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## Tools for managing metal contaminated areas: multidisciplinary approach to develop inputs for a more sustainable region

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This work aims to develop an environmental management model specifically designed for mining areas that have been contaminated by toxic metals. A sustainable management model is suggested to be established, utilizing a combination of developed tools. This model will provide tools and strategies to effectively manage and mitigate the environmental impact of such contamination, with the goal of promoting an increment of sustainability in these regions. The environmental management model combines the outcomes of employing a range of analytical techniques and tools to monitor polluted regions, including biophysical analyses, analysis of soil and water chemistry (measuring quality physic-chemical parameters and quantifying potentially harmful metals in soil and water samples), geophysics (using magnetic, electromagnetic, electrical, and seismic methods), and satellite hyperspectral remote sensing. The artificial intelligence model will utilize the data gathered from many domains as its inputs. On the other hand, a plan for the economic and financial viability of the management model will be formulated.

With the model we aim to optimize and conserve resources during the sampling and analysis phases. It will provide crucial real-time information for decision-making, specifically for monitoring and managing pollution. The device has wide-ranging utility in identifying metal pollution, facilitating the transfer of technology to various geographical regions and other metal contamination situations, such as landfills and agricultural fields.

Through our multidisciplinary approach, we anticipate diverse contributions to the region affected by metals contamination. The region benefits from the adoption of new strategies that improve current routines, streamline procedures, and ensure timely execution. This leads to positive environmental, social, and economic outcomes, including resource conservation, remediation of contaminated sites, restoration of ecosystem balance, improved company performance, reduced environmental impact, and promotion of regional sustainability.

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