Two-year in-situ monitoring of water balance and vegetation growth on soil covers for tailings on a 1:3 slope

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To meet mine closure objectives, the design of cover systems for tailings in a semi-arid climate must satisfy three major criteria:

* Safe – the cover must not collapse, ensuring the protection of people and animals.
* Stable – The cover must resist erosion over time.
* non-polluting – The cover should support vegetation by storing and releasing stormwater, shedding excess water, and effectively segregating tailings.

To evaluate different potential cover designs, four trials were established on dried tailings with a 1:3 slope. The trials were each 120 meters in length and 20 meters in width and 1.5m deep. Each trial was configuration using material which was locally available. Typically, they included minimal topsoil as a seedbank, and varying thicknesses of coarse and fine material.

Soil moisture and suction sensors were installed at various depths to monitor conditions. Additionally, six cameras were installed on the cover surface to capture daily images, enabling the observation of vegetation growth and gully formation.

This paper will explore the findings from the last two years of monitoring, indicating the range of infiltration depths, volume of water percolating to tailings, establishment and die-off of vegetation cover, and the presence and persistence of erosion on the slopes.

This project provides valuable insights into the rehabilitation of slope tailings in semi-arid environments, highlighting the importance of material selection in ensuring long-term stability and ecological sustainability.