

# HEAVY METALS AND NITROGEN CONTENT OF CESSPITS SEPTAGE AND POLLUTION FLUXES IN PALESTINE

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## ABSTRACT

Reports on the influence of onsite septic systems on ground and surface waters are very scarce. The main goal of this research, therefore, was to assess the pollution loads of total nitrogen (TN) and heavy metals (HM) from cesspits that serve 70% of the West Bank population. Firstly a survey was carried out to collect baseline data from two unsewered Palestinian villages. Secondly, 50 random septage (septic tank sludge) samples were collected from cesspits of various desludging frequencies, and finally 5 infiltrated septage samples were collected from a monitoring and sampling pipe installed at a distance of 1 m from a cesspit. The survey revealed that the average specific water consumption, wastewater production and septage infiltration were 58, 49, and 19 L/cap.d, respectively. The average TN concentration in septage was 297 mg/L, which decreased by 46% during transport through the soil to the monitoring well. The TN specific contribution of septage that was emptied and infiltrated was 8.5 and 3.3 g/cap.day, respectively. The average concentrations of HMs (mg/L) in the septage were Cu (0.24), Ni (0.03), Pb (0.01), Mn (0.47), Fe (12.6), Cr (0.04), and Zn (1.23). Septage content of Cu, Mn and Fe was not in compliance with the Palestinian regulations for wadi disposal and effluent reuse in agriculture. But according to municipal regulations, septage HMs concentrations allow its disposal in municipal WWTPs. There was no clear relation between the HM and TN content of septage and the desludging frequency. The septage that infiltrated contributed to as much as 15% of the total groundwater recharge from precipitation. The specific TN that is infiltrated from cesspits is equal to 29 kg TN/hectare.yr. Therefore, cesspits should be replaced with proper wastewater management system to protect both ground and surface waters.

## Keywords

Onsite, Sewage, Cesspit, Heavy metals, Total Nitrogen, Water resources pollution