

**Table S1** Physiochemical parameters at sampling sites {in mg/l, except for pH (standard unit), EC ( $\mu\text{s}/\text{cm}$ ), and heavy metals ( $\mu\text{g}/\text{l}$ )}

| Parameter                             | W1     | W2    | W3    | W4    | W5    | W6    | W7     | W8    | W9    | W10   | W11   | W12   | W13   | W14   | W15   | W16   | Permissible limit* |      |
|---------------------------------------|--------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------|------|
|                                       |        |       |       |       |       |       |        |       |       |       |       |       |       |       |       |       | ISIRI              | WHO  |
| pH                                    | 7.23   | 8.01  | 7.11  | 7.43  | 7.55  | 7.95  | 7.11   | 7.35  | 7.55  | 7.52  | 7.57  | 8.11  | 7.64  | 7.09  | 7.35  | 7.31  | 6.5-9              | **   |
| EC                                    | 7340   | 3250  | 3655  | 2520  | 4689  | 3720  | 6225   | 2719  | 2310  | 934   | 627   | 7150  | 1689  | 1485  | 3385  | 2965  | **                 | 1500 |
| TDS                                   | 4690   | 2072  | 2330  | 1610  | 3000  | 2380  | 3980   | 1740  | 1475  | 595   | 400   | 4570  | 1080  | 950   | 2160  | 1890  | 1500               | 1000 |
| TH (as $\text{CaCO}_3$ )              | 1531.6 | 530   | 753.3 | 465   | 1000  | 450   | 1400   | 575   | 625.5 | 300   | 201   | 1200  | 280   | 475.6 | 748   | 480.2 | 500                | **   |
| Alk (as $\text{CaCO}_3$ )             | 295.6  | 124   | 265.5 | 432   | 227   | 305   | 479.5  | 218   | 160.7 | 180   | 125   | 212.7 | 335.2 | 370   | 325.8 | 335.2 | **                 | **   |
| $\text{Ca}^{2+}$                      | 292    | 92    | 109   | 142   | 92.5  | 60    | 235.5  | 90    | 121   | 70    | 42    | 131.5 | 35.5  | 100   | 100.5 | 85    | **                 | 300  |
| $\text{Mg}^{2+}$                      | 201    | 73.2  | 121.2 | 26.4  | 185.5 | 72    | 201.3  | 84.9  | 85.5  | 31.2  | 24    | 210   | 45.9  | 55    | 120.1 | 55.5  | **                 | **   |
| $\text{Na}^+$                         | 948.3  | 494.5 | 455   | 355   | 563.5 | 632.5 | 921.8  | 341.9 | 230.5 | 65    | 45    | 1012  | 261   | 115.1 | 356.8 | 411.9 | 200                | 200  |
| $\text{K}^+$                          | 29.3   | 11.7  | 7.65  | 9.75  | 15.2  | 14.4  | 23     | 10.53 | 5.34  | 3.98  | 2.35  | 10.56 | 3.67  | 1.33  | 2.79  | 3.21  | **                 | 12   |
| $\text{Si}^{4+}$                      | 2.52   | 2.09  | 2.88  | 1.55  | 3.23  | 2.67  | 1.45   | 3.88  | 1.96  | 2.55  | 0.98  | 2.88  | 2.56  | 1.69  | 2.49  | 1.02  | **                 | **   |
| $\text{HCO}_3^-$                      | 358    | 158.6 | 315.5 | 524.6 | 277.1 | 372.1 | 585.1  | 266.8 | 196.9 | 220   | 152.5 | 259.5 | 409.5 | 453.6 | 401.5 | 409   | **                 | **   |
| $\text{SO}_4^{2-}$                    | 1345   | 580.6 | 673.4 | 305   | 832.6 | 455   | 845.6  | 346.6 | 189.5 | 45.5  | 45.3  | 989.8 | 211.6 | 120.8 | 488.5 | 500.9 | 400                | 400  |
| $\text{Cl}^-$                         | 1275.5 | 617.7 | 549.3 | 355   | 811.3 | 759.5 | 1311.6 | 467.8 | 523.5 | 158   | 95.85 | 1581  | 168.3 | 170.3 | 533.6 | 341.8 | 400                | **   |
| $\text{PO}_4^{3-}$                    | 0.09   | 0.07  | 0.13  | 0.17  | 0.14  | 0.09  | 0.15   | 0.19  | 0.22  | 0.17  | 0.14  | 0.16  | 0.12  | 0.074 | 0.11  | 0.13  | **                 | **   |
| $\text{NO}_3^-$                       | 12.1   | 15.3  | 11.5  | 15.5  | 7.11  | 21.5  | 18.3   | 28.9  | 24.9  | 19.5  | 15.8  | 11.4  | 17.33 | 12.9  | 15.5  | 22.6  | 50                 | 50   |
| $\text{NO}_2^-$                       | 0.017  | 0.012 | 0.025 | 0.013 | 0.017 | 0.011 | 0.015  | 0.039 | 0.037 | 0.019 | 0.011 | 0.032 | 0.009 | 0.015 | 0.012 | 0.011 | 3                  | 3    |
| $\text{NH}_3$                         | 0.029  | 0.035 | 0.028 | 0.041 | 0.039 | 0.023 | 0.019  | 0.036 | 0.051 | 0.045 | 0.013 | 0.019 | 0.055 | 0.031 | 0.023 | 0.027 | **                 | **   |
| $\text{F}^-$                          | 0.82   | 0.69  | 1.17  | 1.22  | 1.33  | 1.29  | 1.56   | 1.39  | 1.55  | 1.28  | 1.04  | 1.51  | 1.66  | 1.34  | 1.45  | 1.11  | 1.5                | **   |
| B                                     | 2.66   | 1.97  | 1.41  | 1.19  | 3.09  | 2.54  | 1.77   | 3.76  | 4.34  | 1.11  | 0.56  | 0.93  | 1.67  | 1.55  | 2.84  | 1.65  | 500                | 2400 |
| TP                                    | 0.12   | 0.11  | 0.15  | 0.21  | 0.16  | 0.13  | 0.18   | 0.26  | 0.25  | 0.21  | 0.18  | 0.18  | 0.15  | 0.087 | 0.15  | 0.16  | **                 | **   |
| TN                                    | 1.62   | 1.23  | 1.66  | 1.17  | 0.95  | 0.77  | 1.41   | 1.15  | 0.89  | 0.94  | 0.65  | 1.09  | 0.59  | 0.55  | 0.89  | 0.61  | **                 | **   |
| Fe                                    | 151.5  | 132.4 | 91.5  | 76.9  | 187.6 | 155.8 | 86.5   | 68.6  | 106.4 | 83.3  | 55.6  | 41.8  | 81.5  | 139.8 | 103.6 | 77.6  | **                 | **   |
| Zn                                    | 30.2   | 21.9  | 20.5  | 23.7  | 21.5  | 15.9  | 24.4   | 46.7  | 28.5  | 32.6  | 16.8  | 55.1  | 21.7  | 31.6  | 31.5  | 23.7  | **                 | **   |
| Mn                                    | 23.9   | 19.7  | 11.6  | 9.12  | 15.7  | 20.5  | 29.7   | 33.9  | 21.6  | 19.5  | 10.4  | 13.4  | 20.9  | 15.3  | 26.8  | 20.6  | 400                | **   |
| Cr                                    | 1.88   | 1.34  | 1.98  | 1.32  | 2.43  | 1.99  | 2.31   | 2.98  | 3.67  | 1.77  | 1.23  | 2.67  | 2.44  | 2.09  | 3.15  | 2.55  | 50                 | 50   |
| Cu                                    | 15.7   | 11.5  | 15.7  | 14.1  | 38.9  | 12.7  | 49.3   | 36.3  | 28.3  | 19.4  | 14.8  | 23.1  | 15.9  | 35.6  | 28.4  | 23.8  | 2000               | 2000 |
| Pb                                    | 4.9    | 2.33  | 7.9   | 9.89  | 9.33  | 7.56  | 6.34   | 5.22  | 2.67  | 5.87  | 2.09  | 5.76  | 7.87  | 4.43  | 3.12  | 2.88  | 10                 | 10   |
| Cd                                    | 0.92   | 0.77  | 1.14  | 1.19  | 1.22  | 0.88  | 1.55   | 0.88  | 1.23  | 1.12  | 0.67  | 0.89  | 1.19  | 1.44  | 1.15  | 1.27  | 3                  | 3    |
| $\text{Mg}^{2+}/\text{Ca}^{+2}$ Ratio | 1.1    | 1.3   | 1.9   | 0.3   | 3.3   | 2.0   | 1.4    | 1.6   | 1.2   | 0.7   | 1.0   | 2.7   | 2.2   | 0.9   | 2.0   | 1.1   |                    |      |
| Simpson's Ratio                       | 6.12   | 6.69  | 2.99  | 1.16  | 5.03  | 3.51  | 3.85   | 3.01  | 4.57  | 1.23  | 1.08  | 10.47 | 0.71  | 0.65  | 2.28  | 1.44  |                    |      |
| Saturation Index                      | 6.12   | 6.97  | 6.60  | 6.27  | 6.73  | 6.79  | 6.00   | 6.76  | 6.76  | 6.95  | 7.33  | 6.60  | 6.97  | 6.48  | 6.53  | 6.51  |                    |      |
| SAR                                   | 10.41  | 9.30  | 7.09  | 7.16  | 7.73  | 12.96 | 10.61  | 6.18  | 3.90  | 1.62  | 1.37  | 12.68 | 6.78  | 2.29  | 5.66  | 8.50  |                    |      |
| RSC                                   | -25.5  | -8.1  | -10.3 | -0.7  | -15.5 | -2.9  | -18.9  | -7.20 | -9.90 | -2.5  | -1.6  | -19.8 | 1.1   | -2.1  | -8.5  | -2.2  |                    |      |

\* For drinking purposes; \*\* No health concern at levels found in drinking water.