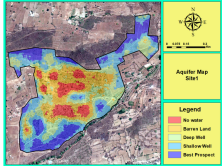


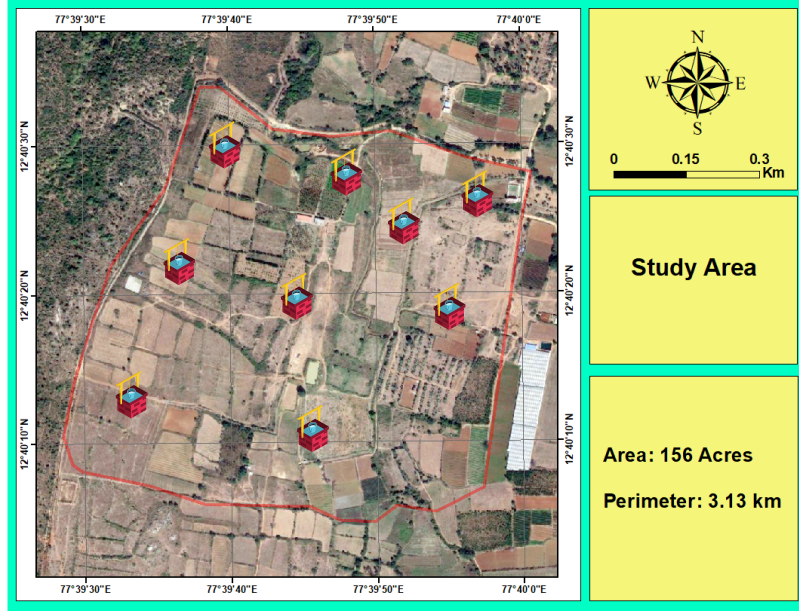
# WHAT DO WE MONITOR?

## → Groundwater Location

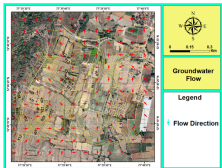


Hydrogeological mapping of groundwater resources is one of the main tools for the controlled development of groundwater resources.

Locating potential groundwater targets is becoming more convenient, cost effective than Survey methods and efficient with the advent of a number of satellite imagery. The nature of Space-based groundwater exploration is to delineate all features connected with localization of groundwater for Integrated Groundwater Management.



## → Groundwater Flow



The direction and speed of groundwater movement are determined by the various characteristics of aquifers and confining layers of subsurface rocks in the ground.

If the water meets the water table (below which the soil is saturated), it can move both vertically and horizontally. Water moving downward can also meet more dense and water-resistant non-porous rock and soil, which causes it to flow in a more horizontal fashion, generally towards streams, the ocean, or deeper into the ground. Water moving below ground depends on the permeability and on the porosity of the subsurface rock.

## → Groundwater Trend



Multi-satellite time series images can be used to locate the changes in depths of groundwater levels levels with time.

Satellite Gravimetry can measure gravity anomalies (change in mass concentration) with time. The microwave ranging system is designed to measure these variations with high precision. Variations in gravity observed by gravimetry satellites are interpreted as terrestrial water storage (TWS) changes.

# GROUNDWATER DETECTION FROM SPACE

By Riddish Soni

Groundwater is the water that soaks into the soil from rain or other precipitation and moves downward to fill cracks and other openings in beds of rocks and sand. It is, therefore, a renewable resource, although renewal rates vary greatly according to environmental conditions.

### Groundwater Usage:

Globally about 50% of drinking water is obtained from groundwater withdrawal.

- Approximately 70% of the groundwater withdrawal is used for agriculture.
- Globally, about 38% of land uses groundwater for irrigation.
- Monitoring groundwater is crucial for water resources management.

Traditionally, water wells are used for monitoring groundwater levels.

- Nowadays there are direct measurements of groundwater from remote sensing observations.
- Measurements from radar satellites have been used to estimate groundwater flow, total surface area, and groundwater zones at a resolution of 3 m.
- These measurements are used to derive global, large-scale groundwater distribution by using additional hydrological information.
- Satellite derived radar observations can be used to calculate mm level ground displacement changes caused as a result of overexploitation of water resources.