

Does mining have an effect on land quality?

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Key words: Land distribution; Land management; Land readjustment; Remote sensing; Young surveyor; Keyword 1; Keyword 2; Keyword 3

SUMMARY

Danielskuil is a small place in the Northern Cape province of South Africa situated within the ZF Mgcawu District Municipality and the Kgatelopele Local Municipality. The main economic activities in Danielskuil are mining (especially limestone, diamonds and marble). Danielskuil is situated in close proximity to three mines: Idwala Lime, Petra Diamonds, and KP Lime (formerly PPC Lime). The primary research objective is to investigate the potential impact of mining activities on the quality of the surrounding land. Utilising remote sensing techniques, this study aims to analyse satellite and aerial imagery to identify land degradation patterns, monitor soil conditions and assess vegetation health over time. The research seeks to determine whether mining activities, including blasting, pollution and other related factors have a significant impact on the quality of the surrounding land. The process involves acquiring high resolution imagery of the mining area and landscape, followed by image pre-processing to ensure accurate data. Change detection techniques, such as vegetation indices and land cover classification will then be applied to identify changes in vegetation health and cover. Indicators of land degradation, including soil erosion, water quality changes and vegetation stress are monitored using spectral analysis and DEMs.

Time series analysis is used to identify trends and patterns in land quality changes. The accuracy of the results is assessed through ground truthing and calculation of accuracy metrics. By leveraging remote sensing, mining operators and regulatory agencies can effectively monitor and manage the environmental impacts of mining activities promoting sustainable land use practices. Ultimately remote sensing provides a cost-effective and efficient means of monitoring mining impacts on land quality, supporting informed decision-making and sustainable resource management.

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FIG Congress 2026
The Future We Want - The SDGs and Beyond
Cape Town, South Africa, 24–29 May 2026