

IM4DC

Action Research Report

SUMMARY

Researchers:

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School/Centre:

Centre for Mined Land Rehabilitation

University/Institutions:

Sustainable Minerals Institute,
The University of Queensland

Key themes:

Community and Environmental Sustainability

Key countries:

Zambia

Completion:

May 2015

Research aims:

This project focused on Cu-Co hyperaccumulator plants occurring in the Copper-Cobalt Belt in Zambia, to unlock their potential for phytoextraction to offer a low-cost approach to rehabilitate metal-contaminated soils.

The Action Research aimed to elucidate metal speciation and elemental distribution in selected Cu-Co hyperaccumulator plants with high potential for phytoextraction.

For further information on this action research:

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The Potential of Zambian Copper-Cobalt Hyper-accumulator Plants for Phytoremediation of polluted (Mining/Smelter) Soils

The Copper-Cobalt Belt of the Democratic Republic of Congo and Zambia is one of the most important metallogenic regions and, without doubt, the richest metallophyte (plants endemic to metal-enriched soils) location in the world. The existence of more than 30 Cu-Co hyperaccumulator plants is a special feature of this region and these plants accumulate extraordinarily high concentrations of Cu and Co metal in their living tissues. Such plants have the potential to be used for phytotechnologies; i.e. by growing and harvesting these plants, Cu-Co can be removed from (polluted) soils. This process can serve to remediate contaminated soils, for example around smelters (phytoextraction), or create a 'metal enriched crop' (phytomining). This project aimed to elucidate metal speciation and elemental distribution in selected Cu-Co hyperaccumulator plants with high potential for phytoextraction.

The fieldwork campaign was successfully completed in Zambia in October–November 2014. During the fieldwork the team visited a range of active and abandoned mines and tailings storage facilities in the Copperbelt Region of Zambia. The team also visited two First Quantum Minerals (FQML) mine sites: Bwana Mkubwa and Kansanshi, and the Copperbelt University in Kitwe. During the fieldwork a range of metallophytes and Cu-Co hyperaccumulator plants were discovered. The team collected approximately 200 plant specimens, 25 soil samples and 10 mineral samples for chemical analysis. Cryogenically preserved samples from 3 different Cu-Co hyperaccumulator species were also collected for advanced analysis in South Africa and Australia. The micro-PIXE analysis on the collected plant samples took place in May 2015 in South Africa, and synchrotron analysis in Australia is scheduled for July 2015.