



Groundwater Potential Zonation

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Introduction:

Study of groundwater potential requires proper understanding of its origin, occurrence and movement, which are directly or indirectly controlled by landform characteristics. In geomorphological context, landforms may give clue to subsurface water conditions. Various landforms of structural, denudational and depositional origin play an important role in the groundwater potentials. The area selected for the present study is Gunjawani Basin.

Groundwater Occurrence

The Gunjawani Basin is underlain by basaltic rock. In Deccan Trap, the primary porosity is due to the presence of interconnected vesicles, which is not filled with secondary minerals where the secondary porosity depends on due to weathering, and formation of joints and fractures in the rock.

The occurrence of groundwater aquifer zones (within 12 m BGL) have been studied in detail by inventorying a total of 24 open wells. Overall 5 open wells with lithologs and 24 well inventory studied in detail along with six GSDA observations wells. The total depth of open wells ranges from 5.2m to 13.3m BGL with an average of 7.92m BGL. The well diameter ranges from 2.45m to 9.0m with an average of 4.32m. Water table fluctuation ranges from 3.0m to 8.3m BGL in post monsoon of October 2006.

Groundwater Recharge and Water Balance

Runoff

Annual Runoff computed using Water Balance Method is 263.9 (M.Cu. M) and according to Stranger's table total Runoff of the basin is 269.17 M. Cu. M.

Recharge

Ground water recharge in the Gunjawani Basin by different methods shows values 52.78 M. Cu. M (Rainfall infiltration method), 51. 86 M. Cu .M (Hydrodynamic method), 52. 78 M.Cu.M (Water balance equation method) and the storage of ground water is 121. 8 M.Cu.M.

Structural Landforms

The Structural Landforms found in the study area are structural hills and lineaments. The groundwater potential is very poor in structural hills shows moderate to good groundwater potential zone. Lineaments shows moderate to good groundwater potentials. Messa and Butts having moderate to poor potential .

Denudational Landforms

From the groundwater point of view this Pediment falls in poor to moderate groundwater potential zone. Pedeplain have moderate to good groundwater potential.

Depositional Landforms

Groundwater prospects in alluvial plain is invariably found to be good and in valley fills zone is fairly good.

Conclusions:

Hydrogeomorphologically, the investigated area is occupied by Structural Hills, Lineament, Dyke, Messa, Buttes, Denudational Hills, Pediment, Pedeplain, Alluvial Plain and Valley Fills. By studying hydrogeomorphological conditions of the area, it is possible to decipher the groundwater potentiality. Lineaments, dyke, pedeplain, alluvial plain and valley fills units have moderate to good and good groundwater potentiality respectively. Whereas pediment unit in the study area is having poor to moderate groundwater potentiality due to variation in weathering thickness, joints and fractures in weathered basalt rock. It is clear that 58% of the total basin area is occupied by flat surfaces. These flat surfaces are observed in pedeplain and valley fill units having high density of dug wells. As a result, the groundwater level is increasing considerably during monsoon period. From the study it is concluded that nearly level, very gentle slopes are better than the much steeper hilly areas from the groundwater point of view. On the basis of landforms identified in the study area and considering their characteristics zones are categorized groundwater potential as favorable, moderately favorable and poor zone.