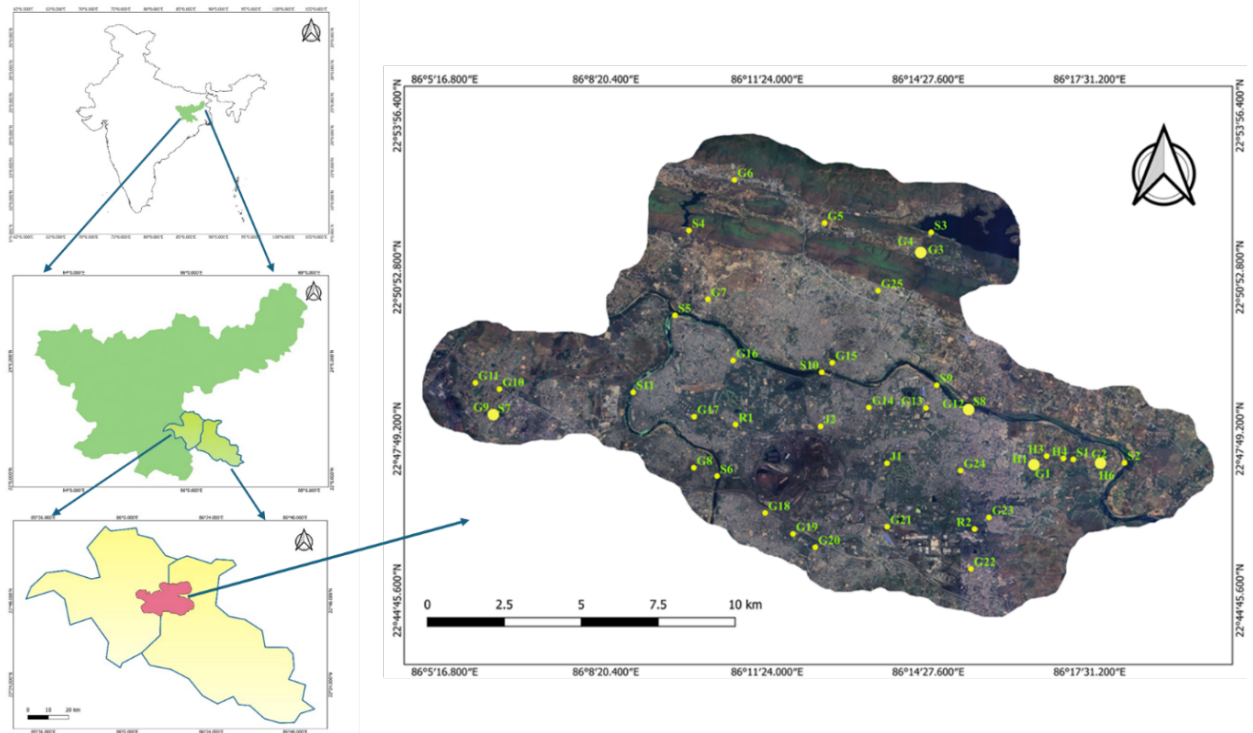
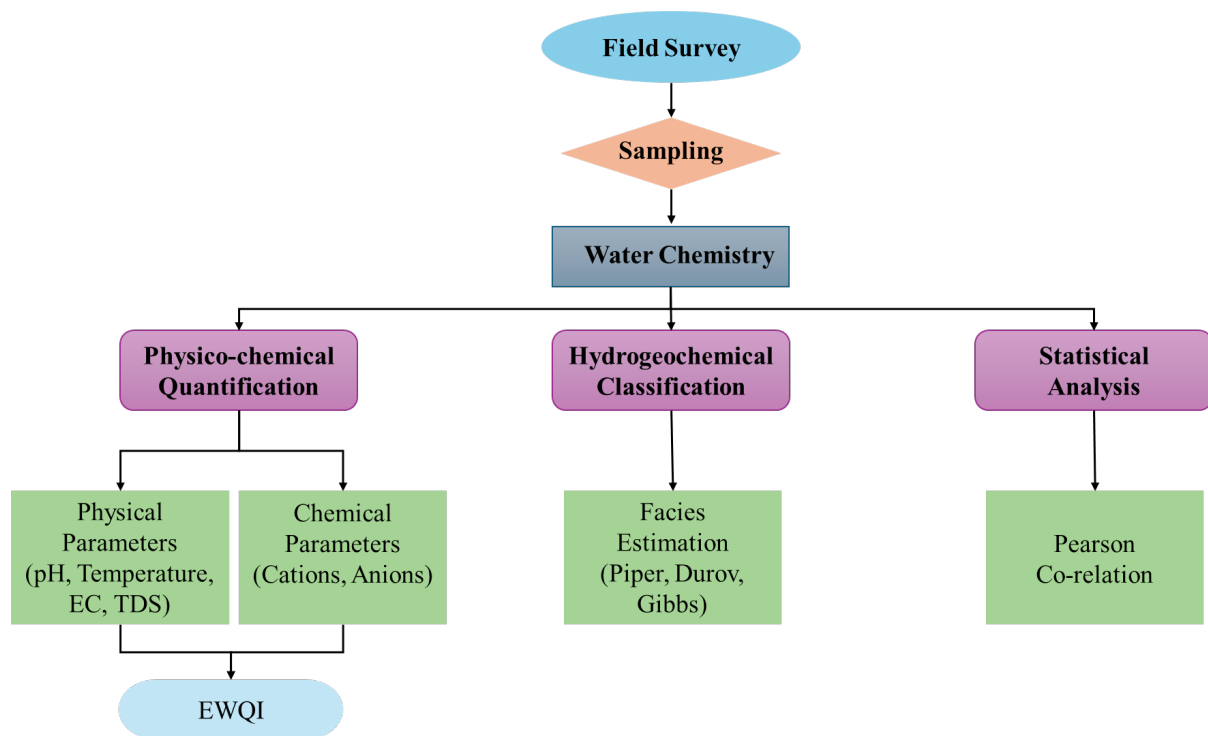


**Figure 1**



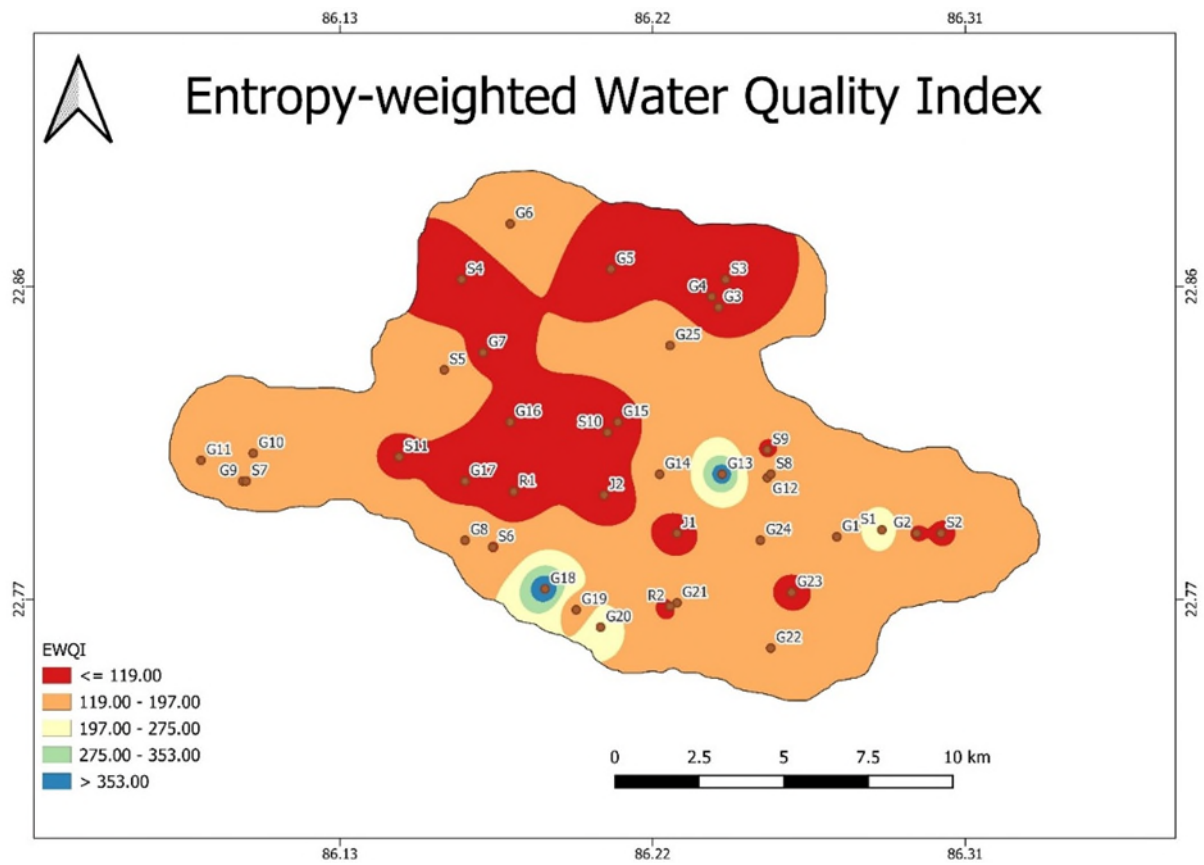
**Figure 1:** Study area map that highlighting the sampling points.

**Figure 2**



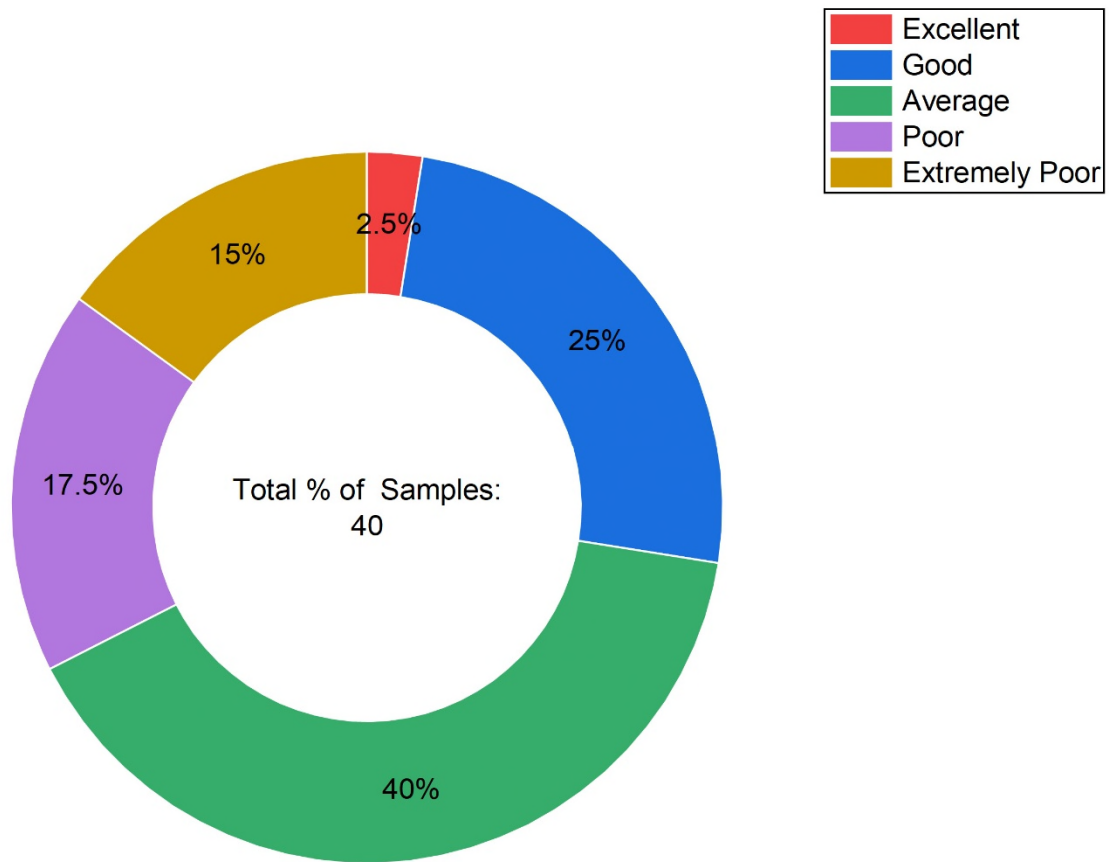
**Figure 2:** Schematic diagram showing methodology adopted.

**Figure 3**



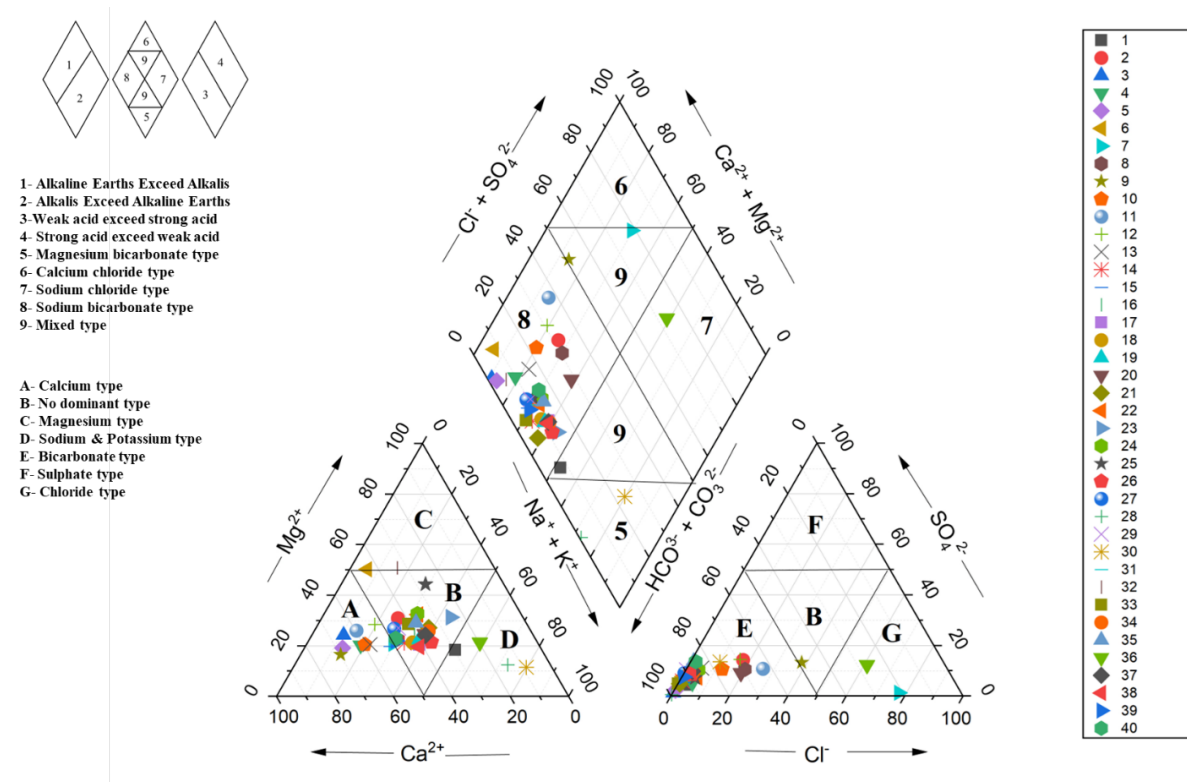
**Figure 3:** Spatial distribution map of Entropy-weighted water quality index.

**Figure 4**



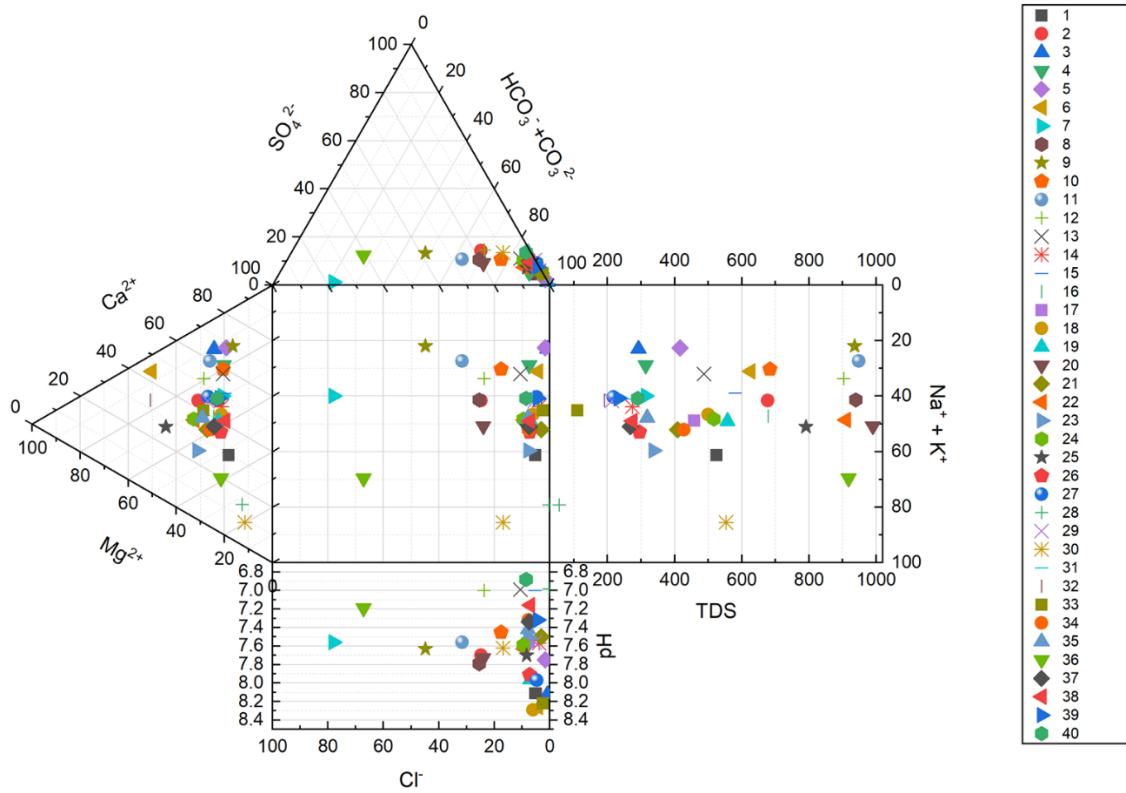
**Figure 4:** Pie diagram showing the percentage of water samples in each category.

**Figure 5**



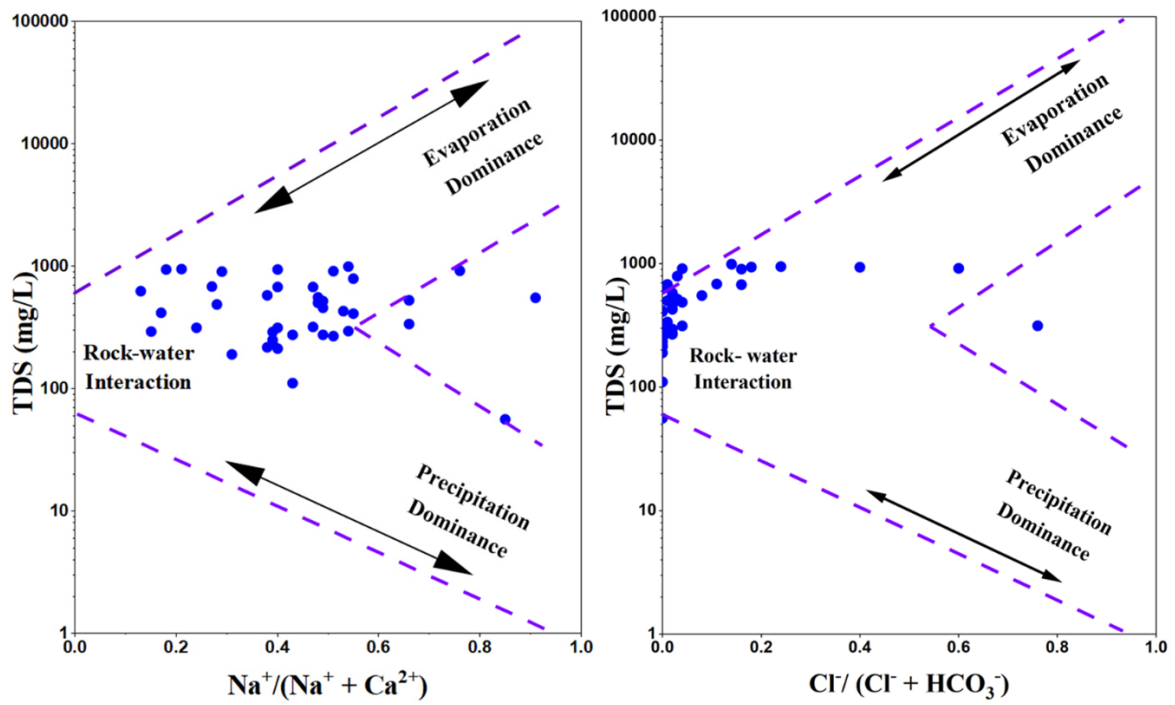
**Figure 5:** Piper diagram illustrating the hydrochemical facies and relative ionic composition of the analysed pre-monsoon water samples.

**Figure 6**



**Figure 6:** Durov diagram depicting the hydrochemical evolution and dominant geochemical processes controlling the chemistry of the analysed pre-monsoon water samples.

**Figure 7**



**Figure 7:** Gibbs diagrams showing the relationship between TDS and major ion ratios to identify the controlling mechanisms influencing the chemistry of the analysed pre-monsoon water samples.

**Figure 8**

|                               | pH      | EC      | TDS     | Alkalinity | TH      | CO <sub>3</sub> <sup>2-</sup> | HCO <sub>3</sub> <sup>-</sup> | Ca <sup>2+</sup> | Mg <sup>2+</sup> | Na <sup>+</sup> | K <sup>+</sup> | Cl <sup>-</sup> | SO <sub>4</sub> <sup>2-</sup> | F <sup>-</sup> | PO <sub>4</sub> <sup>3-</sup> | NO <sub>3</sub> <sup>-</sup> | Al      | Mn      | Fe      | As |  |
|-------------------------------|---------|---------|---------|------------|---------|-------------------------------|-------------------------------|------------------|------------------|-----------------|----------------|-----------------|-------------------------------|----------------|-------------------------------|------------------------------|---------|---------|---------|----|--|
| pH                            | 1       |         |         |            |         |                               |                               |                  |                  |                 |                |                 |                               |                |                               |                              |         |         |         |    |  |
| EC                            | 0.00993 | 1       |         |            |         |                               |                               |                  |                  |                 |                |                 |                               |                |                               |                              |         |         |         |    |  |
| TDS                           | 0.00978 | 0.99999 | 1       |            |         |                               |                               |                  |                  |                 |                |                 |                               |                |                               |                              |         |         |         |    |  |
| Alkalinity                    | 0.32679 | 0.53137 | 0.53174 | 1          |         |                               |                               |                  |                  |                 |                |                 |                               |                |                               |                              |         |         |         |    |  |
| TH                            | 0.06004 | 0.89352 | 0.89375 | 0.45493    | 1       |                               |                               |                  |                  |                 |                |                 |                               |                |                               |                              |         |         |         |    |  |
| CO <sub>3</sub> <sup>2-</sup> | 0.35027 | 0.30763 | 0.30769 | 0.27335    | 0.49586 | 1                             |                               |                  |                  |                 |                |                 |                               |                |                               |                              |         |         |         |    |  |
| HCO <sub>3</sub> <sup>-</sup> | 0.2891  | 0.50699 | 0.50737 | 0.98898    | 0.40616 | 0.15449                       | 1                             |                  |                  |                 |                |                 |                               |                |                               |                              |         |         |         |    |  |
| Ca <sup>2+</sup>              | 0.00249 | 0.81009 | 0.81022 | 0.33919    | 0.95729 | 0.50598                       | 0.28839                       | 1                |                  |                 |                |                 |                               |                |                               |                              |         |         |         |    |  |
| Mg <sup>2+</sup>              | 0.14968 | 0.84584 | 0.84621 | 0.56162    | 0.85609 | 0.36855                       | 0.5272                        | 0.67008          | 1                |                 |                |                 |                               |                |                               |                              |         |         |         |    |  |
| Na <sup>+</sup>               | -0.0225 | 0.71558 | 0.71525 | 0.39843    | 0.4048  | -0.1477                       | 0.42311                       | 0.29831          | 0.50599          | 1               |                |                 |                               |                |                               |                              |         |         |         |    |  |
| K <sup>+</sup>                | -0.1334 | 0.26491 | 0.26412 | -0.03193   | -0.0121 | -0.1729                       | 0.00856                       | -0.0149          | -0.0044          | 0.4731          | 1              |                 |                               |                |                               |                              |         |         |         |    |  |
| Cl <sup>-</sup>               | -0.0557 | 0.15543 | 0.1553  | -0.06679   | 0.15547 | 0.30596                       | -0.1174                       | 0.17898          | 0.07921          | 0.16424         | -0.0257        | 1               |                               |                |                               |                              |         |         |         |    |  |
| SO <sub>4</sub> <sup>2-</sup> | -0.0465 | 0.89915 | 0.89889 | 0.37759    | 0.7725  | 0.18961                       | 0.36238                       | 0.70788          | 0.71785          | 0.65006         | 0.30608        | 0.09629         | 1                             |                |                               |                              |         |         |         |    |  |
| F <sup>-</sup>                | -0.143  | 0.66792 | 0.66757 | 0.22866    | 0.566   | 0.06956                       | 0.21586                       | 0.51648          | 0.52985          | 0.52775         | 0.12836        | 0.0631          | 0.57507                       | 1              |                               |                              |         |         |         |    |  |
| PO <sub>4</sub> <sup>3-</sup> | -0.1257 | -0.2092 | -0.2104 | -0.3688    | -0.3509 | -0.1683                       | -0.3561                       | -0.3656          | -0.2472          | 0.01621         | 0.24805        | 0.10042         | -0.2363                       | -0.0095        | 1                             |                              |         |         |         |    |  |
| NO <sub>3</sub> <sup>-</sup>  | -0.4286 | 0.38621 | 0.38647 | -0.0497    | 0.32283 | -0.0162                       | -0.0262                       | 0.28533          | 0.31875          | 0.16104         | 0.07162        | 0.17003         | 0.29589                       | 0.42957        | 0.0723                        | 1                            |         |         |         |    |  |
| Al                            | -0.2234 | -0.1334 | -0.1348 | -0.39605   | -0.3658 | -0.4012                       | -0.3581                       | -0.3695          | -0.2786          | 0.25626         | 0.42594        | -0.0404         | 0.01013                       | -0.0859        | 0.47052                       | 0.18706                      | 1       |         |         |    |  |
| Mn                            | 0.13128 | 0.40986 | 0.40963 | 0.39825    | 0.38987 | 0.31689                       | 0.37417                       | 0.28772          | 0.48658          | 0.38264         | 0.13515        | -0.0494         | 0.38201                       | 0.14787        | -0.0794                       | -0.1175                      | -0.0422 | 1       |         |    |  |
| Fe                            | 0.02818 | 0.02698 | 0.02765 | 0.17596    | -0.0062 | -0.0274                       | 0.19305                       | 0.01975          | -0.0512          | 0.04868         | -0.1138        | -0.0602         | 0.12247                       | -0.1583        | -0.0813                       | -0.2334                      | -0.1503 | 0.25688 | 1       |    |  |
| As                            | 0.00272 | -0.0239 | -0.0242 | 0.11668    | -0.1123 | 0.08698                       | 0.12556                       | -0.1403          | -0.0374          | 0.06353         | 0.09551        | -0.1967         | 0.00492                       | -0.1256        | 0.22593                       | -0.0617                      | 0.0578  | -0.0417 | 0.10887 | 1  |  |

**Figure 8:** Pearson correlation matrix illustrating the interrelationships among physicochemical parameters and trace elements.