



## Collection and Generation of Data

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### Introduction

Data was gathered from a number of organisations, including the GSDA, Irrigation, Agriculture, Revenue, etc. To eliminate discrepancies and prepare the data for use on a GIS platform, the data was first gathered, then assembled, and confirmed. Data collecting takes place in enterprises on several levels. When transactions are conducted and data is entered, IT systems routinely collect information on customers, staff, sales, and other aspects of corporate operations. In order to acquire client input, businesses follow social media and conduct surveys. Then, using internal systems as well as external data sources as necessary, data scientists, other analysts, and business users gather pertinent data for analysis. Data preparation, which comprises obtaining data and getting it ready for use in business intelligence (BI) and analytics systems, begins with the latter activity. Data collecting is frequently a more specialised process for research in science, health, higher education, and other professions. Researchers devise and put into place measures to collect particular sets of data.

### Data Compilation and Gathering

The procedure for data collecting and compilation for the different components is described below.

1. Hydrogeological data: 139 monitoring wells representing the shallow aquifer of CGWB and GSDA are used to determine current and historical water levels as well as water level trend data.
2. Hydrochemical Data - Ground water quality data from 26 exploratory wells and 86 CGWB and GSDA monitoring wells that represent shallow aquifers, respectively.
3. Exploratory Drilling - Data from 49 exploratory and 5 observation wells of the CGWB that were drilled to a depth of 200 m bgl.
4. Hydrology Data - Information from the Irrigation Dept. on the utilisation status of various irrigation projects.
5. Hydrometeorological Data – Revenue Dept. provides long-term rainfall data for each taluka.
6. Irrigation Data - Information on the land irrigated with both surface and ground water,

### Data Production

Includes all tasks necessary for the initial research project's planning, data collection, processing, analysis, and upkeep. Choosing a

study design, creating instruments for data collection, collecting data, creating data, modifying data, verifying data, validating data, analysing data, backing up data versions, and creating and tagging metadata are a few of these tasks. To determine the scope and extent of additional data generation, data adequacy was determined based on the data collected and the data already present with CGWB. The amount of data needed was reduced because the study will be conducted internally. The generation of data was primarily done for the investigation of ground water, monitoring of water levels, geophysical surveys, ground water quality, and infiltration rates.

### Exploration of Ground Water - Drilling Activity

Where there is a data gap, ground water investigation has been conducted to a depth of 200 m bgl in AUSA, Latur, Chakur, Nilanga, and Renapur talukas, leading to the construction of 32 Wells (EWs-30, OW-2). Annexure II presents the key elements of ground water exploration, along with the locations. The wells were bored between 105 and 209 metres beneath ground level, and their discharge varied from traces to 12.24 lps. Zones were found in the 20 to 189 m bgl depth range, and the aquifer found was made

up of fractured vesicular basalt, fractured basalt, and fracturing in large basalt. In order to separate the phreatic aquifer from the deeper aquifer, the well casing of 30 m length was routinely lowered in majority of the wells with cement sealing. The deeper aquifers in EWs can be found at different depths of 59-72, 82-90, 119-122, and 136-148 mbgl. The high-yielding wells with discharges between 3.16 and 12.24 lps were built in Renapur, Nilanga, Pohregaoon, Wadona, and other locations. At the flow interface and fractured zone of basaltic lavas flows, prospective aquifers are found in the region.

#### **Monitoring Water Levels: Establishing and Maintaining KOW**

139 critical observation wells were set up with a depth range of 5.6 to 30 m bgl and a diameter range of 1.45 to 15.5 m in order to comprehend the water level scenario in different seasons. All 139 KOWs' seasonal water level data have been gathered, processed, and the locations are shown in Annexure-III. The data on the water levels of the exploratory wells that reflect the Aquifer-II were also tracked and are shown in Annexure-II.

#### **VES for Geophysical Survey**

One of the terrain characteristics we employ in our geophysical services to distinguish between lithologies in the subsurface is electrical resistivity. This can aid in locating foreign objects in an environment that is more or less uniform. One of the primary goals of geophysical prospecting is to obtain the distribution of this parameter. Numerous tools and techniques are used in various fields to try to achieve this goal. In order to properly plan ground water management, electrical resistivity surveys were conducted in these locations to determine the ground water potential zones. A total of 25 Vertical Electrical Soundings (VES) were performed utilising the Schlumberger electrode configuration and the ABEM SAS 300C Terrameter. Annexure V presents the locations and the specifics of the VES results.

#### **Hydrogeological data acquisition at the micro level**

##### **1. Activities of Hydrogeology Wing**

2. The Hydrogeology wing of TWAD Board is vested with the responsibility of scientific source identification works in the field of exploration, exploitation, assessment of water sources. It is also committed to ensure

conservation and management of the water resources for the sustainability of sources to provide protected, potable water supply to the rural and urban population. TWAD Board executes water supply schemes under the various programmes implemented with Central and State Government financial assistance for which the selection sustainable source is of paramount importance.

#### **Expertise Available**

##### **Man Power**

1. A fleet of Hydro-geological personnel with a wide knowledge of groundwater exploration, conservation, and management of water resources are available. Most of them are post-graduates in Hydro-geological sciences and some are doctors of philosophy in a certain specific area of research on groundwater sciences.
2. Availability of the technical know-how for scientific exploration for sitting of wells for the drinking water supply schemes & industrial water supply schemes.
3. Technological availability for identification and exploitation of the groundwater resources.
4. Assessment of aquifer characteristics through scientific ways of conducting pumping tests.
5. Delineation of aquifer zones through electrical well logging techniques.
6. Expertise in scientific identification / site-specific location for the construction of the type of recharge structure to be implemented for the sustainability of the drinking water headwork's / sources under the various programmes executed in TWAD Board.
7. Expertise in carrying out the monitoring studies through the scientific methodology to assess the impact.
8. Analysis of all the Hydrological data to arrive at consensus conclusion.
9. Expertise in the Rainwater Harvesting mechanism for innovative design of the various types of recharge structures based on the varied Hydrogeological environs to harness the rooftop rainwater harvesting.
10. Assessment of groundwater potential zones – regional and local based on micro-level studies.
11. Assessment of potentiality in a micro level watershed through the watershed approach.

#### **Projects Implemented:**

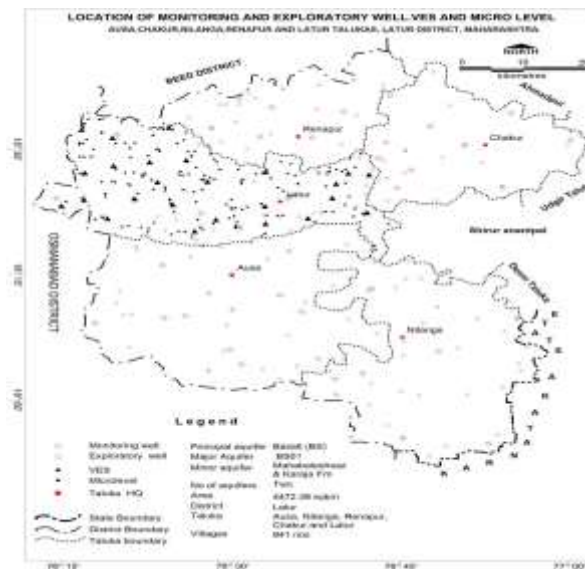
1. Implemented the UNICEF assisted Water Resources Management Study in

Karaipottanar Watershed in Namakkal district of Tamil Nadu State.

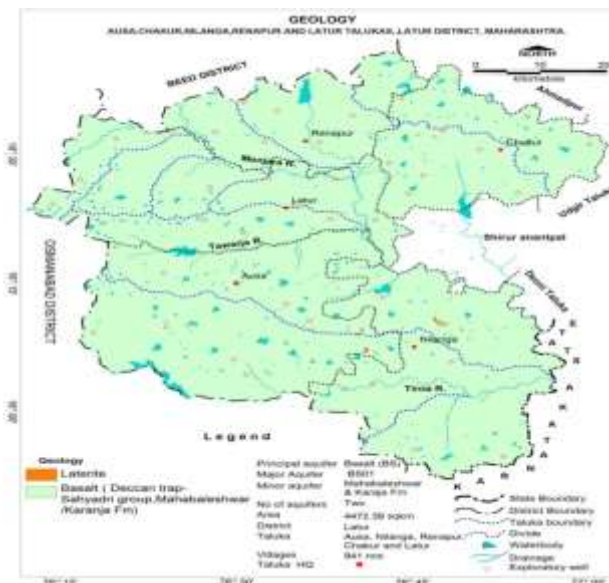
2. Completed the Project on the preparation of District Water resources Atlas under Unicef Assistance.
3. Completed the project on Lineament Analysis using Digital data for creating the sustainable drinking water source for rural areas of Gingee Taluk, Villupuram District.
4. Completed the project on Recharge through Bore Blasting in Mattancherry Micro watershed in Dindugal district.
5. Completed the project on recharging the groundwater through defunct bore wells in Puduchatram block of Namakkal district of Tami Nadu.
6. Completed State Planning commission funded project on "Updating the groundwater potential Zonation map" using remote sensing and GIS for all the 385 blocks of the State.
7. Infra Structure Available:
8. Sophisticated equipment (Resistivity meters)– both indigenous and imported (Signal Averaging System) – for groundwater exploration.
9. Hydrofracturing equipment for rejuvenation/ revitalization of failed/ low yielding bore wells (hard rock areas) to enhance the specific capacity of the bore wells.
10. Electrical logger and Pumping test units for delineation and assessment of aquifer parameters.
11. Remote Sensing data products – Satellite Imagery, Aerial Photographs, GOI Topo sheets with thematic maps and derived maps and related equipment such as – Mirror Stereoscope, Availability of the software - Arc INFO, Arc View, Erdas, Geomatica for taking up GIS application based Projects and for further updating and Related Hardware and Software required for the R & D works.
12. Availability of the Digital database for the entire State of Tamil Nadu.
13. Availability of the Zonation maps for recharge studies based on the Recharge Project Study undertaken by TWAD Board in collaboration with the Institute of Remote Sensing, Anna University Data Centre comprising of rainfall data, water level data, geophysical resistivity data, hydrofracturing data, pumping test data, block-wise information data, basin wise information, etc.,
14. District wise Hydrogeological reports, Journals, and Periodicals etc.,

#### **Present Activities:**

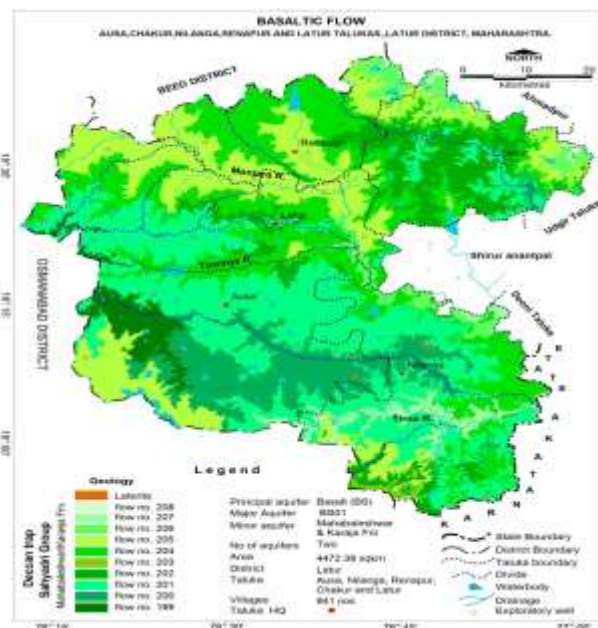
1. For sustainability of sources, implementation of recharge structures in close proximity to the drinking water supply head works were taken up various GOI and GOTN funds, Twad Board so far constructed 12558 Recharge structures, such recharge structures which includes (8406 Check Dams, 381 Percolation pond, 275 Recharge pit, 651 Recharge trench, 101 Others includes (Desilting, Core wall, Finger Dyke), 757 Ooranies, 177 Defunct Borewell, 872 Recharge Shafts, 885 Roof Top Rainwater Harvesting, and 53 Hydrofracturing Unit) Impact study on recharge structure is also being carried out.
2. Weekly, seasonal and annual rainfall data for all districts in Tamil Nadu from IMD and Groundwater level during January 2016 and May 2016 through 1286 observation wells were collected, through TWAD Observation Wells, and the data compiled and analyzed and report on groundwater scenario is prepared. 11952 GPS Coordinates for the sources created have been entered in the IMIS Web Portal. Twad Board is in number one position in updating geo-tagged information about the Source distribution, Delivery point, and House source connection. 18,770 photos uploaded and approved using the mobile application in the IMIS web portal Groundwater Prospects Maps or Hydrogeomorphological Maps (HGM maps) project was sanctioned to TWAD Board by Ministry of Drinking Water Supply (MoDWS) Government of India at a cost of Rs.198.80 lakhs and completed. Groundwater prospects Maps for the entire state of Tamil Nadu based on Toposheet wise (220 toposheets) have been completed as per the guidelines of NRSC Hyderabad and sent to GOI and NRSC. The preparation of quality layer is completed and sent to NRSC, Hyderabad for approval. According to data gap analysis, micro level hydrogeological data was also needed at 172 places in addition to KOWs to understand the shallow aquifer's subsurface lithological disposition, water level scenario, and other hydrogeological inputs like weathered thickness, etc (Aquifer-I). Thus, 172 dug wells were included for the purpose of collecting micro level data. The locations are supplied in Annexure-IX, and the specifics of the dugwells inventoried for micro level data collecting are provided there.



Location of EW, Monitoring wells, VES and Microlevel



Geology



Disposition of Basaltic Flows

### Topical Layers

The primary database was complemented by the following 5 thematic layers, which were also created on the GIS platform. These .Drainage

1. Geomorphology
2. Soil
3. Geology and Structure
4. Land Use - Land Cover

In Chapter I, the thematic layers of drainage, soil, geomorphology, land use, and land cover are described. The location of the basaltic flows is presented in as well as the region's geology. According to geological analysis, the majority of the studied region is covered with

layers gave exact information needed to evaluate the current ground water scenario and to suggest a future management strategy basaltic lava flows that were created by sporadic fissure-type eruptions between the upper Cretaceous and lower Eocene ages. The Deccan Trap is composed of a series of ten major flows that range in elevation from 560 to 701 metres above mean sea level. These flows are often horizontally arranged over a large area and give rise to the plateau-like topography known as table land. These flows take place in layers that range in thickness from 15 to 50 metres. Flows are d

## References

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