Groundwater Quality depletion in the Quaternary shallow aquifer of Lake Maga downstream (Far-North Cameroon) highlighted by WQI. Shall we worry about? (Oral)

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ABSTRACT

The Quaternary shallow aquifer (QSA) in the "Yaéré" has undergone major changes due to the influence of hydro-agricultural developments of Lake Maga. Understanding changes in the quality of the water of the QSA related to wetland is important for the sustainable management of this vital resource for local populations and their socio-economic activities. With this in mind, the aims of this study is to take an initial look at change in groundwater quality and evolution of shallow water table of the Maga Dam downstream. To this end, the Water Quality Index (WQI) developed by Tiwari and Mishra (1985) was used to assess and evaluate changes in groundwater quality evolution in three groundwater points, between 1993, 2019, and 2021. The data used are from the chemical analysis, from technical reports of SOGREAH done in 1993, as well as from the work of Aguizal *et al.* (2019) and iwoudam *et al.* (2024), and unpublished data PhD fieldworks. In a point of a chemical view, no noticeable changes in groundwater chemical facies were observed. The WQI values obtained in 1993 range from 65.5 to 131.2, with an average of 100.77, indicating groundwater of excellent to poor quality. In 2019, the values ranged from 171.72 to 372.00, with an average of 246.73, indicating groundwater quality of poor to unfit for consumption. In 2021, the values range from 261.95 to 441.63, with an average of 364.55, indicating groundwater quality for very poor to unfit for human consumption. The groundwaters that are unsuitable to human consumption are associate to moderately mineralized (≈600 µS/cm) water near ponds, irrigation canals, and spillways. They are generally associate to high content of HCO_3^-, Na^+, and sometimes of NO_3^-. After 28 years, groundwater quality has deteriorated by a factor of 4 on average. Additional hydrochemical analyses, trace metal elements, and groundwater quality monitoring will provide a better understanding of changes in the water quality of the Quaternary aquifer.

Keywords: Shallow Quaternary Aquifer, WQI, hydro-agricultural development of Maga, Wetland