

# How should we make decisions and prioritize work in environmental sustainability?

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## **ABSTRACT**

Mineral development can cause significant changes to an environmental landscape and create significant environmental risks. Strong environmental sustainability in mining is essential for a thriving local community and a social license to operate during all stages of the mine life-cycle. From this, what are the key features of environmental sustainability in mineral development? Also, how should we prioritize work and planning in environmental sustainability? There are many facets of improving environmental sustainability including using less water, minimizing mine footprint, minimizing waste, using less energy, and generally ensuring a flourishing environment before, during, and after operations. Reviewing multi-criteria analysis and quantitative decisions making tools, this research explores how mine management should make decisions on prioritization of environmental work. In addition, what are the key environmental risks to review when managing environmental sustainability in different situations? Also, how or if projects can vary in environmental sustainability design.

Individual environmental values play an essential role as different people will value the environment in very different ways. The environment can have value in terms of cultural, spiritual, and aesthetic aspects that are not easily valued during economic cost-based analyses. In addition, ecosystem services like water purification, nutrient cycling, carbon sequestration, and production of food have been previously modeled and valued for environmental decisions. With that in mind, this research will aim to discuss how environmental sustainability prioritization can vary depending on value systems and preferred choice. Game theory will be discussed to analyze how communities, companies, and regulators interact in mining regions for improved environmental resource management sustainability. In the end, the goal will be to understand how technology, policy, and decision-making processes should be developed to improve environmental sustainability within mineral economics. This has important implications for policy makers, community leaders, and mining company managers.

**Key Words:** Mineral Economics, Environmental Sustainability, Decision Making, Game Theory, Multi-Criteria Analysis