



Aquifer Mapping & Management

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Why in News

A Memorandum of Agreement (MoA) has been recently signed between **Central Ground Water Board (CGWB)**, **Ministry of Jal Shakti** and **Council Of Scientific And Industrial Research–National Geophysical Research Institute**, for use of **advanced heliborne geophysical survey** (through helicopter) and other scientific studies under the **Aquifer Mapping Programme**.

Geophysical data is used to provide information on the **physical properties** of the **Earth's surface and subsurface**. As a result, geophysical data can **help locate hydrocarbons, minerals, aggregate, and other natural resources**.

For example **groundwater mapping, mineral mapping**.

Key Points

Objectives of the study:

- High resolution aquifer mapping using **heliborne geophysical studies**, including identification of sites for artificial recharge.

The main advantages of the **Heliborne geophysical survey** is that it is fast, highly data dense, precise and economical.

- Create **3D** Geophysical model, geophysical **thematic maps** at **horizontal and vertical plains**.
- **Aquifer Geometry** of principal aquifer with demarcation of de-saturated and saturated aquifers.

The rocks in which groundwater is stored are called aquifers. They are typically made up of **gravel, sand, sandstone or limestone**.

- Spatial and depth wise distribution of **paleochannel network** if any and its linkage with the aquifer system.

A palaeochannel, or paleochannel, is a remnant of an **inactive river or stream channel** that has been filled or buried by younger sediment

- Selecting suitable sites for groundwater withdrawal and water conservation through artificial or managed aquifer recharge.
- The study is likely to generate **groundwater data** in a very short time period helping in groundwater management by preparing **site specific plans** for improving ground water levels in water stressed areas.

India and Groundwater

- India is the **largest user of groundwater** in the world, extracting groundwater to the tune of **253** billion cubic meter (bcm) per year.
 - It is about **25% of the global groundwater extraction**.
 - Out of the total of **6584** assessment units, **1034** have been categorized as ‘**Over-exploited**’, **253** as ‘**Critical**’, **681** as ‘**Semi-Critical**’ and **4520** as ‘**Safe**’.
 - The remaining **96** assessment units have been classified as ‘**Saline**’ due to **non-availability of fresh groundwater** due to salinity problems.
- **Availability of Water:**
 - India has about **1123 billion m³** of water resources available, out of which **690 bcm** is surface water and rest **433 bcm** is groundwater.
 - Out of total groundwater available, **90% of it is used for irrigation purposes** which is mainly for agricultural purposes.
 - The remaining **10% accounts for domestic and industrial purposes combined**.

- **Water Crisis in India:**

- According to the **Composite Water Management Index (CWMI)** report released by the **NITI Aayog** in 2018, **21 major cities** (Delhi, Bengaluru, Chennai, Hyderabad and others) are racing to **reach zero groundwater levels by 2020**, affecting access for **100 million people**.

The CWMI report also states that by 2030, the country's water demand is projected to be **twice the available supply**, implying **severe water scarcity** for hundreds of millions of people and an eventual **6% loss in the country's GDP**.

- Maharashtra and nearly half the country is facing an acute water shortage. Besides **Maharashtra, Tamil Nadu, Karnataka, Rajasthan, parts of Gujarat, Punjab and Haryana** are facing a water shortage of unprecedented levels.

National Aquifer Mapping and Management program (NAQUIM)

- It is being implemented by the **Central Ground Water Board (CGWB)**.
- NAQUIM envisages **mapping of aquifers** (water bearing formations), their characterization and development of Aquifer Management Plans to facilitate **sustainable management of groundwater resources**.
- NAQUIM was initiated as a part of the **Ground Water Management and Regulation Scheme** to delineate and characterize the aquifers to develop plans for ground water management.

Central Ground Water Board

It is a **subordinate office** of the **Ministry of Jal Shakti**, and is the National Apex Agency entrusted with the responsibilities of **providing scientific inputs for management, exploration, monitoring, assessment, augmentation and regulation of groundwater resources** of the country.

CSIR-National Geophysical Research Institute

- The National Geophysical Research Institute (NGRI) is a **geoscientific research organization** established in 1961 under the Council of Scientific and Industrial Research (CSIR).
- **HQ:** Hyderabad

Source: PIB