Sagar Island, the largest Island in the Ganga delta, is made up of unconsolidated alluvial sediments of Quaternary age. Coastal marshes, tidal flats, tidal marsh, mudflats, sand dunes, marine terraces and tidal inlets are some of the coastal geomorphological features of this island. The area is characterized by the presence of fluvio-tidal and marine coastal facies deposits where freshwater aquifer occurs between the depths of 180 m and 330 m. The upper aquifer zone contains saline water in its upper part and brackish water in its lower part. The lower aquifer zone are confined and separated from the overlying brackish aquifer by an impermeable clay layer of ~20 m thickness. The present study comprises an integrated geomorphological, hydrological, geoelectric and geochemical investigations to assess the prevailing surface and ground water condition, viz. aquifer depth, chemical quality of ground water and hydrological characteristics in some parts of Sagar Island. The vertical electrical sounding results show presence of five to six prominent layers consisting of alluvial top soil, saline water, brackish water, impermeable clay layer, fresh water and bottommost clay with silt and sand lenses under the prevailing hydrodynamic condition. The average thickness of the freshwater bearing zone under confined condition is about 180 m at an average depth of about 182 m from the surface. Some potential zones of aquifer are marked for drinking water purposes. Chemically fresh groundwater is Na-HCO$_3$ type with TDS ranging from 500 to 780 mg/l. Chemically the groundwater is safe for drinking and domestic purposes with insignificant seawater contamination values.