Which strategies to conserve and restore metallophytes threatened by intensive mining activities in southeastern D.R. Congo?

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In soils translocation soils bank Success depends on Can be a valuable solution for Which strategies to conserve and restore metallophytes threatened by intensive mining activities in southeastern D.R. Congo? Developing of partnership between universities and mining companies Improving restoration programs using native plant material Delivering appropriate know-how to mining companies

Context
Integration of economic activities with environmental integrity: case of mining activities in southeastern Democratic Republic of Congo (Fig. 1).

While pristine habitats are threatened by mining activities, plant communities include numerous endemic species (Fig. 2).}

Fig 2. Due to high available copper and cobalt concentrations in soils, Cu-Co hills present original plant communities with over 600 metallophytes including 56 endemics.

Fig 1. The copperbelt, located in the southeastern D.R. Congo (a), represents one of the largest ore bodies of copper (Cu) and cobalt (Co) in the world. Most Cu-Co outcrops have now been allocated to mining companies and expected to be impacted in the coming years and decades (b).

How do we conserve and restore Cu-Co communities?

A gain information on ecology of plant communities & experience on the restoration of copper vegetation

B temporarily store and conserve native copper plant diversity for future re-establishment on post-mining sites

Complementarity of implemented actions:

1. In-situ conservation
   - Conservation of pristine communities
   - Good seed source
   - Limited surfaces
   - Potentially damaged by illegal miners and mine prospection

2. Communities translocation
   - Whole-turf translocation is more effective than topsoil translocation
   - Success depends on community-type better results for steppe than steppic savanna
   - Higher weed invasion in topsoil
   - Problem to translate structuring species with Xylopodium
   - (e.g. Cryptostephus mambulense)

3. Species translocation
   - In pristine copper outcrops
   - In translocated communities
   - In botanical garden
   - In deep rooted communities
   - Success depends on species
   - Can be a valuable solution for deep rooted species

4. Direct seeding
   - Encouraging first results on topsoil
   - Few germination in whole-turf communities
   - Success is species dependent

5. Seeding production in nursery
   - Production of seedlings of native species for translocation
   - Useful for the production of xylopodia species and structuring species
   - Importance of adequate material availability

6. Seed bank
   - 3 conservation sites
     - Botanic Garden Meise
     - University of Lubumbashi
     - Mine site
   - Most species with orthodox seeds
   - Regular seed viability tests

7. Phytostabilization
   - On anthropogenic polluted sites
   - Seeding or seeding transplantation
   - With native grass species
   - Enrichment with endemics species

Copper outcrop
Steppe on shallow soils & higher [Cu], [Co]
Steppic savanna on deeper soils & lower [Cu], [Co]
Main plant communities

1. Conservation actions
   - In-situ conservation
   - Ex-situ conservation
     - Communities translocation
     - Species translocation / Botanical garden
     - Direct seeding
     - Plant nursery
     - Seed bank
     - Phytostabilization

2. Rehabilitation / restoration
   - Seeding
   - Transplantation

3. Mine site
   - Whole-turf translocation
   - Topsoil translocation

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