

Application of electrical resistivity method for the assessment of groundwater potential at Panchkhal Valley, Kavre, Nepal

***Umesh Chandra Bhusal¹, Hari Ghimire¹, Bhaskar Khatiwada², and Prakash Das Ullak³**

¹*Explorer Geophysical Consultants Pvt. Ltd., Kathmandu, Nepal*

²*Central Department of Geology, Tribhuvan University, Kirtipur, Kathmandu Nepal*

³*Department of Geology, Tri-Chandra Campus, Tribhuvan University, Ghantaghar, Kathmandu Nepal*

*Corresponding author: ucbhusal@gmail.com

Groundwater is widely distributed in nature, but its occurrence and distribution is confined to certain geologic formations and structures. Hydrogeology of the area depends on the local lithology, geological structure, geomorphology and climate. Surface geophysical methods are used to measure the physical properties of the subsurface such as electrical conductivity or resistivity, dielectric permittivity, magnetic permeability, density, or acoustic velocity which are used to characterize the subsurface condition. Electrical methods are widely applicable for groundwater exploration because of the close relationship between electrical conductivity and the physical properties of aquifers. The main propose of the study was to assess the groundwater potential at Panchkhal valley, Kavre, Nepal using electrical resistivity methods. Data acquisition was carried out by resistivity meter WDJ-4 using Schlumberger configuration for vertical electrical sounding (VES) method and Wenner and Dipole-Dipole method for two dimensional electrical resistivity imaging. Data were analyzed using geophysical software IPI2Win and Res2Dinv which are used for processing and interpretation of the resistivity data. A total of four 2D ERT profiles and ten VES point were carried out in the area to map the subsurface lithology of the area. Geoelectric layers of the area were clay, silt, compact lateritic soil, sand, gravel, fractured bedrock and competent fresh basement rock. The depth of the fractured bedrock from the existing ground level ranges from 50 m to 60 m on different part of the study area. The result of 2D electrical resistivity methods was used for locating the position for VES Survey and assessing the availability of groundwater in the highly weathered and fractured rock. Result of the study was verified by drilling four deep tube wells in the area. Results from this study are useful for technical groundwater management in the area, as they clearly identified suitable borehole locations for groundwater prospecting.