

District Charsadda Groundwater evaluation through chemical, geophysical and geological integration

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Located at the confluence of the Kabul, Swat and Jandi rivers, Charsadda District has excellent potential for groundwater storage and continuous supply due to continuous recharge from these rivers. The area is characterized by a deep layer of gravel and sediments, which serve as an energy source for underground water storage. About 80% of the district Charsadda area is covered by recent alluvium, including rivers, streams, floodplains and lakebeds, dating back to the Pleistocene. The remaining 20% is covered by other rocks, and the ridge slopes towards the northeast at an angle of 45 to 50 degrees. The soil properties of Charsadda facilitate the infiltration of water from these rivers, which recharges the groundwater aquifer. The Landover of the Charsadda is excellently tuned for all agricultural activity and yield sufficient wheat, Maize, many fruits etc., for local needs, due to this extensive cultivation activity the fertilizer and pesticide used for crops finally reach to the groundwater aquifer., and possess a permanent threat for health issues upon exposure/utilization. The thickness of the sediments cover through Peshawar valley is around 300 meter, due to the mountains barrier which surround the valley from all direction, hence no horizontal permeable connection on surface and within subsurface for horizontal flow except the Khairabad fault which provides a pathway to horizontally drain the aquifer of Peshawar valley. The ground water also flows within subsurface generally (not always) follows the surface flows direction. This flow of the groundwater within first few tens of meter maintain the serenity of the aquifer for longer periods by removing all these received contaminations.

The new central campus of Bacha Khan University, which is currently under construction from 2021, is located in an area where the water table reaches 2-3 meters below the ground. The purpose of this research is to study quantitative and qualitative estimates of groundwater, to determine the quality and hence the feasibility of designing an optimal water treatment system for local land conditions. The Groundwater analysis, includes testing for chemicals and rare earth metals, to provides insight into actual groundwater quality and allows filtration protocols to purify water by customized filtering to meet drinking standards. The main objective is to provide clean water to the university population, including students and staff, and to study the feasibility of establishing a mineral water company to sell ground water. This project not only addresses the water needs of the university community, but also the resource generation potential for universities that are currently facing them.

Keywords: Groundwater; Charsadda; infiltration; storage; drinking standards