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WORKING PAPER

WP-SEAS-21-005

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# Characterization and Assessment of Geothermal Water Quality Parameter's alongside with Pollution Index of Groundwater (PIG), Hierarchal Cluster Analysis (HCA) for Geothermal Provinces in Gujarat, India.

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## WORKING PAPER

**Serial:** WP-SEAS-21-005

**Title:** Characterization and Assessment of Geothermal Water Quality Parameter's alongside with Pollution Index of Groundwater (PIG), Hierarchal Cluster Analysis (HCA) for Geothermal Provinces in Gujarat, India.

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**Abstract (150 words):** The study in the paper looked at the groundwater quality of Unai, Tulsishyam and Dholera districts in the State of Gujarat located in the country India. The methods used were Pollution Index of Groundwater (PIG), Ecological Risk Index (ERI), Hierarchal Cluster Analysis (HCA). A total of 22 samples were collected from 3 places and were examined for pH, TDS, Na<sup>+</sup>, K<sup>+</sup>, Ca<sup>2+</sup>, Mg<sup>2+</sup>, F<sup>-</sup>, HCO<sub>3</sub><sup>-</sup>, Cl<sup>-</sup>, SO<sub>4</sub><sup>2-</sup>. The disposal of the major ions showed that they are below their maximum acceptable limits. pH of water samples was measured and only one sample out of 21 was out of the permissible limit. For Langelier Saturation Index only one sample was found to be out of order, Ryznar Stability Index has a higher corrosion resistance and can withstand higher calcium hardness and pH values. PSI calibrates the relationship between saturation and scale development by including an approximation of the water's buffering potential into the index, all 21 values have high PSI values Than the prescribed. There are five groups in which degree of pollution of drinking water is classified: PIG < 1.0 indicates an insignificant pollution; 1.0 – 1.5 indicates low pollution; 1.5 – 2.0 indicates moderate pollution; 2.0 – 2.5 indicates high pollution; and PIG > 2.5 indicates very high pollution. 28% of samples have insignificant pollution, 38% of the samples have very high pollution. If I want to break everything into area wise: All the samples at Dholera are of high levels, Unai has somewhat comparable and proper water and Tulsishyam has a lot of Values under control and the water quality present there is on a safer side.

**Keywords:** Geothermal Energy; Pollution Index of Groundwater (PIG); Ecological Risk Index (ERI); Hierarchal Cluster Analysis (HCA).

**Keywords:** Geothermal, PIG, HCA, Ground Water