MAPPING AND EVALUATION OF POLLUTION IN MINE ENVIRONMENTS IN SOUTHERN AFRICA USING GIS AND EMS

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ABSTRACT

Environmental problems arising from mining have become a major issue within the Southern African Development Community. The present studies, undertaken by SANTREN, are preliminary investigations into the environmental problems associated with mine dumps, for the purpose of developing and providing high quality training courses in the SADC region. Two case study areas have been identified. 1. Copperbelt area - Zambia - copper-mining, and 2. Carletonville area - South Africa - gold-mining

Scientific conclusions indicate polluting impacts of slime dams and rock dumps on soil and water quality, esp. when placed in sensitive areas, for example in the floodplains and river courses of the Copperbelt, and on dolomite in the Carletonville area. Whereas siltation and water pollution due to slime dams are current problems in the Upper Kafue River Basin in Zambia, groundwater pollution and sinkholes are major environmental problems in area of Wonderfonteinspruit. Criteria are defined for the spreading of pollution from mine dumps into the environment.

Using GIS as a tool it was possible to create a complete survey of mine dumps in the case study areas.
The main aim of this project is to develop training material and modules in environmental analysis, methods of identification and evaluation of environmental impacts within a GIS-based environmental management system. In this regard, the experience with the KatBo GIS System, which was developed and used for monitoring and

studying environmental problems related to copper mining activities of the Mansfeld Region in East Germany, was integrated in the project.

By implementing the research results in the management system of tailing dumps it is possible to protect the economy of the relevant country from further environmental damage. Using GIS and EMS (Environmental Management Systems) it is possible to evaluate and prioritise necessary mitigation measures.

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