

Vulnerability assessment and actual groundwater quality data a case of study in Mozambique

Ameno Bande¹; Isabel Margarida Antunes²; Acacia Naves³

¹ *Pedagogic University.*

² *ICT/University of Minho*

³ *Universidad A Coruña*

Corresponding Author(s): anaves@udc.es, imantunes@dct.uminho.pt

The Nhartanda Valley is located in Southern Africa, center of Mozambique, in the southern part of the City of Tete. It occupies an area of 6.8 km². City of Tete faces a set of serious structural issues of access to water such as a precarious public water supply system large losses, pressure drawdown, and lack of investment in the network management, water rationing and a poor sewerage system. Historically, the public water supply in the area relies mainly on surface water reservoirs and groundwater. Nevertheless, repeated droughts have caused groundwater abstraction increase in the last few decades, and it was identified as a risk for the groundwater quality and quantity. Furthermore, the presence of potential contaminant activities along the valley and adjacent areas associated with Zambezi river pollution contribute to the degradation of water quality. The analysis of hydrology, hydrogeology and land uses of the study area has been carried out. Groundwater vulnerability was determined through the calculation of the GOD index and DRASTIC index for wells and boreholes of the Nhartanda Valley. The vulnerability to water pollution of Nhartanda Valley, through the application of the GOD methodology, varies from medium to high. The 9.1% of the study area is considered of medium vulnerability, while 90.9% is of high vulnerability. Of the latter, 80 % of the area has a moderately high vulnerability. The vulnerability of the aquifer, through the application of the DRASTIC methodology, varies from high to very high, corresponding to 40% and 60% of the area, respectively. The two methodologies have shown a similar vulnerability response of the aquifer, which is characterized by a high to very high vulnerability. On the other hand, the actual physico-chemical and microbiological water quality of the aquifer has been evaluated from the results of water samples analyses from the wells and boreholes of the valley. A specific set of actions and measures are necessary and urgent for the protection of Nhartanda Valley aquifer; which main function is to provide drinking water to City of Tete population. The identification of the most vulnerable areas has generated basic information to water use planning and designing of measures for aquifer protection and remediation.

Acknowledgments: This work is co-funded by the European Union through the European Regional Development Fund, based on COMPETE 2020 (Programa Operacional da Competitividade e Internacionalização), project ICT (UID/GEO/04683/2013) with reference POCI-01-0145-FEDER-007690 and national funds provided by Fundação para a Ciência e Tecnologia (Portugal).