International Journal of Applied and Natural Sciences (IJANS)
ISSN (P): 2319–4014; ISSN (E): 2319–4022
Vol. 15, Issue 1, Jan–Jun 2026; 17–24

International Academy of Science, Engineering and Technology
Connecting Researchers; Nurturing Innovations

PHYSICOCHEMICAL ASSESSMENT OF BOREWELL WATER QUALITY IN MARAKANAM, PUDUCHERRY: A COMPARATIVE STUDY AGAINST IS 10500:2012 STANDARDS

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ABSTRACT

Groundwater is the primary source of drinking water in rural India, yet its quality varies widely depending on geology, land use, and anthropogenic pressures. This study investigates the physicochemical quality of borewell water from Marakanam, Puducherry, analysed by SMS Labs Services Pvt. Ltd. Twenty eight parameters were tested, including pH, total dissolved solids, hardness, major ions, and trace metals. All values conformed to acceptable limits of IS 10500:2012 standards, indicating potable quality. Unlike industrial belts, Marakanam's aquifers are relatively free from anthropogenic contamination, with negligible pesticide use and no nearby factories. Microbiological threats are minimal, but seasonal monitoring remains essential. Public health implications are discussed in relation to rural disease patterns, while risk assessment models, such as the Water Quality Index (WQI) and Heavy Metal Pollution Index (HPI), contextualize the findings. The paper concludes that Marakanam's groundwater is safe but requires proactive community level management to sustain quality amid coastal development pressures.

KEYWORDS: *Drinking Water in Rural India*

Article History

Received: *05 May 2026* | ***Revised:*** *07 May 2026* | ***Accepted:*** *09 May 2026*