CLEMÊNCIO M. CARLOS NHANTUMBO   Sustainable Water Quality Monitoring for Developing Countries in the Context of Mining   REPORT 1070

Sustainable Water Quality Monitoring for Developing Countries in the Context of Mining

Monitoring systems and modelling

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Clemêncio Nhantumbo is a doctoral candidate in Water Resources Engineering at Lund University in Sweden and a lecturer in the Chemical Engineering Department at Eduardo Mondlane University in Mozambique. This thesis combines management strategies with hydraulics, chemical reaction theory, and mass transfer modelling to deal with water-related environmental issues in developing countries in the context of mining.

Mining impacts the environment worldwide, especially water resources through acid mine drainage. Both groundwater and surface water quality may be affected by acid mine drainage, making it inappropriate for human uses and activities, for example water supply, agriculture, navigation, and recreation. Acid mine drainage also impacts the biodiversity. In severe cases, almost no aquatic living species can be found in waters impacted by polluted mining water. In Mozambique, although the risk of impact from mining on water quality is pronounced, monitoring systems or methods for prediction are not well established, as in most developing countries. Particularly the Zambezi River Basin is vulnerable to pollution release from mining and strategies to prevent and remediate such releases are urgently needed.

In this thesis, a water quality monitoring system that can be used in developing countries is established with focus on the Zambezi River Basin in Mozambique. The system takes into consideration both the lack of human and financial resources as well as the mining development that characterize developing countries. Modelling is introduced as an opportunity to reduce the cost of water quality monitoring by estimating parameters that are costly and difficult to measure. Also, model simulations can be used to allocate resources to more vulnerable areas, which is important in developing countries where the resources are limited.
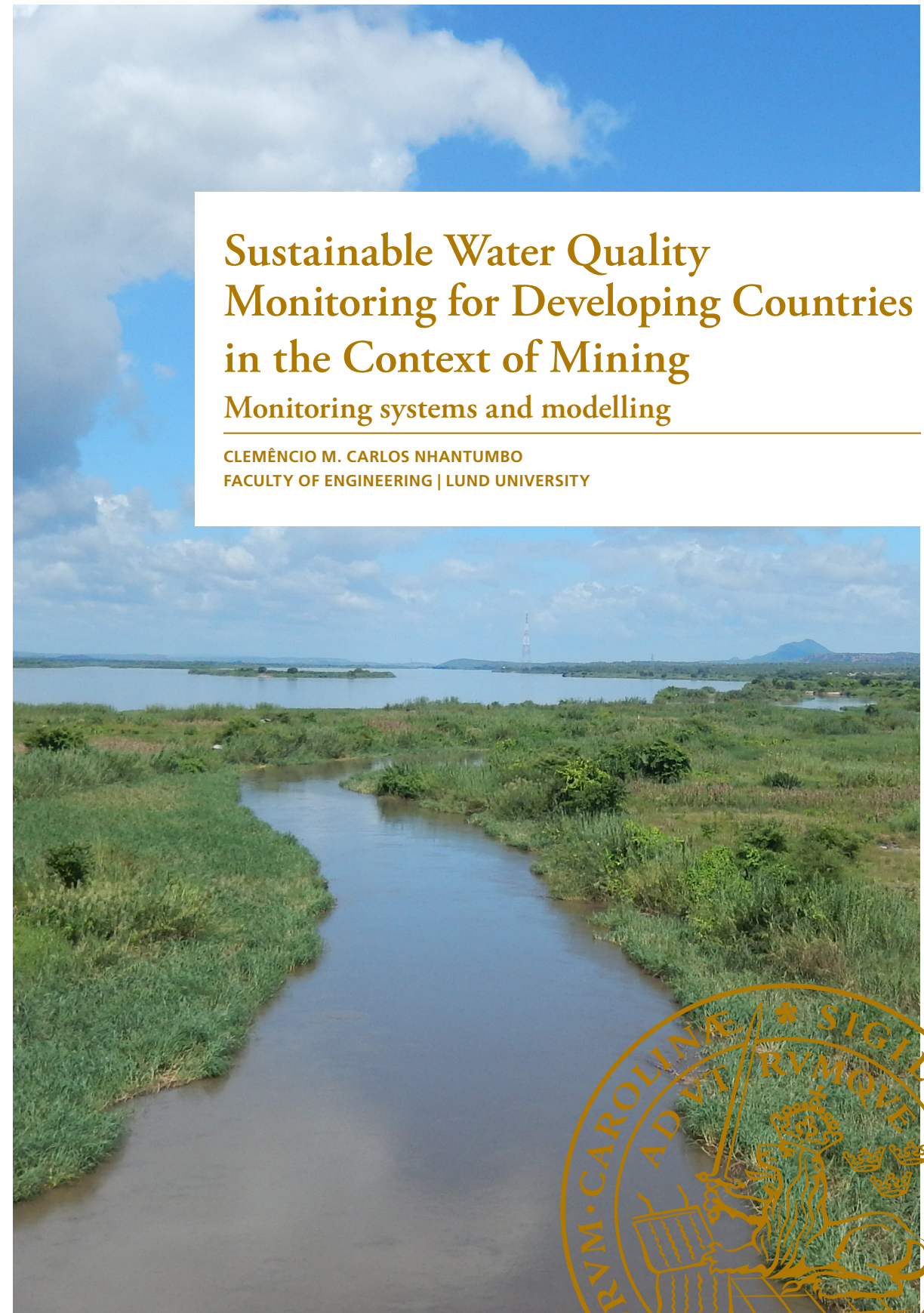
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