

TWO GROUNDWATER SCENARIOS: A CASE STUDY FROM WALIGAI REGION BANNU DEPRESSION PAKISTAN

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Abstract

Waligai region Bannu depression (32.8-33.2N & 70.3-71.2E) is surrounded by Surghar Ranges in the East, Kurrum Fault in the West, Kohat Salt zone/Bahadur Khel salts in the North and Manzai Range in the South almost 6 km² area where we have aquifer with two very different groundwater; saline water (3-5% dissolved salts) and fresh water. The average depth of water table is 100 ft and the aquifer is present in the Siwalik Group of Tertiary age.

Looking at the map of the area surface waters are relatively abundant in the area, shedding off from the Bahadur Khel Salts and Surghar Range in the form of seasonal rainy streams e.g. Nala Kasho and Nala Johar respectively. From this it is easy to infer that aquifers are being recharged from local & distant precipitation, flowing surface waters and surface waters impounded in the reservoirs. These widely varying pathways, as well variations in the host rock/sediments of the aquifers, will give wildly varying water qualities.

There are two major groundwater recharge zones for the Waligai region groundwater. It is inferred that the Bahadur Khel Salts being in the North is the recharge zone and the hydraulic head gradient direction is N-NW for this specific area, have contaminated aquifers to varying degrees which is the cause of the saline underground water in the northern side of Waligai area which is in vicinity of Nala Kasho. While the fresh salinity free water aquifer in the southern side of the area are recharged from the Surghar Range which is in vicinity of Nala Johar and here the hydraulic head direction is South to North. Hence the main playing character is the recharging area in controlling the chemistry of groundwater.