

SPATIAL QUALITY OF MUNICIPAL WASTEWATER FLOWING IN WADI AL ZOMAR AND INFILTRATED THROUGH THE WADI BED

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Abstract

Wadi Zomar is one of the most polluted wadis in Palestine, where more than 25,000 m³ of untreated sewage from Nablus East is discharged. In this research, the quantity and quality of wastewater flowing in wadi Zomar was assessed during dry and wet seasons, and also the infiltrated wastewater through the top soil, at four stations along the 30 km length of the wadi. The results revealed that about 1,800 m³ and 10,000 m³ of flowing wastewater was infiltrated during dry and wet season, respectively, representing 43% and 16% of the total wastewater flow. The surface fluxes of COD, BOD, N and P along the wadi in wet and dry seasons at the four stations decreased due to self-purification processes and infiltration into the subsurface. In the dry season, the decrease in fluxes from Station1 to Station 3 ranged from 57to 69%. In the wet season, the decrease from St.1 to St.3 ranged from 40 to 70%, which was significantly less than in the dry season. Out of the total N, P, COD and BOD loads that entered section 1(St.1-St. 2), high percentages infiltrated (31, 34, 29 and 27) % in the dry season and (7, 21, 3 and 5) % in the wet season. Therefore large quantities of organic matter, nitrogen and phosphorus infiltrated through the soil bed until as deep as 2.0 m. These pollutants may infiltrate deep into the ground, depending on the chemical and biological processes and may finally reach the groundwater. The sediment samples results at St.1 and St.2 showed high values of some heavy metal such as (Cu, Ni, Pb and Cr). Heavy metals may be very mobile in the soil if they are present in the leachate as organic metal complexes. Therefore, natural processes occurring in the wadi system are not adequate for environmental protection, especially of groundwater quality.

Keywords

Wadi, Municipal Sewage, Infiltration, Pollution fluxes, Groundwater pollution, Self purification