
Investigating the Impact of Human-Induced Pollution and Seasonal Variations on the Water Quality of ZAT River in Morocco: A Comprehensive Analysis

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The quality of water resources in the Tensift basin, specifically in the ZAT sub-basin, is under increasing pressure due to population growth, urbanization, industrial, and agricultural development. For most urban and rural centers and industrial units, wastewater is discharged into the receiving environment (surface water) without prior treatment, this state exacerbates the eutrophication processes, due to the contributions of point and diffuse pollution. These combined processes lead to considerable degradation of the physicochemical quality of water resources, especially surface waters. In this study, we assess the surface water quality of the ZAT river in different spatial and temporal contexts by a monitoring network consisting of 9 sampling stations. The location of these stations was chosen to monitor the respective natural and anthropic contributive loads entering the main river. The monitoring campaigns were conducted on a bi-monthly basis during the summer, winter, and spring 2021 periods. They included sampling, on-site measurements, and laboratory analyses and ultimately led to the use of the Weighted Index (WI) and the Biotic Index of the Iberian Working Group on Biological Monitoring (IBMWP). The results showed that in terms of quality and using both indices, the upstream river ranges from good (WI) to medium (IBMWP) quality, while it varies from medium (WI) to poor (IBMWP) quality in the downstream river. As for the temporal variation, the (WI) index exhibited a good quality during spring and from good to medium quality during winter and summer. On the other hand, the (IBMWP) displayed a medium-poor quality during winter and summer. The findings also indicated that Anthropogenic contamination and the decline in slope with temperature increase are variables impacting the worsening of water quality in the summer. Downstream stations in summer, which were substantially lower than the stations upstream, served as evidence of this. The outcomes also demonstrated that urban pollution has a significant impact on water quality degradation and low quality. The results of the current study indicate thus that it is essential to review the management policy and change the vision towards a more descriptive, holistic, and sustainable management of water quality.

Keywords: Anthropogenic, Pollution, Seasonal variation, River, Quality indices, Morocco.