International Conference on Environmental, Mining, and Sustainable Development (ICEMSeD)
Vol. 01, No. 1, 2026
***e*-ISSN XXXX-XXXX**

SUSTAINABLE MINING AND QUARRYING IN THE GAMBIA: ENHANCING RESOURCE EFFICIENCY AND ENVIRONMENTAL RESILIENCE
A CASE STUDY OF BULLOCK QUARRY

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ABSTRACT

The growing demand for construction materials in The Gambia has increased the importance of quarrying activities, while simultaneously raising concerns about their environmental and social impacts. This study examines sustainable mining and quarrying practices at Bullock Quarry in The Gambia, with a particular focus on enhancing resource efficiency and environmental resilience. The research adopts a mixed-methods case study approach, utilizing both primary and secondary data sources. Primary data were collected through field observations, interviews with quarry management, workers, and local community members, as well as site assessments of operational and environmental practices. Secondary data were obtained from government reports, environmental regulations, academic literature, environmental impact assessments, and industry publications related to sustainable mining and quarrying. The findings reveal that Bullock Quarry contributes significantly to local economic development through employment creation and the supply of construction aggregates. However, the operation faces challenges related to dust generation, noise pollution, land disturbance, waste management, and ecosystem degradation. The study found that resource efficiency can be improved through optimized extraction techniques, recycling of quarry waste, efficient water use, and the adoption of energy-efficient equipment. Furthermore, environmental resilience can be strengthened through progressive land rehabilitation, biodiversity restoration, effective drainage systems, continuous environmental monitoring, and active stakeholder engagement. The analysis demonstrates that integrating sustainable quarry management practices can reduce environmental risks while improving operational productivity and long-term site sustainability. The study concludes that sustainable quarrying requires a balanced approach that combines economic objectives with environmental stewardship and community participation. The Bullock Quarry case highlights the need for stronger regulatory enforcement, investment in sustainable technologies, and the implementation of comprehensive environmental management plans. These measures can enhance the sustainability of quarry operations in The Gambia and contribute to broader national goals of sustainable development and environmental conservation.

Keywords: sustainable mining; quarrying; resource efficiency; environmental resilience; environmental management.

https://doi.org/10.69855/icemsed
https://gpijournal.com/index.php/icemsed
PUBLISHED BY: GPress Indonesia