100% of these water is reused

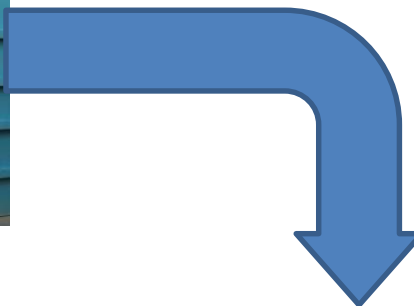


No Water Contact

- Physical treatment to recipitate sediments

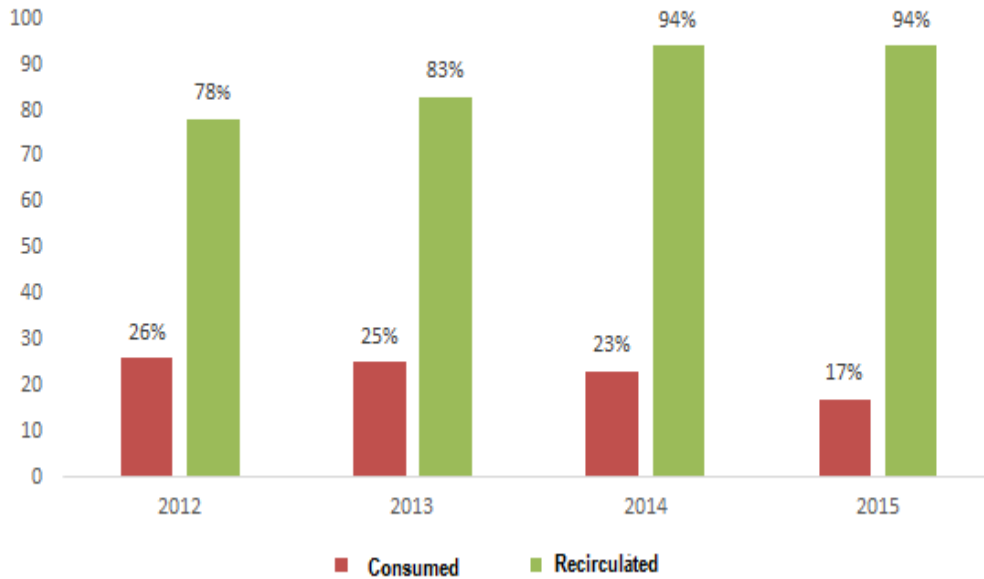


Water Recycling



Water Management

Water consumed and recirculated



Management of Solid Waste



Donation



Comercialization



Organic Solid Waste Management



1) Chopping of organic waste



2) Inoculation of effective microorganisms



3) Incorporation in revegetation process



4) Final results



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Recognition



FIGARS 2012

Otorgado a:

CIA. MINERA COIMOLACHE S.A.-U.P. TANTAHUATAY

En mérito al civismo demostrado, según Ordenanza Municipal 191, como reconocimiento a las buenas prácticas en el manejo de residuos sólidos que se generan en su institución.

Cajamarca, diciembre 2015



Ing. José Pajares Abanto
Gerente de Desarrollo Ambiental



Ing. Jessica Lau Zamora
Coordinadora Proyecto FIGARS



Native Species



1. CORTADERIA (*Cortaderia selloana*).



2. QUINUAL (*Polylepis racemosa*).



Native Species



3. CHINCHANGO (*Hipericum laricifolium*).



4. ALISO (*Alnus acuminata*).



Native Species



5. PANRRO (*Weinmannia cymbifolia*).



6. CHILCA (*Baccharis latifolia*).



Native Species



7. LA QUINA (*Cinchona officinalis*).



Mining Reclamation





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Mining Reclamation





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Mining Reclamation



Año	2011	2012	2013	2014	2015	2016
pH	3.2	3.4	4.8	6.1	6.1	6.3



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Mining Reclamation





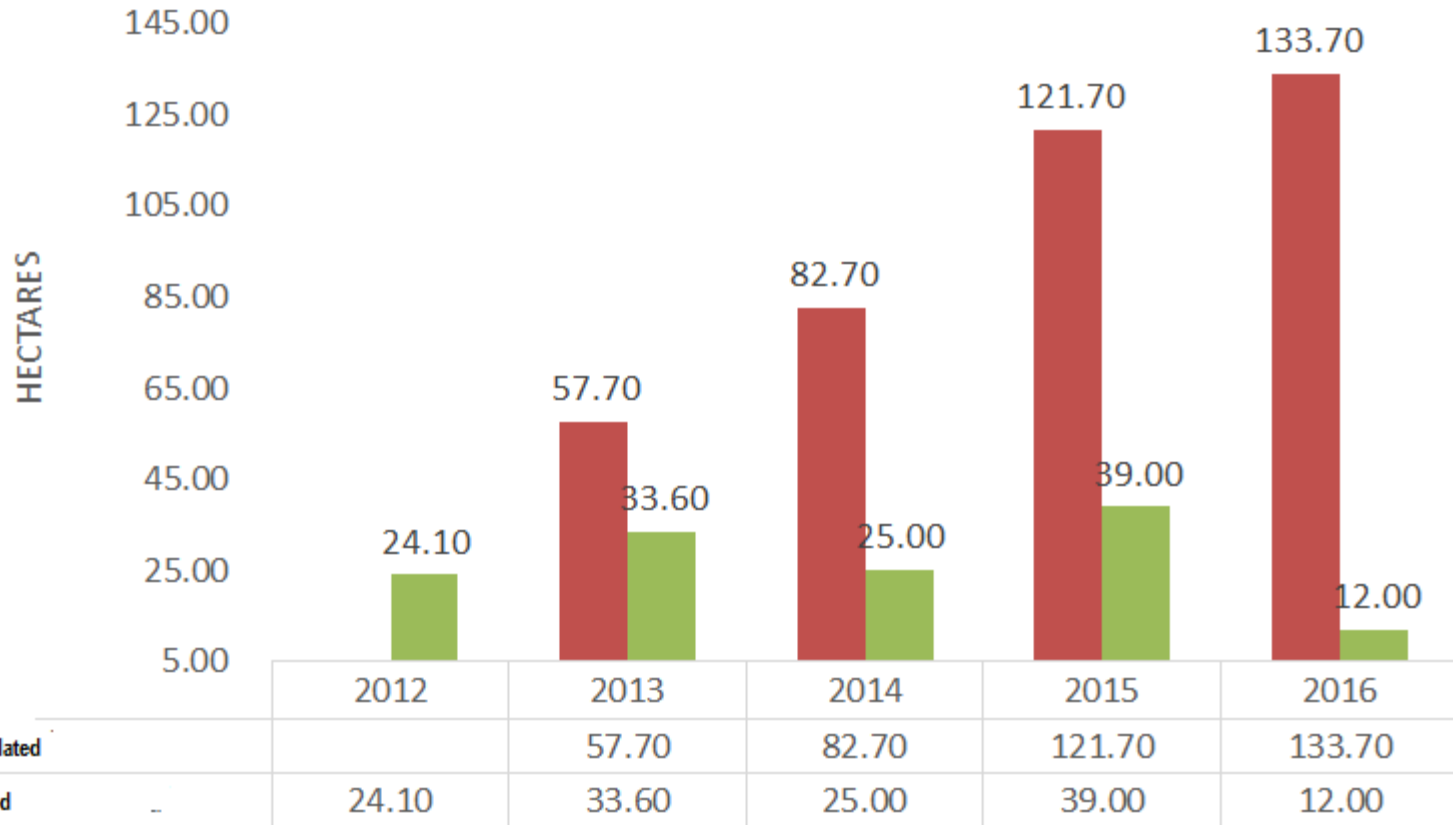
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Mining Reclamation



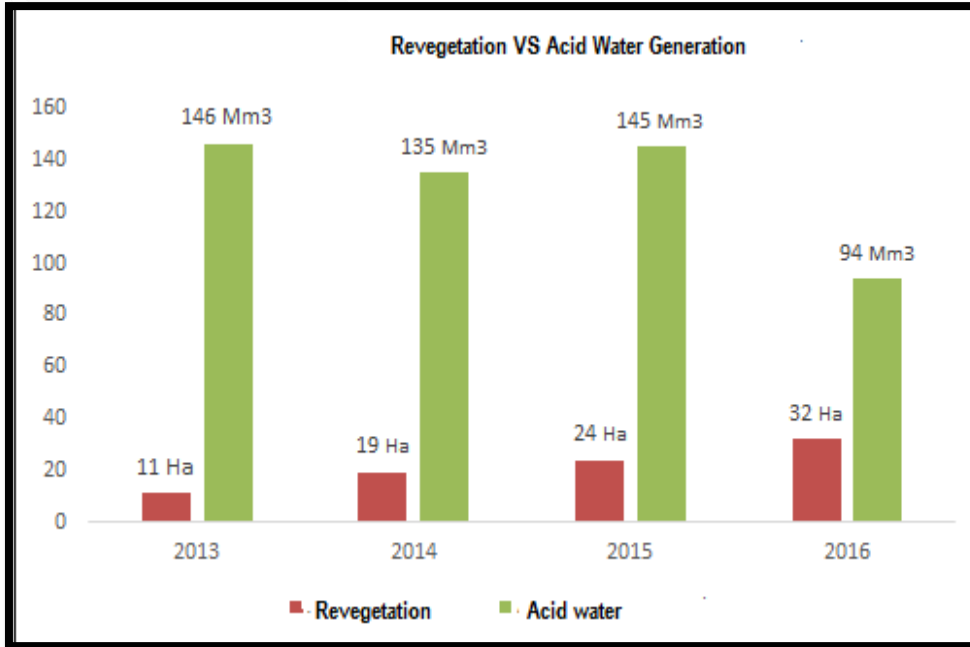


Revegetation



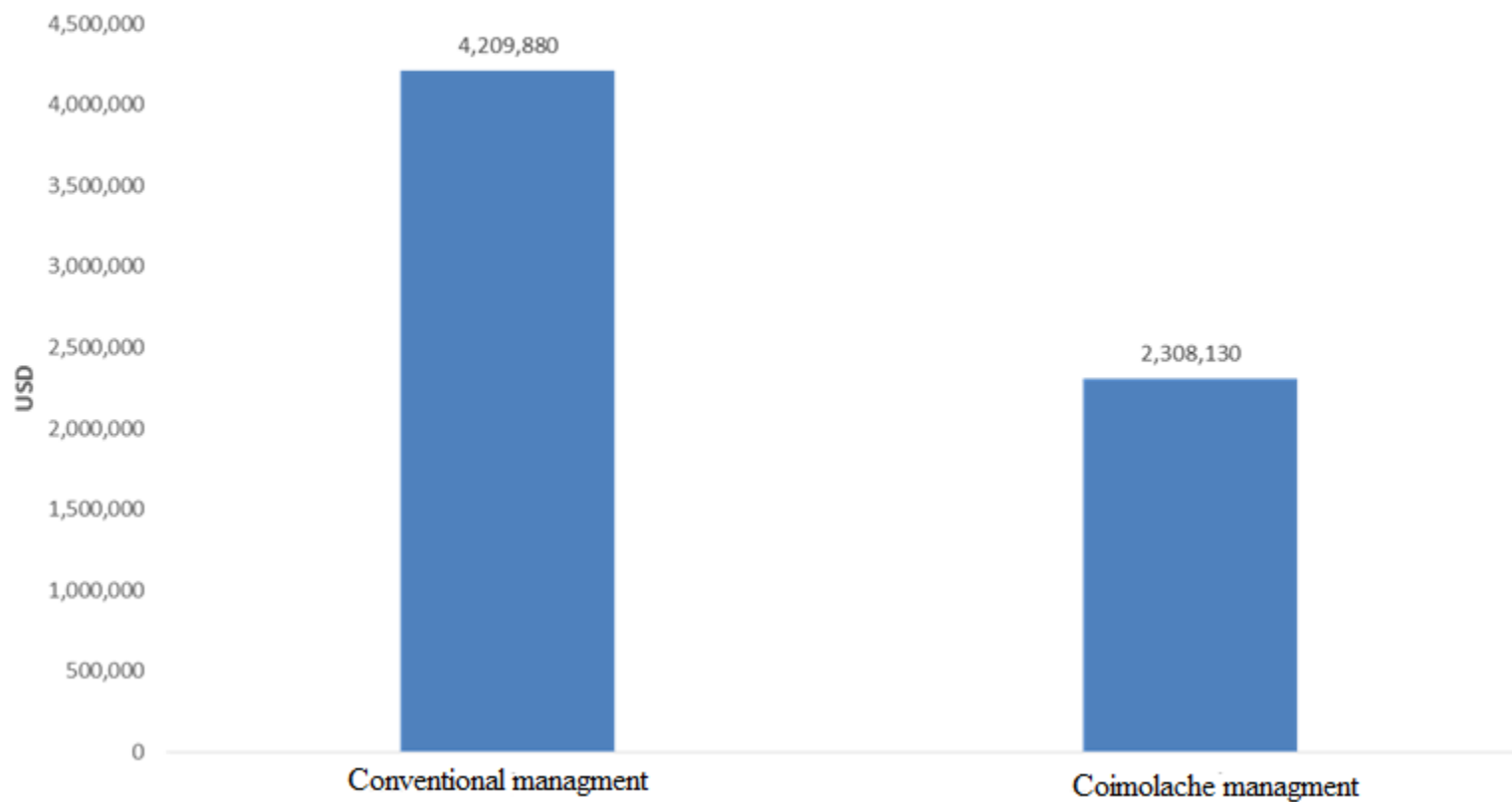


Acidic Water Minimization



Saving Costs

Environmental Operating Cost



Challenges: Steep Slopes



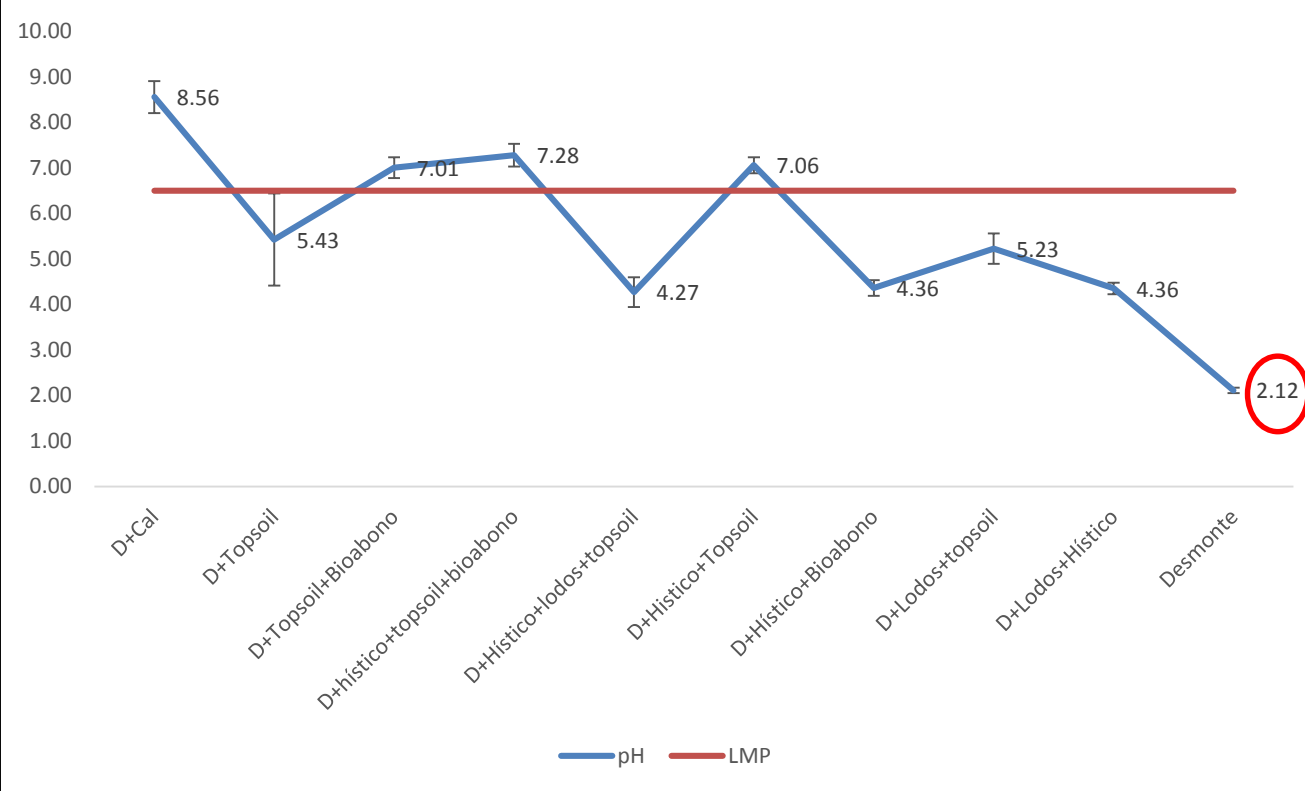
- Revegetation on steep and rocky slopes

Challenges: Capping Techniques



pH Results

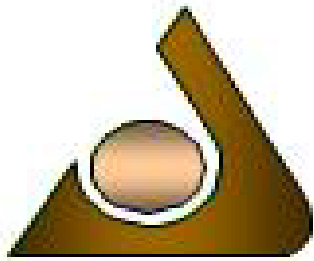
pH de Subdrenaje en Diferentes Coberturas





Visitors





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Thanks