



## A Case Study

# Assessment and management of underground water quality in different land slopes of calcareous soils

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### Summary

A Case study was undertaken to attempt the assessment and management of underground water quality in different land slopes of calcareous soils (India). The underground water of open/tube wells situated at higher elevation have low pH, EC, water soluble  $Mg^{2+}$ ,  $Na^+$ ,  $CO_3^{2-}$ ,  $HCO_3^-$ ,  $Cl^-$ , SSP and SAR than in lower elevations. The SSP and SAR also increased with increase in EC and pH. The underground water from undulating upper pediment (typic ustothrepts) as well as upper pediment (typic ustothrepts) and lower pediment (Vertic Haplustepts) of calcareous soils were placed under safe class of  $C_2S_1$  and  $C_3S_1$ , respectively. Whereas the alluvial plain (Calcic Haplustepts) and coastal plain (Fluventic Haplustepts) in doubtful class of  $C_4S_1$  and  $C_4S_2$ , respectively. In general, underground water samples from different land slopes of calcareous soils were placed under  $C_3S_1$  water quality class.

**Key words :** Characterization, Assessment, Underground water quality, Calcareous soils, Land slopes, South Saurashtra, Gujarat

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## Introduction

Under ground waters in different land slopes of calcareous soils in southern Saurashtra region in Gujarat (India) have diversity of quality problems. Irrigation water of good quality is usually not available in sufficient quantities to satisfy the water requirement of crops in the southern Saurashtra region of Gujarat (India) as there are limited canal water facilities. Under these conditions, the farmers are obliged to use underground of water with high quantities of dissolved salts, invariably accompanied with yield reduction in most of the crops being grown. Indiscriminate use of such water often leads to crop failures and development of the saline or sodic soils, which are in turn, require expensive treatment to make them productive again. On the other hand judicious use of saline water can contribute to the sustainable production of various crops particularly in light textured well-drained soils. Attempts have been made in the present case study to assess

quality of underground water in different land slopes of calcareous soils in Meghal Irrigation Command area of Southern Saurashtra in Gujarat (India) and to suggest management strategies.

## Resources and Research Methods

The study area comprises of south Saurashtra agro-climatic zone covering major part of calcareous soils of Junagadh district in Southern Saurashtra region of Gujarat (India). It lies between  $21^{\circ}14'$  to  $21^{\circ}01'$  N latitude and  $70^{\circ}24'$  to  $70^{\circ}16'$  E longitude and 5 to 115 m above MSL.

The area climatically falls under semi-arid (dry) climate with a mean annual rainfall of 815 mm. The maximum, minimum and mean temperatures are  $33.8^{\circ}C$ ,  $19.8^{\circ}C$  and  $26.78^{\circ}C$ , respectively. The temperature regime of the study area is hyperthermic in undulating upper pediment, upper pediment and lower pediment, while isohyperthermic in alluvial plain