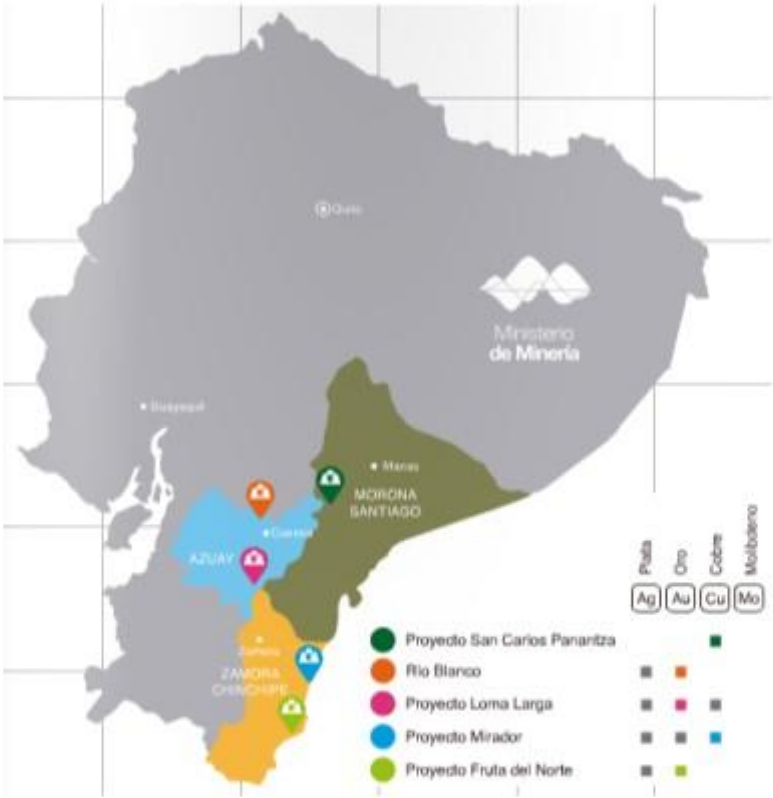
The trends and challenges in teaching Mining Engineering

The development of mining in Ecuador is one of the government's top priorities within the strategic sector. The mining ministry and the national mining development plan have been created recently. Mining has been identified as an activity that creates sustainable development on a local, regional and national level.

Mining here is focused mainly on extracting gold, silver and copper though five strategic mining projects.



Also available are deposits of Molybdenum, barium, uranium, thorium, cesium, niobium, tin, tungsten and Lead.

Medium and large scale, open pit and underground mining techniques are going to be used and the projects will last between 11 and 27 years.

Mining is an activity that generates significant impact, including environmental (such as contamination), social (conflicts) and health (cancer, skin and breathing problems) as well as possible damage to the ecosystems around it. That's why responsible management is required, that will focus on taking care of the environment as well as the health and safety of human beings while generating benefits for society in general.

Nowadays we can still find artisanal mining which uses techniques that are intensive, and potentially dangerous on the water source and can also contaminate land. This has possible health risks for the miners. Thankfully this practice has diminished with recent laws around this subject.

There are various institutions that regulate mining in Ecuador such as:

- The Ministry of Non Renewable Resources
- The Mining Regulations and Control Agency
- The National Institute of Geological Research (Mining and Metals)
- The National Mining Company

Clean and Responsible Mining

Clean and responsible mining is executed under strict parameters based on international norms to develop a quality program that will not destroy the environment.

To this effect, we need to consider the different phases of mining and the impact generated by each one.

- Prospecting
- Exploring
- Exploitation
- Benefits
- Smelting
- Refining
- Commercialization
- Mine Closing.

The Trends and Challenges in Teaching Mining Engineering

There isn't any program in the world that can generate new and significant knowledge on its own, it requires collaboration from many other disciplines. For example, an important medical discovery needs teamwork between Physicians, Mathematics, Biologists, Chemical doctors, and many more.

Teaching mining engineering is not an exception. It requires a substantial leap that will integrate additional elements related to the application of clean technology, lifecycle analysis (from birth to death), new materials, decreasing environmental impacts, remediation, biotechnology, occupational health and safety and management skills, all for each one of the phases of mining.

A fundamental aspect is interdisciplinary research, which allows the design of solutions to specific problems in mining. New techniques, that are economic, social and environmentally sustainable, should be aligned with experts from other disciplines, the participation of national and international research networks and a focus on linking all of the mining sectors to have active feedback and achieve the required needs.

All of this should be supported by legislation that gets along with the needs of development and sustainability, that its clearly written, permanent and that it gives the correct conditions to attract foreign investment.