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IDENTIFICATION OF GROUNDWATER POTENTIAL ZONE OF KENDRAPARA DISTRICT, ODISHA USING GEOSPATIAL TECHNOLOGY APPROACH

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ABSTRACT
Groundwater is considered as the preferred source of water for meeting domestic, industrial and agricultural requirements, due to its longer residence time in the ground, low level of contamination, wide distribution, and availability within the reach of the end user. In case the natural recharge is not sufficient, it has to be met through artificial recharge. To provide scientifically, appropriate locations for constructing artificial recharge structures, each hydro-geomorphic unit will be evaluated for its recharge potential and suitably a map showing such groundwater recharge potential zones for appropriate recharge will be prepared. Using remote sensing and geographic information system (GIS) it is possible to take number of different thematic maps of the same area and overlay them on top of one another to form a new integrated layer. This study was aimed to identify the groundwater recharge potential zones, to be used for better and improved groundwater resources. The thematic layers considered in this study are geomorphology, land use land cover, drainage density that were prepared using satellite imagery and other conventional data. The thematic layers were first digitized from satellite imagery, supported by ancillary data such as toposheets, finally all thematic layers were integrated using ArcGIS 9.3 software to identify the groundwater potential zones for the study area and generate a map showing these groundwater potential zones namely 'poorly suitable', to 'high suitable' on knowledge based weightage factors.

Keywords: *Groundwater, LULC, Geomorphology, Rainfall*

INTRODUCTION
Groundwater is a most important natural resource of the earth and is required for drinking, irrigation and industrialization. The resource can be optimally used and sustained only when quantity and quality of groundwater is assessed. It has been observed that lack of standardization of methodology in estimating the groundwater and improper tools for handling the same, leads to miscalculation of estimation of groundwater. It is essential to maintain a proper balance between the groundwater quantity and its exploitation. Otherwise it leads to large scale decline of groundwater levels, which ultimately cause a serious problem for sustainable agricultural production (Baldev et al., 1991, Chaturvedi et al., 1983, Elewa et al., 2010, Gustafson, P. 1993). A possible solution for such problems is micro level planning, and use of standard methodology for assessing the groundwater. Groundwater resources are dynamic in nature as they grow with the expansion of irrigation activities, industrialization, urbanization etc. As it is the largest available source of fresh water lying beneath the ground it has become crucial not only for targeting of groundwater potential zones, but also monitoring and conserving this important resource. The expenditure and labour incurred in developing surface water is much more compared to groundwater, hence more emphasis is placed on the utilization of groundwater, which can be developed within a short time. Besides targeting groundwater potential zones it is also important to identify suitable sites for artificial recharge usage cycle. Groundwater recharge refers to the entry of water from the unsaturated zone below the water table surface, together with the associated flow from the water table within the saturated zone. Groundwater recharge occurs when water flows past the groundwater level and infiltrates into the saturated zone. Field investigations help to explain the process of groundwater recharge and evaluate the spatial-temporal difference in the study area.

In recent times remote sensing and geographic information system technique is proved to be a cost effective and time saving tool to produce valuable data on geomorphology, geology, land use/ land cover, slope, lineament density, drainage density, etc. which helps to decipher groundwater recharge potential zones. Apart from visual interpretation, many researchers for deriving geological, structural and geomorphological details use digital techniques. The various