

# Environmental monitoring of underground water

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Water is an important natural resource. Groundwater is one of most vital and consistent source of renewed water globally containing areas which have extreme rainfall and abundant of surface water. This study assesses the climate impact on groundwater level using the precipitation, temperature. The analysis explores the fact that the groundwater is continuously depleting due to variability in rainfall. They also illustrates that groundwater level is decreasing day by day and the rainfall temporary influences for a very short time period on the groundwater level depending upon the consumption. The Quetta Valley is the largest population centre in Balochistan province in western Pakistan. This area is arid and groundwater is the main water source for domestic and agricultural use. This work presents global positioning system (GPS) data and assessment of spatial and temporal variations in water levels.

The underground water level in Quetta has dropped down to 21000 feet deep. It is estimated that water table in Quetta valley is declining at an average rate of 4-5 feet per year.

The only source of water for the residents of Quetta is the groundwater reservoirs. Quetta, the provincial headquarter of Balochistan is located at an average elevation of 1, 680 m above mean sea level. It is surrounded by Chilton, Murdar and Zarghoon Mountains. Quetta is facing many socio-economic problems due to its ever increasing population growth and the influx of Afghan refugees. Overexploitation of groundwater has created several problems in the valley that include significant groundwater decline in several parts of the valley, deterioration of water quality and subsidence of land. One practical way to control groundwa-

ter mining is to strengthen the institutions that are to oversee implementation of the Groundwater Rights Administration Ordinance.

Legislation and practical measures are needed to discourage the drilling of new tube wells and to regulate groundwater use on the basis of hydrological criteria and groundwater availability, keeping future needs in view. Modern techniques such as mathematical modeling to predict groundwater yield in future should be used, and a programme of public awareness through radio, TV and leaflets should be introduced.

Efficient technologies such as sprinkler/drip should be adopted where possible. 1"Urgent measures should be implemented to control groundwater exploitation. 2"Artificial recharge techniques should be adopted - injection wells, vertical recharging wells and recharging galleries. 3"Catchment areas should be increased to increase water stored in aquifers.

Decentralized water supply system in Quetta is faced with various challenges. The analysis of water situation in one of residential neighbourhoods suggests that the water supplied from the groundwater source becomes unsafe for human consumption by the time it reaches the consumer.

Leakages results in the failure to meet the water demand.

Land use changes have reduced the infiltration of rainwater. The government does not have any integrated system to tackle this problem. Higher willingness to pay for improved water supply indicates the utmost need for a better system. The proposed model provides the opportunity to utilize and integrate local institutions, green spaces, low-cost technology & future plans of the government for the sustainable water management and fulfils the required water demand.