

## Ground Water Survey & Investigation (GWS&I)

### Introduction

The thrust on ground water is increasing exponentially in recent years to support the exploding population for the domestic, irrigation and industrial needs. A comprehensive understanding of the ground water regime, its recharge and discharge characteristic is very important to evolve strategy for its optimal utilization. Hence precise assessment of quantity and quality of ground water resource is a pre-requisite for planning its development. With these objective in view, Ground Water Survey and Investigation (GWS&I) Organisation was setup in the year 1996.

### Organization

The GWS&I headed by a Director in the rank of Chief Engineer is functioning as a nodal agency for monitoring of ground water resources of the State, under the administrative control of the Department of Water Resources. GWS&I has ten field Divisions and five Water Quality Laboratories. The Divisions are facilitated with Data Processing Centres. State Level Ground Water Data Processing Centre (SGWDPC) and Data Storage Centre (SDSC) have been set up at Bhubaneswar to handle the entire hydrological data of the state for dissemination to the Hydrological Data Users Group (HDUG). It also provides technical supports for sustainable ground water explorations to the user agencies and individuals. Some of the major activities of GWS&I have been highlighted as follows.

- **Assessment of Ground Water Resources**

For all 314 Blocks of the State, the ground water resource assessment has been done as per norms of Ground Water Estimation Committee (GEC) of Govt. of India. As per the assessment, the net

dynamic ground water resource of the State is 16.68 lakh ha mtr. The annual draft as of March 2013 for irrigation use is 4.15 lakh hectare meter, for domestic use is 0.78 lakh hectare meter and for industrial use is 0.09 lakh hectare meter. The gross annual utilisation of ground water (irrigation, domestic & industrial) is estimated to be 5.02 lakh hectare meter which is 30.07% of the total ground water resources of the State. Districtwise ground water potential and its utilisation presented in the Annexure-VIII.

- **Ground Water Table Monitoring**

The ground water table monitoring is being carried out regularly at 1100 locations (integrated with CGWB) four times in a year i.e. pre-monsoon, mid-monsoon, post-monsoon and post-winter period for quantitative study of ground water potential. Besides, Water table monitoring at 240 location and in 23 Urban Centers have been started along Real Time Data Acquisition System (RTDAS) through telemetry.

- **Ground Water Quality Monitoring**

Water sample collection and its chemical analysis are being undertaken once in a year during pre-monsoon period at 1100 locations. The same is repeated at 237 stations earmarked as trend stations to conduct water quality study three times more in a year i.e. during mid-monsoon, post-monsoon and post-winter period.

- **Ground Water Exploration through Remote Sensing Study**

Remote sensing studies are being carried out for higher accuracy in ground water survey work by interpretation of satellite imagery with proper ground truthing in different Blocks as well as specified watersheds under various R&D programmes.

- **Hydrological Information System (HIS) & Preparation of Hydro-geological Block Reports**

The data acquired such as ground water table, water quality, hydrogeology from 1100 monitoring stations covering the entire state are added to the database. These data are processed and converted to usable information through GRASP, GWDES, WISDOM & GIS software. The water table and water quality data available in the state data storage centre from 2001 onwards. The index of available data can also be accessible in the website; [www.odishahydrologyproject.com](http://www.odishahydrologyproject.com). Latest version of ArcGIS software is available with the Directorate. The application of GIS has been linked to the HIS. Incorporating these data and latest ground water norms, Hydro-geological Reports of different Districts, Blocks and specified watersheds are prepared. These reports serve as the reference manuals for micro-level ground water resources planning.

- **Feasibility of Bore Well**

This organization has technical know-how for identification of feasible sites for installation of bore wells. Vertical Electrical Sounding tests are being conducted for sponsored proposals. The Directorate also undertakes deposit works of various agencies/individuals for such feasibility studies. During 2015-16, 35 VES tests have been conducted for deposit works.

- **Geographical Information System (GIS)**

Under Hydrology Project Phase-I, digitization of GIS data sets such as land use, geomorphology, drainage, administrative boundary, geology (litho units, local macroscopic structure), settlements, transportation networks, soil, contour and hydrological boundary for the entire state have been completed. These are utilized for determining

the zoning of ground water table and ground water quality linking the GIS layers with Hydrological Information System (HIS).

- **Artificial Recharge to Ground Water & Rain Water Harvesting**

For augmentation of ground water and raising of water table by artificial recharge Centrally Sponsored Schemes are being taken up. Besides deposit work of other organisation are also been taken up. During 2011-12, 14 demonstrative artificial recharge project costing to ₹ 3.25 crores have been taken up. The work is under progress and likely to be completed during 2015-16.

- **Hydrological Investigation in Micro Watershed**

For determining the hydrogeological status of problematic micro water sheds, the Directorate undertakes various survey and investigation works. This includes aquifer parameter, water table, water quality, well census and potential. The scope of artificial recharge is also investigated. During current financial year investigation of 05 micro sheds covering about 400sqkms. have been taken up.

- **Ground Water Legislation**

Even though the average utilization of ground water resources in the State is only 28.33%, in some of the Blocks its utilization is quite high (>50%). In order to prevent such regional imbalances in ground water development which can lead to aquifer degradations, exploitation of ground water resources in a judicious and regulated manner is extremely essential. A bill to regulate the development of ground water resources in the State has been passed on the State Legislative Assembly. Thereafter the bill sent for assent of Hon'ble President has been returned back with some observations.

- **Hydrology Project Phase-II**

The Hydrology Project Phase-II (HP-II) is under implementation in the State since 2006 for a period

of 6 (six) years, which was extended up to May, 2014. Under the R&D studies, mainly the activities like model development for DSS-Planning in Mahanadi Basin and two Purpose Driven Studies (PDS) on coastal sand dunes and mapping of water logging areas in coastal districts have been taken up. The works have been ventured with the consultancy of DHI, Denmark and IIT Roorkee respectively. During financial year 2015-16, an amount of ` 24.99 Lakhs has been spent under HP-II (EAP) Scheme.

**Rooftop Rainwater Harvesting and Ground Water Recharge**

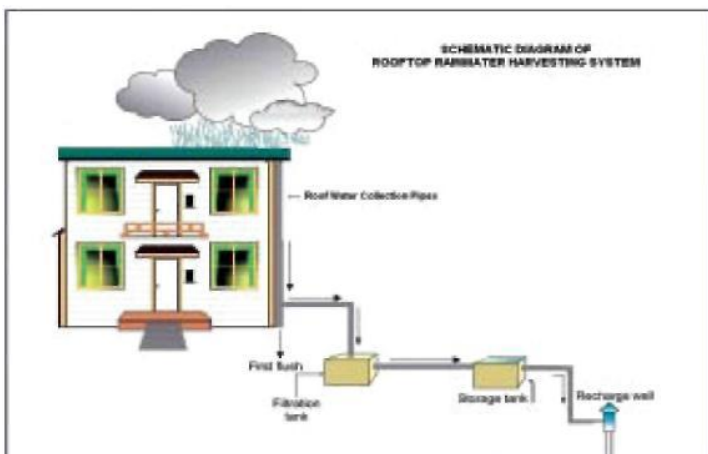
Ground Water serves as a major source of domestic water supply across the state. Due to rapid urbanization, the scope of natural ground water recharge is being reduced day by day. The Department of Water Resources (DoWR), Govt. of Odisha, has launched a new scheme. The Scheme will be implemented by GWS&I over a period of five years with proposed investment of ` 100.00 crore. The objective of this scheme is to execute large numbers of Rooftop Rainwater Harvesting Systems (RRHS) in private and Govt. buildings, which will improve ground water table and ground water quality situations in these areas. On pilot basis, the scheme is being implemented in five

towns i.e. Bhubaneswar, Berhampur, Titilagarh, Bolangir and Jharsuguda.

All types of Govt. buildings in above five towns can be provided with RRHS by GWS&I under the scheme. Private buildings, having roof area less than 200 Square Metres (2150 Sq. Ft.) and not having more than three floors will be eligible to be covered under the scheme. Initially the building owners will construct the RRHS at their own cost with the technical support provided by GWS&I or empanelled consultants. After completion of the system, 50% of the cost incurred for construction of the system subject to maximum of ` 45,000/-, shall be paid to the building owner as subsidy. The scheme guidelines and other details are available in DoWR website; <http://dowrodisha.gov.in>.

During Financial Year 2014-15, GWS&I have completed RRHS for 13 Govt. buildings in Bhubaneswar and Berhampur. For encouraging participation of private building owners, awareness raising activities including training / empanelment of consultants have been also initiated under the scheme.

During the financial year 2015-16, 80 Nos. roof top rainwater harvesting structure in Govt. buildings and 627 Nos. in private building were installed.



*RRHS-ORMAS Building at Bhubaneswar*

