

# Decision Making Analysis to Assess Vulnerability to Mining Conflicts in Peru

Jesús Alfaro, Fiorella Aguirre, Amy Checcllo

Universidad del Pacífico

Luis Sánchez Cerro 2141 (Lima, Peru)

{jd.alfaro, fa.aguirrez, aa.checclloh}@alum.up.edu.pe

**Abstract.** Despite the great importance of mining as an economic activity in Peru; its execution has been largely marred by negative impacts, both on the environment and on society itself. It is a fact that a large percentage of social conflicts in Peru are related to this activity. Due to this situation, we decided to apply the Analytic Hierarchy Process (AHP) - a multiple criteria decision-making model to identify the vulnerability of mining projects, based on three main criteria: economic, social and environmental. To evaluate this model, it was applied to three mining projects of great importance in Peru.

This paper obtained consistent results, providing a model that can be used to identify and prevent vulnerability in social conflict due a mining project.

**Keywords.** AHP, mining conflict, economic, social, environmental

## Acknowledgments

Dr. Álvaro Talavera, Faculty Sponsor, Academic Department of Engineering.

## References

- Badri, A., Nadeau, S., & Gbodossou, A. (2011). Integration of OHS into Risk Management in an Open-Pit Mining Project in Quebec (Canada). *Minerals*, 1(1), 3-29. <https://doi.org/10.3390/min1010003>
- Banda, W. (2019) An integrated framework comprising of AHP, expert questionnaire survey and sensitivity analysis for risk assessment in mining projects. *International Journal of Management Science and Engineering Management*, 14(3), 180-192. <https://doi.org/10.1080/17509653.2018.1516577>
- Bebbington, A., Bebbington, D. H., Bury, J., Lingán, J., Muñoz, J. C., & Scurrah, M. (2008). Mining and Social Movements: Struggles over livelihood and rural territorial development in the Andes. *World Development*, 36(12), 2888-2905. <https://doi.org/10.1016/j.worlddev.2007.11.016>
- Bradshaw, S. (2009). *Mining conflicts in Peru: Condition critical*. Oxfam America. <https://policy-practice.oxfam.org/resources/mining-conflicts-in-peru-condition-critical-620802/>
- Castellares, R., & Fouché, M. (2017). The Determinants of Social Conflicts in Mining Production Areas. *Peruvian Economic Association*, 100, 1-26. <https://perueconomics.org/wp-content/uploads/2014/01/WP-100.pdf>
- Dao, M., Nguyen, A., Nguyen, Pham, H., Nguyen, D. T., Tran, Q., Dao, H., Nguyen, D., Dang, H., & Hens, L. (2019). A hybrid approach using fuzzy AHP-Topsis assessing environmental conflicts in the titan mining industry along central coast Vietnam. *Applied Sciences*, 9(14), 2930. <https://doi.org/10.3390/app9142930>
- De Luis-Ruiz, J., Salas-Menocal, B., Fernández-Maroto, G., Pérez-Álvarez, R., & Pereda-García, R. (2021). Determination of Environmental Factors for the Implementation of the Exploitability Index in Industrial Aggregate Mining Using Multi- Criteria Analysis. *ISPRS International Journal of Geo-Information*, 10(4), 196. <https://doi.org/10.3390/ijgi10040196>
- Haslam, P. A., & Tanimoune, N. A. (2016). The determinants of social conflict in the Latin American mining sector: New evidence with quantitative data. *World Development*, 78, 401-419. <https://doi.org/10.1016/j.worlddev.2015.10.020>
- Patyk, M., & Bodziony, P. (2022). Application of the analytical hierarchy process to select the most appropriate mining equipment for the exploitation of secondary deposits. *Energies*, 15(16), 5979. <https://doi.org/10.3390/en15165979>
- Saaty, T., & Vargas L. (2012). Models, Methods, Concepts & Applications of the Analytic Hierarchy Process (Second Edition). *Springer*. <https://doi.org/10.1007/978-1-4614-3597-6>

Saenz, C. (2019). A social conflict diagnostic tool for application in the mining industry: a case study in Peru. *Corporate Social Responsibility and Environmental Management*, 26(3), 690-700. <https://doi.org/10.1002/csr.1714>

Vargas, L., Moreno-Loscertales, C., & Moreno-Jiménez, J. (2021). Conflict resolution in the era of cognitive multicriteria decision-making: an AHPretributive approach. *International Transactions in Operational Research*, 30(3), 1453-1478. <https://doi.org/10.1111/itor.13088>