CHAPTER-I
INTRODUCTION
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GENERAL STATEMENT :

The unusual ground water potential is one of the principal assets of a nation, when properly used, this water help in adequate municipal supplies, provide the needs of growing industries and ensure stable irrigational water requirements even during climatically adverse conditions. Already about half of the irrigation demands in India are being met from ground water sources. Phenomenal rise in agricultural production in the country making it self-sufficient in food, is due to emergence of highly yielding varieties of seeds and utilization of ground water as an assured source of irrigational water.

India, is one of the country which has largest cropped area under irrigation being 66.5 million hectares at the end of the year 1986. Area added annually under crop land which comes to about 2.5 million hectares; is also one of the largest. Ground water plays a major role because out of the crop land, ground water accounts for 24.50 million hectares, being 40% of the total. In the present annual development, it accounts for about half the crop land. In terms of total usable land, water accounts for 40 million hectares. One of the remarkable features
of ground water development in the country is in its very cheap and simple ground water structures like dug wells, bore wells and tube wells.

Rapid agricultural growth requires systematic ground water planning to increase efficiency, save energy and to manage ground water pumpage, water quality. For current assessment ground water potential of a region, the storage and transmissibility coefficients of an aquifer are the important characteristics. They are essential parameters in the economic development of ground water potential of a region.

The present study area is mainly underlain by Vindhyan Sandstone and drained by the river Kali-Sindh, Chambal and its canals, hence, it is known as Chambal canal command area, which originates in Vindhyan ranges in Indore district of Madhya Pradesh. After traversing a total length of 964 km., it joins the Yamuna river near Sahan village, in Etawa district, U.P. The Chambal river basin comprises an area of 1,39,468 km², out of which 90,760 km² is in Rajasthan. A total of 1750 km² lying between the latitude 25°10'00" : 25°51'20" N and longitude 75°51'22" : 76°35'30" E falling in Ladpura, Anta, Sultanpur and Etawah blocks of Kota district.

The present study utilizes pre-monsoonic and post-monsoonic water level data to determine water level fluctuations in the area. Collection, compilation, analysis and interpretation of all available data to know the chemical quality of water. Bore
hole data have been collected to study the lithological units and on the basis of these lithological units a correlation has been attempted to know the aquifer system of the area.

To know the trend of water level fluctuations about 25 observation wells were selected to monitor pre-monsoon and post-monsoon water levels and 25 water samples were collected to evaluate the water quality and its suitability for domestic and irrigation purposes.

AIMS AND SCOPE:

The present studies were carried out with a view to (i) delineate the different aquifers occurring in the area and their inter-relationship, (ii) study of movement of ground water, (iii) study of fluctuation of water levels in response to several changes, (iv) study of quality of ground water and its suitability for various purposes, (v) role of canal seepage in water fluctuation and improving or deteriorating the chemical quality and (vi) to understand the factors involved in creating the problem of water logging and salinity.

METHODS OF STUDY:

The author during his field work selected about 50 observation wells from the study area and monitored the depth
to water level twice i.e. pre-monsoon and post-monsoon periods. From each aquifer systems at least 10 observation wells were selected after an interval of 5 to 10 kms.

For evaluation of chemical quality of ground water at least 5 samples from each aquifer system were collected and subjected to partial chemical analysis. Figure-30 illustrates the trend of water level fluctuations and depth to water level.

HYDROGEOLOGICAL DATA:

The study area falls in sub-humid type or monsoonal type of climate where temperature ranges in between 15°C in the month of December-January to 40°C during May. The maximum temperature in summer months at times goes beyond 40°C. The average annual rainfall in the area is about 775.45 mm. Average to heavy rainfall months are from July to September. Occasional showers also occur in winter. The alternate wet and dry season with suitable rainfall favours the crop pattern in this area. Relative humidity in the area is around 55% on an average.

FAUNA AND FLORA:

Eucalyptus globulus, Acacia arabica (Babool), Azadirachta indica (Neem), Zizyphus jujuba (Ber) are the main plants and lizard, monkey, rabbit, fox, etc. are the important animals of this area.
Wheat grain, mustard are the main Rabi crops whereas jowar, rice, soyabean, sugarcane and ground-nuts are the main Kharif crops.

LOCATION AND COMMUNICATION:

The study area is situated in the Kota district lying in the eastern part of Rajasthan in between latitudes 25°10'00" : 25°51'20" N and longitudes 75°51'22" : 76°35'30" E (Fig. 1).

Kota city is very well connected with Aligarh via Agra and Delhi by railway lines of the western railways. From Kota, the study area is easily accessible by metalled and partly non-metalled roads.
FIG. 1 - LOCATION MAP OF THE STUDY AREA, IN PART OF KOTA DIST. RAJASTHAN.