CHAPTER I

INTRODUCTION TO
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NAMAKKAL
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1.1 INTRODUCTION

The depth to the water table varies widely in crystalline rocks generally due to undulating topography. In hard rock areas two zones can be generally identified.

1. Weathered zone and
2. Hard rock with water bearing joints and fractures.

In the weathered zone, part of the bedrock, the groundwater occupies the inter-granular spaces of the formation. The yielding capacity of this zone is often limited and is seasonal in character. In general, this zone does not contribute appreciably to bore-well yield and the contained water can be tapped only by constructing large diameter wells. In most bore-wells, this zone is completely shut off by casing.

The saturated fractures or joints found in the relatively unweathered bedrock at greater depths are capable of yielding a substantial quantity of water. These fracture and joints are mostly horizontal in nature and interconnected with a network of joints and fissures. The yield from these zones is not readily affected by seasonal changes. In hard rock areas such saturated zones are normally found at depths ranging from 50-65 meters. In
tectonically disturbed zone, such as the study area, they may even occur at greater depths of 120 meters or more. In this zone large vertical fractures may also contribute substantially to the yield of bore-well. Deep-seated shears and tension fractures, thrust faults and folds may localize productivity along certain well-defined linear zones. In such tectonically disturbed zones significant permeability may be developed in the deep-seated fractures and these water-bearing fractures may be encountered at deeper levels.

1.2 INTRODUCTION TO BUDHAN SANDAI AREA

Namakkal District is known for its scarce water resources in view of low annual rainfall. Nowhere else in the world sub-surface groundwater exploitation has been attempted on such a massive a scale as in India, particularly Peninsular India, comprising mostly of hard rock terrane. Limited and erratic variations in productivity of wells over relatively short distances are observed in this type of hard rock terranes.

The main objective of the present study is to investigate the hydrogeology of Budhan Sandai area, groundwater potential and quality of groundwater for domestic, industrial and agricultural purposes. The study is based on various techniques such as geophysical, geochemical and hydrogeological studies.
LOCATION MAP OF
THE STUDY AREA

KARNATAKA

ANDHRA PRADESH

KERALA

STUDY AREA

FIG 1
1.3 LOCATION OF THE STUDY AREA

The Budhan Sandai is located in Namakkal district. Which is one of the taluk in Namakkal. Budhan Sandai bounded on the North by Nainar malai, East by Sandhamankalam, South by Namakkal town. The Budhan Sandai area lies between the co-ordinates of latitude $11^\circ15'$ to $11^\circ20'$ north and longitude $78^\circ10'$ to $78^\circ15'$ east. It comprises part of the toposheets 58 1/3 published by the Survey of India (1972). Fig.1 shows the location map of the study area.

1.4 PREVIOUS WORK

The study area has been studied by Government agencies like Public Works Department (PWD), Tamil Nadu Water Supply and Drainage Board (TWAD), Central Groundwater Board (CGWB), etc., to locate groundwater sources, water quality, pump test and fluctuation of water level periodically. K.V.Satyendran (1994) made hydrogeological studies in near by Budhan Sandai area and brought out hydrogeological variations within the Budhan Sandai area. He observes that within a small span of few metre one come across highly productive wells, barren wells, and potable wells.

Besides, there are also number of private consulting geologists who have surveyed the area geophysically for locating groundwater potential.

1.5 OBJECTIVES

The main objective of this study is to investigate the hydrogeology of the Budhan Sandai area and to assess its geological formation, groundwater
potential and quality of groundwater for domestic, industrial and agricultural purposes. The study is based on geohydrological conditions employing various techniques such as geophysical, geochemical, remote sensing and hydrogeological studies.

Namakkal district is known for its scarce water resources in view of low annual rainfall, absence of perennial water. Under these conditions of poor surface water resources the next step is to seep sub-surface water resources for the requirement of the district. The author has taken the study of Budhan Sandai area and investigated the hydrogeological conditions using detailed geological, geomorphological, geophysical, geochemical and remote sensing data. An integrated approach has been made to identify the favourable areas for groundwater resources with the available data. Hydrogeochemistry has also been used to study the quality of groundwater in the study area and the same has been classified for drinking and irrigation purposes.

1.6 METHODS OF STUDY

1.6.1 REMOTE SENSING TECHNIQUES

Available maps prepared from Landsat imagery pertaining to Budhan Sandai area had been studied by the author. From the above maps, the author has noted major lineaments, stream pattern and fault zones, and the same had been checked during the fieldwork.
1.6.2 FIELD GEOLOGICAL MAPPING

The base map of the Budhan Sandai area has been prepared from the toposheet (1:50,000 scale) 58 I/3 published by the Survey of India in the year 1972.

Systematic traverses were conducted to establish the lithological boundaries. Bearings were taken with the help of Brunton Compass in reference to prominent villages and other land mass located in the base map. Actual and inferred contacts of the various rock units occurring in the study area are represented in the geological map. Lineaments, faults, folds, shear zones, fracture zones and joints were carefully checked in the field.

1.6.3 HYDROGEOLOGICAL MAPPING

The work includes inventory of the existing wells in the study area, collection of water level data, collection of water quality data by the author at Namakkal Circle.

The above studies aim at a quantitative assessment of the groundwater resources of this region so as to prepare a scientifically detailed plan for its exploitation. The systematic hydrogeological surveys normally include:

1. Geological mapping and determination of possible groundwater sources of the area,
2. Preparation of water table maps,
3. Detailed well inventory for the existing wells,
4. Observations of groundwater table fluctuations,
5. Vertical electrical soundings (VES) and
6. Preparation of figures and tables showing water quality.

Quality of water studies include collection of water samples from dug-wells, as many as representative localities, as possible within, the study area and carrying out partial and complete chemical analysis of the same with a view to determine the suitability of water for domestic, agricultural and industrial uses.

1.6.4 COMPILATION OF HYDROGEOLOGICAL DATA

The data collected by the author has been correlated to locate suitable groundwater sources. The observations made by the author on structural aspects of the region augments well with the observations made by earlier workers on the hydrogeological conditions of this study area. The above data of Budhan Sandai area are discussed in the following chapters.