

Evaluation of surface water quality using the water quality index (WQI) and the synthetic pollution index (SPI): a case study of Indus Delta region of Pakistan

Ghulam Shabir Solangi^{a,*}, Altaf Ali Siyal^a, Muhammad Munir Babar^a, Pirah Siyal^b

^aU.S.-Pakistan Center for Advanced Studies in Water (USPCAS-W), Mehran University of Engineering and Technology, Jamshoro, Pakistan, Tel. +92 3013617394; email: solangi_shabir@yahoo.com (G.S. Solangi), Tel. +92 3353340405; email: aasiyal.uspcasw@faculty.muett.edu.pk (A.A. Siyal); Tel. +92 3013504344; email: mmunirbabar.uspcasw@faculty.muett.edu.pk (M.M. Babar)
^bNational Centre of Excellence in Analytical Chemistry, Jamshoro, Pakistan, email: pirahaltaf@chemist.com

Received 3 December 2017; Accepted 21 April 2018

ABSTRACT

Under changing climate scenario, groundwater aquifers in the Indus Delta, Pakistan are spoiled due to seawater intrusion, and thus people living in the deltaic area are compelled to use contaminated water of surface water bodies for their daily domestic needs. The present study was thus carried out to assess the water quality of the surface water bodies using numerical indices, that is, the water quality index (WQI) and the synthetic pollution index (SPI). Fifty water samples collected from natural lakes, ponds, and depressions were analyzed for different physicochemical parameters using standard methods. The physicochemical analysis revealed that most of the sampled surface water bodies contained unsafe water for drinking as well as for irrigation purposes. The WQI identified that water of 82% of water bodies was unfit for drinking purpose while remaining 18% was classified as very poor. Whereas SPI revealed that water of 2% of surface water bodies was moderately polluted, 20% severally polluted, and remaining 78% was unfit water for drinking purpose. The study highlights the significance of using WQIs for evaluation of water quality for domestic use and a healthy ecosystem in the similar deltaic areas of the world.

Keywords: Physicochemical parameters; Water pollution; Surface water; Water quality; Indus River Delta

* Corresponding author.