

3rd International Conference on Hydrology & Meteorology

September 15-16, 2014 Hyderabad International Convention Centre, India

Application of hydrological and water table data for preparing water budget model for Mahi-Narmada inter-stream area, Gujarat

Sumit Dabral¹ and N Sharma²

¹NHPC Ltd., India

²The Maharaja Sayajirao University of Baroda, India

Water table study forms an important part of watershed development and long term monitoring of water table fluctuation coupled with the hydro-meteorological data can be used to identify groundwater resource potential of any area. Study area to a large extent depends upon groundwater for its drinking and agricultural needs. The study area receives rainfall due to SW monsoon and is limited to the period between June to September. The period is further extended upto November month due to retreating monsoon. The rainfall data for 42 years i.e., from 1961 to 2003 from 18 rain gauge stations located within the study area was used. The average rainfall for the study area stands at 858.99 mm. The mean annual rainfall gradually increases from west to the east which can be observed in the isohyetal map of the study area. The highest rainfall recorded in the study area was in Savli station in the year 1976 with 2688.7 mm precipitation and lowest was recorded during 1968 with 101 mm at Kawant station. The western and central part of the study area has thick alluvial cover as a result area is under intense use of groundwater. Whereas, in the eastern part due to hard rock formation and less habitation, the development of groundwater resources are not under threat. The maximum depth of water table is in central part, while, it is at shallow depth in eastern and western parts. Due to influence of sea water in the western part, the area has salinity problem, as a result, exploitation of groundwater resources has not taken place. Overall in the study area, groundwater irrigation, industrial development and urban expansion have stressed the aquifer resources. This has negative fallout on the quality of groundwater, which is not uniform throughout. Study demonstrates that the groundwater quality deteriorates with depth and also towards the western part of the region i.e., coastal plains. The rainwater is the main source of recharge, which varies laterally and vertically depending upon hydrogeological conditions. To study water level fluctuation, groundwater level data from year 1990 onwards have been utilized. Water table contour maps have been drawn and it is observed that the water level in the study area ranges between 5 m to 10 m bgl in the eastern and western part of the study area while between 10m to 20m in the central part. In the central part deeper levels of groundwater have been observed which is mainly due to over exploitation of groundwater resources particularly in talukas like Vadodara and semi critical talukas like Karjan, Amod and Sinor. However, the western coastal tracks fall in saline category (especially Jambusar Taluka of Bharuch district). Net groundwater availability in the study area based on the available data is computed to be 111337 ha m and the stage of groundwater development work out to be 67.47% which fall in safe category (Safe: If the stage of groundwater development is less than 70% and the groundwater levels during the last decade does not show any falling trend in water levels (pre and post monsoon) the area is categorized as safe i.e., white). Recharge from rainfall during monsoon season is calculated to be 927.45 MCM/yr in 2004 while in the year 1991 it was 892.17 MCM/yr. Net draft computed for the study area comes out to be 396.31 MCM/yr in the year 1991 and 525.85 MCM/yr in 2004.

Biography

Sumit Dabral has completed his PhD from the Maharaja Sayajirao University of Baroda in the year 2010 in Hydrogeology. He joined NHPC Ltd. in the year 2004 and is presently posted in Tawang, Arunachal Pradesh where he is looking after the geo-technical investigation work of two hydroelectric projects, Tawang I & II, in capacity of Deputy Manager (Geology). He has published more than 10 papers in reputed journals and 5 papers in national and international conferences.

dabralsumit@gmail.com