REFORESTATION - QUALITY IMPROVEMENT OF CONTAMINATED MINING SOIL

Olaf Pollmann and Leon van Rensburg

ABSTRACT

Most sub-Saharan countries are influenced by either drought or heavy rainfall, poor soil quality and anthropogenic and industrial impacts. South Africa is one of the countries in the region in which the greatest impact of mining on the environment is seen. The environmental impacts are obvious and need to be addressed during each phase of environmental planning, especially in rural development and agriculture sectors. The environmental impacts of mining in South Africa are, in general, increased concentrations of heavy metals and changes of pH in both impacted soils and especially in water. Mining processes coupled with weather conditions affect the agricultural and forestry sector by impacting water and soil quality. The addition of different organic fertilizers, as a nutrient source and soil ameliorant in contaminated platinum and gold tailings, allowed the indigenous tree species - *Searsia lancea* (L.F.) F.A. Barkley to grow despite the high levels of contamination. In a laboratory trial with both types of tailings the combination of different fertilizer and cultivation techniques allowed for a reduction of 50% in heavy metal contamination and increase of ~ 140% in microbiological activity after treatment. These results of this soil amelioration show a sustainable use of trees combined with fertilizer to decontaminate mine soil while producing a resource (wood), lowering carbon dioxide and preventing contamination of surrounding areas by aeolian transport (sandstorms etc.).

KEYWORDS

Biological rehabilitation, Heavy metals, Mine soil, pH buffering, Sewage sludge

In: Sustainable Agricultural Development: Recent Approaches in Resources Management and Environmentally-Balanced Production Enhancement, Co-edited by Mohamed Behnassi, Shahid A. Shabbir and Joyce D'silva. Springer Netherlands; Auflage: 1st Edition. (März 2011), ISBN-10: 9789400705180