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UCT researchers develop tools to support mine closure planning

A team of researchers at the University of Cape Town (UCT) has developed novel tools to support mine closure planning, management, and policymaking – which are also useful for government, industry, civil society, academia, and international agencies. This is part of a Water Research Commission (WRC) project and has led to the development of a new set of tools to aid responsible and sustainable mine closure in the country.

Mining closure is a growing concern in mining countries around the world due to the associated environmental and social impacts. This is particularly true for countries such as South Africa, which is economically dependent on mining but where closed and abandoned mines have had devastating impacts on surrounding communities, scarce water resources and the environment.

South Africa has 230 operating mines located in diverse natural and social settings. These include coal, platinum and chrome mines, among others. Over six million people live in urban and rural mining host communities, which are likely to be significantly affected by mine closure. Government in all spheres requires guidance in identifying high-risk areas and relevant policy and programmatic interventions.

“Despite the existence of global best practice guidelines and local legislation, mine closure remains a complex challenge in South Africa,” said Dr Megan Cole, a project leader and principal researcher at UCT. Cole said only a limited number of mines have been issued closure certificates and/or have successfully progressed into clearly defined post-closure land uses. Closure certificates are only granted if the required documents, including a closure plan and an environmental risk report, are furnished and the environment has been satisfactorily rehabilitated.

Cole further said that mine closure risks and opportunities are site specific, affecting different communities to varying degrees, at different times and in distinctive ways, depending on factors such as water resources, land capability, socio-economic profiles, economic diversity, public infrastructure and access to markets. “Given these complexities, the national government, local government and other stakeholders need guidance in identifying high risk areas and suitable post-closure interventions to mitigate these risks on a case-by-case basis,” noted Cole.

The WRC has funded research into mining and water-related matters since the early 70s. The latest study produced three novel mine closure tools: a Mine Closure Risk Rating

System, a Post-closure Opportunities Framework, and a Mine Closure Risk and Opportunity Atlas.

The **Mine Closure Risk Rating System** defines a methodology and produces results for calculating comparative mine closure risk ratings across all operating mines. The results are visualised in GIS and the map identifies mines and areas where mine closure is highly likely and needs immediate attention. It further ranks mines by environmental and social risk, enabling the prioritisation of mitigation and intervention by mining companies and government.

The **Post-closure Opportunities Framework** provides a defined process for going about identifying the most suitable options for sustainable development and economic diversification based on a participatory process that involves reviewing all possible alternatives and testing them against environmental, social, economic and governance criteria.

Supporting the other two tools is the **Mine Closure Risk and Opportunity Atlas**. This freely available interactive online GIS tool was developed with inputs from experts in the mining industry and potential stakeholders of mine closure to communicate mine closure risks to a wide audience and to enable stakeholders to interrogate the risks and opportunities related to mine closure.

The Atlas incorporates a comprehensive spatial database of over 65 datasets covering operating mines, processing plants, mining host communities, land, water, energy, biodiversity, infrastructure, and economic, social and governance factors. Using these datasets, users can conduct their own analyses and assessments. Its presentation of risk for individual operating mines is unique. The Atlas has been specifically configured to function on smartphones and computers to ensure that affected mining communities have access to all the information presented in it. This could support community participation in mine closure planning and economic diversification opportunities.

While the three tools have been developed for South Africa, the concepts, design and insights could be applied to any mining country in the world.

It is hoped that these tools will support just economic transitions away from mining in different regions across the country. In addition, the tools could promote deeper discussions on mine closure management and planning among a diverse group of stakeholders and support evidence-based decision-making.

[Download the report](#)

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