

Integrated geophysical techniques for groundwater investigation and development in Haripur Area, Khyber Pakhtunkhwa

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Water is a most important source of every living creature and sustains all kind of human activities such as domestic needs, industries and agriculture etc. The development and management of surface and groundwater resources is getting a difficult task as a result of increasing demands due to rapid population growth, decreasing supply of good quality of groundwater due to increasing irrigation demand. Groundwater has played a vital role in maintenance of Pakistan's economy, especially in Khyber Pakhtunkhwa. This article illustrates the results of groundwater investigation carried out in Haripur plain, Khyber Pakhtunkhwa. The goals of the study were to determine groundwater potential and to locate suitable zones for the groundwater exploration in the study area. To achieve above mentioned goals, integrated geophysical studies were carried out in the study area. The total geographical area under this study is about 644 sq. km. The study area is located in the northwestern corner of Potwar Plateau. The economy of the study area is based on agriculture. The mountain highlands in the study area are composed of sedimentary and metamorphic rocks belonging to Precambrian to tertiary age. Unconsolidated deposits in the study area comprising of clay, silt & sand, gravels and boulders underlay the Haripur plain. In order to identify the aquifers in unconsolidated deposits, vertical electrical sounding and borehole geophysical surveys were carried out in the Haripur area. The data obtained from integrated geophysical techniques were interpreted using latest software. The integrated geophysical results showed that the thickness of the alluvial cover is in general between 100 to 300 meters below the subsurface. Furthermore, the composition of the alluvial deposits varies throughout the study area. A rough classification showed that sediments are predominantly coarse in the northeast of the study area and sand & gravel with intercalations of clay in the central part of the study area. The resistivity values between 100 ~ 350 Ω m on the top geo-electrical cross-section indicate the presence of thick clay layer. The resistivity values between 35 ~ 100 Ω m in the second layer indicate sand / gravel or sand / boulders admixture layer. The authors conclude with the opinion that the integrated geophysical studies play an important role in the overall groundwater resources investigation and development of the Haripur area for better environment in future.