**Supplementary Materials**

**Spatiotemporal distribution of high-fluoride in groundwater and**

**its health risk assessment in children in a new dental fluorosis field**

**Table S1.** Seasonal estimated daily intake scores for different age groups based on oral exposure in study area

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **WELLS** | **EDIing**  **(mg/kg/day)** | | | **EDIing**  **(mg/kg/day)** | | | **EDIing**  **(mg/kg/day)** | | | **EDIing**  **(mg/kg/day)** | | |
| **Summer** | | | **Autumn** | | | **Winter** | | | **Spring** | | |
| Children | Teenage | Adult | Children | Teenage | Adult | Children | Teenage | Adult | Children | Teenage | Adult |
| W-1 | 8.43E-02 | 3.84E-02 | 9.23E-03 | 1.86E-02 | 8.46E-03 | 2.03E-03 | 4.89E-02 | 2.23E-02 | 5.35E-03 | 7.51E-02 | 3.42E-02 | 8.22E-03 |
| W-2 | 8.43E-02 | 3.84E-02 | 9.23E-03 | 2.18E-02 | 9.95E-03 | 2.39E-03 | 4.68E-02 | 2.13E-02 | 5.12E-03 | 7.30E-02 | 3.33E-02 | 7.99E-03 |
| W-3 | 9.00E-02 | 4.10E-02 | 9.85E-03 | 1.90E-02 | 8.65E-03 | 2.08E-03 | 5.74E-02 | 2.62E-02 | 6.28E-03 | 1.40E-01 | 6.39E-02 | 1.54E-02 |
| W-4 | 9.21E-02 | 4.20E-02 | 1.01E-02 | 2.30E-02 | 1.05E-02 | 2.52E-03 | 5.74E-02 | 2.62E-02 | 6.28E-03 | 7.86E-02 | 3.58E-02 | 8.61E-03 |
| W-5 | 9.42E-02 | 4.29E-02 | 1.03E-02 | 3.35E-02 | 1.53E-02 | 3.67E-03 | 1.84E-02 | 8.40E-03 | 2.02E-03 | 7.01E-02 | 3.19E-02 | 7.67E-03 |
| W-6 | 7.79E-02 | 3.55E-02 | 8.53E-03 | 2.95E-02 | 1.34E-02 | 3.23E-03 | 4.46E-02 | 2.03E-02 | 4.89E-03 | 9.14E-02 | 4.17E-02 | 1.00E-02 |
| W-7 | 1.01E-01 | 4.59E-02 | 1.10E-02 | 2.84E-02 | 1.29E-02 | 3.11E-03 | 2.69E-02 | 1.23E-02 | 2.95E-03 | 6.30E-02 | 2.87E-02 | 6.90E-03 |
| W-8 | 8.64E-02 | 3.94E-02 | 9.46E-03 | 2.19E-02 | 9.98E-03 | 2.40E-03 | 4.68E-02 | 2.13E-02 | 5.12E-03 | 4.22E-02 | 1.92E-02 | 4.62E-03 |
| W-9 | 1.12E-01 | 5.10E-02 | 1.23E-02 | 2.54E-02 | 1.16E-02 | 2.78E-03 | 5.45E-02 | 2.49E-02 | 5.97E-03 | 7.79E-02 | 3.55E-02 | 8.53E-03 |
| W-10 | 2.33E-01 | 1.06E-01 | 2.55E-02 | 1.92E-02 | 8.75E-03 | 2.10E-03 | 8.00E-02 | 3.65E-02 | 8.76E-03 | 1.17E-01 | 5.33E-02 | 1.28E-02 |
| W-11 | 2.56E-01 | 1.17E-01 | 2.81E-02 | 2.13E-02 | 9.69E-03 | 2.33E-03 | 6.52E-02 | 2.97E-02 | 7.14E-03 | 1.20E-01 | 5.46E-02 | 1.31E-02 |
| W-12 | 1.33E-01 | 6.07E-02 | 1.46E-02 | 2.28E-02 | 1.04E-02 | 2.50E-03 | 4.68E-02 | 2.13E-02 | 5.12E-03 | 8.00E-02 | 3.65E-02 | 8.76E-03 |
| W-13 | 1.47E-01 | 6.72E-02 | 1.61E-02 | 2.15E-02 | 9.82E-03 | 2.36E-03 | 3.05E-02 | 1.39E-02 | 3.34E-03 | 9.63E-02 | 4.39E-02 | 1.05E-02 |
| W-14 | 1.42E-01 | 6.49E-02 | 1.56E-02 | 3.15E-02 | 1.44E-02 | 3.45E-03 | 2.62E-02 | 1.19E-02 | 2.87E-03 | 4.14E-02 | 1.89E-02 | 4.54E-03 |
| W-15 | 1.34E-01 | 6.10E-02 | 1.47E-02 | 6.75E-02 | 3.08E-02 | 7.39E-03 | 2.90E-02 | 1.32E-02 | 3.18E-03 | 1.17E-01 | 5.33E-02 | 1.28E-02 |
| W-16 | 1.79E-01 | 8.17E-02 | 1.96E-02 | 2.65E-02 | 1.21E-02 | 2.90E-03 | 7.79E-03 | 3.55E-03 | 8.53E-04 | 1.11E-01 | 5.07E-02 | 1.22E-02 |
| W-17 | 1.48E-01 | 6.75E-02 | 1.62E-02 | 3.45E-02 | 1.57E-02 | 3.78E-03 | 2.34E-02 | 1.07E-02 | 2.56E-03 | 1.16E-01 | 5.30E-02 | 1.27E-02 |
| W-18 | 5.41E-02 | 2.47E-02 | 5.93E-03 | 2.61E-02 | 1.19E-02 | 2.86E-03 | 5.60E-02 | 2.55E-02 | 6.13E-03 | 1.37E-01 | 6.26E-02 | 1.50E-02 |
| W-19 | 6.85E-02 | 3.12E-02 | 7.50E-03 | 2.46E-02 | 1.12E-02 | 2.69E-03 | 3.83E-02 | 1.74E-02 | 4.19E-03 | 1.35E-01 | 6.17E-02 | 1.48E-02 |
| W-20 | 7.86E-02 | 3.58E-02 | 8.61E-03 | 2.48E-02 | 1.13E-02 | 2.71E-03 | 4.32E-02 | 1.97E-02 | 4.73E-03 | 1.15E-01 | 5.23E-02 | 1.26E-02 |
| W-21 | 5.96E-02 | 2.72E-02 | 6.52E-03 | 2.02E-02 | 9.20E-03 | 2.21E-03 | 4.53E-02 | 2.07E-02 | 4.96E-03 | 9.99E-02 | 4.55E-02 | 1.09E-02 |
| W-22 | 9.70E-02 | 4.42E-02 | 1.06E-02 | 4.64E-02 | 2.12E-02 | 5.08E-03 | 4.68E-02 | 2.13E-02 | 5.12E-03 | 6.45E-02 | 2.94E-02 | 7.07E-03 |
| W-23 | 6.53E-02 | 2.98E-02 | 7.15E-03 | 1.34E-02 | 6.10E-03 | 1.47E-03 | 4.68E-02 | 2.13E-02 | 5.12E-03 | 1.15E-01 | 5.26E-02 | 1.26E-02 |
| W-24 | 9.28E-02 | 4.23E-02 | 1.02E-02 | 2.61E-02 | 1.19E-02 | 2.85E-03 | 8.00E-02 | 3.65E-02 | 8.76E-03 | 1.45E-01 | 6.59E-02 | 1.58E-02 |
| W-25 | 3.97E-02 | 1.81E-02 | 4.35E-03 | 2.57E-02 | 1.17E-02 | 2.82E-03 | 4.96E-02 | 2.26E-02 | 5.43E-03 | 5.16E-02 | 2.35E-02 | 5.65E-03 |
| W-26 | 3.55E-02 | 1.62E-02 | 3.89E-03 | 4.21E-02 | 1.92E-02 | 4.61E-03 | 4.96E-02 | 2.26E-02 | 5.43E-03 | 5.87E-02 | 2.67E-02 | 6.42E-03 |
| W-27 | 3.22E-02 | 1.47E-02 | 3.53E-03 | 3.49E-02 | 1.59E-02 | 3.82E-03 | 6.52E-02 | 2.97E-02 | 7.14E-03 | 5.22E-02 | 2.38E-02 | 5.72E-03 |
| W-28 | 2.78E-02 | 1.27E-02 | 3.05E-03 | 4.07E-02 | 1.86E-02 | 4.46E-03 | 3.83E-02 | 1.74E-02 | 4.19E-03 | 6.19E-02 | 2.82E-02 | 6.78E-03 |
| W-29 | 3.10E-02 | 1.41E-02 | 3.40E-03 | 4.58E-02 | 2.09E-02 | 5.02E-03 | 7.37E-02 | 3.36E-02 | 8.07E-03 | 6.09E-02 | 2.78E-02 | 6.67E-03 |
| W-30 | 3.19E-02 | 1.46E-02 | 3.50E-03 | 2.85E-02 | 1.30E-02 | 3.12E-03 | 6.66E-02 | 3.04E-02 | 7.29E-03 | 4.70E-02 | 2.14E-02 | 5.15E-03 |
| W-31 | 1.32E-01 | 6.04E-02 | 1.45E-02 | 4.65E-02 | 2.12E-02 | 5.09E-03 | 2.34E-02 | 1.07E-02 | 2.56E-03 | 7.37E-02 | 3.36E-02 | 8.07E-03 |
| W-32 | 4.58E-02 | 2.09E-02 | 5.01E-03 | 1.75E-02 | 7.98E-03 | 1.92E-03 | 3.90E-02 | 1.78E-02 | 4.27E-03 | 4.17E-02 | 1.90E-02 | 4.57E-03 |
| W-33 | 5.84E-02 | 2.66E-02 | 6.40E-03 | 4.45E-02 | 2.03E-02 | 4.87E-03 | 9.63E-02 | 4.39E-02 | 1.05E-02 | 6.38E-02 | 2.91E-02 | 6.98E-03 |
| W-34 | 1.25E-01 | 5.72E-02 | 1.37E-02 | 1.20E-01 | 5.46E-02 | 1.31E-02 | 3.68E-02 | 1.68E-02 | 4.03E-03 | 1.54E-01 | 7.01E-02 | 1.68E-02 |
| W-35 | 7.58E-02 | 3.46E-02 | 8.30E-03 | 2.58E-02 | 1.18E-02 | 2.82E-03 | 2.55E-02 | 1.16E-02 | 2.79E-03 | 5.32E-02 | 2.42E-02 | 5.83E-03 |
| W-36 | 7.08E-02 | 3.23E-02 | 7.76E-03 | 2.64E-02 | 1.20E-02 | 2.89E-03 | 3.83E-02 | 1.74E-02 | 4.19E-03 | 5.29E-02 | 2.41E-02 | 5.79E-03 |

**Table S1.** Continued

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| W-37 | 7.06E-02 | 3.22E-02 | 7.73E-03 | 1.98E-02 | 9.04E-03 | 2.17E-03 | 1.70E-02 | 7.75E-03 | 1.86E-03 | 5.21E-02 | 2.37E-02 | 5.70E-03 |
| W-38 | 4.50E-02 | 2.05E-02 | 4.93E-03 | 6.18E-02 | 2.82E-02 | 6.77E-03 | 5.45E-02 | 2.49E-02 | 5.97E-03 | 5.82E-02 | 2.65E-02 | 6.37E-03 |
| W-39 | 8.08E-02 | 3.68E-02 | 8.84E-03 | 1.86E-01 | 8.49E-02 | 2.04E-02 | 4.46E-02 | 2.03E-02 | 4.89E-03 | 1.86E-01 | 8.49E-02 | 2.04E-02 |
| W-40 | 8.43E-02 | 3.84E-02 | 9.23E-03 | 2.66E-02 | 1.21E-02 | 2.92E-03 | 4.68E-02 | 2.13E-02 | 5.12E-03 | 1.23E-01 | 5.59E-02 | 1.34E-02 |
| W-41 | 4.44E-02 | 2.02E-02 | 4.86E-03 | 3.04E-02 | 1.39E-02 | 3.33E-03 | 5.17E-02 | 2.36E-02 | 5.66E-03 | 4.39E-02 | 2.00E-02 | 4.81E-03 |
| W-42 | 9.21E-02 | 4.20E-02 | 1.01E-02 | 4.82E-02 | 2.20E-02 | 5.27E-03 | 4.32E-02 | 1.97E-02 | 4.73E-03 | 6.09E-02 | 2.78E-02 | 6.67E-03 |
| W-43 | 1.71E-01 | 7.78E-02 | 1.87E-02 | 1.86E-02 | 8.49E-03 | 2.04E-03 | 1.35E-01 | 6.14E-02 | 1.47E-02 | 4.31E-02 | 1.97E-02 | 4.72E-03 |
| W-44 | 2.00E-01 | 9.14E-02 | 2.20E-02 | 1.88E-02 | 8.56E-03 | 2.06E-03 | 7.72E-02 | 3.52E-02 | 8.45E-03 | 4.20E-02 | 1.91E-02 | 4.60E-03 |
| W-45 | 1.90E-01 | 8.65E-02 | 2.08E-02 | 1.83E-02 | 8.33E-03 | 2.00E-03 | 4.53E-02 | 2.07E-02 | 4.96E-03 | 4.91E-02 | 2.24E-02 | 5.38E-03 |
| W-46 | 1.99E-01 | 9.07E-02 | 2.18E-02 | 2.03E-02 | 9.24E-03 | 2.22E-03 | 6.87E-02 | 3.13E-02 | 7.52E-03 | 5.35E-02 | 2.44E-02 | 5.86E-03 |
| W-47 | 1.90E-01 | 8.65E-02 | 2.08E-02 | 1.90E-02 | 8.65E-03 | 2.08E-03 | 3.19E-02 | 1.45E-02 | 3.49E-03 | 3.83E-02 | 1.75E-02 | 4.20E-03 |
| W-48 | 2.13E-01 | 9.72E-02 | 2.33E-02 | 2.05E-02 | 9.33E-03 | 2.24E-03 | 1.98E-02 | 9.04E-03 | 2.17E-03 | 1.15E-01 | 5.23E-02 | 1.26E-02 |
| W-49 | 2.29E-01 | 1.04E-01 | 2.51E-02 | 1.86E-02 | 8.49E-03 | 2.04E-03 | 4.18E-02 | 1.91E-02 | 4.58E-03 | 1.11E-01 | 5.04E-02 | 1.21E-02 |
| W-50 | 1.36E-01 | 6.20E-02 | 1.49E-02 | 2.11E-02 | 9.62E-03 | 2.31E-03 | 3.12E-02 | 1.42E-02 | 3.41E-03 | 1.20E-01 | 5.49E-02 | 1.32E-02 |
| W-51 | 1.45E-01 | 6.62E-02 | 1.59E-02 | 1.91E-02 | 8.69E-03 | 2.09E-03 | 1.35E-02 | 6.14E-03 | 1.47E-03 | 1.11E-01 | 5.07E-02 | 1.22E-02 |
| W-52 | 1.41E-01 | 6.43E-02 | 1.54E-02 | 2.60E-02 | 1.19E-02 | 2.85E-03 | 4.32E-02 | 1.97E-02 | 4.73E-03 | 1.20E-01 | 5.49E-02 | 1.32E-02 |
| W-53 | 1.40E-01 | 6.36E-02 | 1.53E-02 | 3.73E-02 | 1.70E-02 | 4.09E-03 | 5.88E-02 | 2.68E-02 | 6.44E-03 | 1.21E-01 | 5.52E-02 | 1.33E-02 |

**Table S2.** Seasonal estimated daily intake scores for different age groups based on dermal exposure in study area

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **WELLS** | **EDIderm**  **(mg/kg/day)** | | | **EDIderm**  **(mg/kg/day)** | | | **EDIderm**  **((mg/kg/day)** | | | **EDIderm**  **(mg/kg/day)** | | |
| **Summer** | | | **Autumn** | | | **Winter** | | | **Spring** | | |
| Children | Teenage | Adult | Children | Teenage | Adult | Children | Teenage | Adult | Children | Teenage | Adult |
| W-1 | 4.2292E-05 | 2.943E-05 | 2.108E-08 | 9.3113E-06 | 6.4796E-06 | 4.641E-09 | 2.452E-05 | 1.7065E-05 | 1.2223E-08 | 3.7672E-05 | 2.6215E-05 | 1.8777E-08 |
| W-2 | 4.2292E-05 | 2.943E-05 | 2.108E-08 | 1.0946E-05 | 7.6172E-06 | 5.4559E-09 | 2.346E-05 | 1.6323E-05 | 1.1691E-08 | 3.6605E-05 | 2.5473E-05 | 1.8245E-08 |
| W-3 | 4.5135E-05 | 3.141E-05 | 2.2497E-08 | 9.5245E-06 | 6.628E-06 | 4.7473E-09 | 2.879E-05 | 2.0032E-05 | 1.4348E-08 | 7.0368E-05 | 4.8968E-05 | 3.5073E-08 |
| W-4 | 4.6201E-05 | 3.215E-05 | 2.3028E-08 | 1.155E-05 | 8.0376E-06 | 5.757E-09 | 2.879E-05 | 2.0032E-05 | 1.4348E-08 | 3.9449E-05 | 2.7452E-05 | 1.9662E-08 |
| W-5 | 4.7267E-05 | 3.289E-05 | 2.3559E-08 | 1.681E-05 | 1.1698E-05 | 8.3787E-09 | 9.24E-06 | 6.4301E-06 | 4.6056E-09 | 3.5148E-05 | 2.4459E-05 | 1.7519E-08 |
| W-6 | 3.9093E-05 | 2.72E-05 | 1.9485E-08 | 1.4784E-05 | 1.0288E-05 | 7.369E-09 | 2.239E-05 | 1.5581E-05 | 1.116E-08 | 4.5846E-05 | 3.1903E-05 | 2.2851E-08 |
| W-7 | 5.0466E-05 | 3.512E-05 | 2.5154E-08 | 1.4251E-05 | 9.9172E-06 | 7.1033E-09 | 1.35E-05 | 9.3978E-06 | 6.7313E-09 | 3.1594E-05 | 2.1986E-05 | 1.5748E-08 |
| W-8 | 4.3358E-05 | 3.017E-05 | 2.1611E-08 | 1.0982E-05 | 7.6419E-06 | 5.4736E-09 | 2.346E-05 | 1.6323E-05 | 1.1691E-08 | 2.1181E-05 | 1.474E-05 | 1.0557E-08 |
| W-9 | 5.6152E-05 | 3.908E-05 | 2.7988E-08 | 1.2759E-05 | 8.8785E-06 | 6.3593E-09 | 2.737E-05 | 1.9043E-05 | 1.364E-08 | 3.9093E-05 | 2.7204E-05 | 1.9485E-08 |
| W-10 | 0.00011692 | 8.137E-05 | 5.8279E-08 | 9.6311E-06 | 6.7021E-06 | 4.8005E-09 | 4.016E-05 | 2.7946E-05 | 2.0017E-08 | 5.864E-05 | 4.0806E-05 | 2.9228E-08 |
| W-11 | 0.00012865 | 8.953E-05 | 6.4124E-08 | 1.0662E-05 | 7.4193E-06 | 5.3142E-09 | 3.27E-05 | 2.2753E-05 | 1.6297E-08 | 6.0061E-05 | 4.1796E-05 | 2.9936E-08 |
| W-12 | 6.6814E-05 | 4.649E-05 | 3.3302E-08 | 1.1444E-05 | 7.9634E-06 | 5.7039E-09 | 2.346E-05 | 1.6323E-05 | 1.1691E-08 | 4.0159E-05 | 2.7946E-05 | 2.0017E-08 |
| W-13 | 7.3922E-05 | 5.144E-05 | 3.6845E-08 | 1.0804E-05 | 7.5183E-06 | 5.385E-09 | 1.528E-05 | 1.0634E-05 | 7.617E-09 | 4.8333E-05 | 3.3634E-05 | 2.4091E-08 |
| W-14 | 7.1434E-05 | 4.971E-05 | 3.5605E-08 | 1.5815E-05 | 1.1005E-05 | 7.8827E-09 | 1.315E-05 | 9.1505E-06 | 6.5541E-09 | 2.079E-05 | 1.4468E-05 | 1.0363E-08 |
| W-15 | 6.7169E-05 | 4.674E-05 | 3.3479E-08 | 3.3869E-05 | 2.3569E-05 | 1.6881E-08 | 1.457E-05 | 1.014E-05 | 7.2627E-09 | 5.864E-05 | 4.0806E-05 | 2.9228E-08 |
| W-16 | 8.9914E-05 | 6.257E-05 | 4.4816E-08 | 1.3292E-05 | 9.2495E-06 | 6.625E-09 | 3.909E-06 | 2.7204E-06 | 1.9485E-09 | 5.5797E-05 | 3.8828E-05 | 2.7811E-08 |
| W-17 | 7.4277E-05 | 5.169E-05 | 3.7022E-08 | 1.7308E-05 | 1.2044E-05 | 8.6267E-09 | 1.173E-05 | 8.1613E-06 | 5.8456E-09 | 5.8284E-05 | 4.0559E-05 | 2.9051E-08 |
| W-18 | 2.7152E-05 | 1.889E-05 | 1.3533E-08 | 1.3114E-05 | 9.1258E-06 | 6.5364E-09 | 2.808E-05 | 1.9538E-05 | 1.3994E-08 | 6.8946E-05 | 4.7978E-05 | 3.4365E-08 |
| W-19 | 3.4366E-05 | 2.392E-05 | 1.7129E-08 | 1.2332E-05 | 8.5817E-06 | 6.1467E-09 | 1.919E-05 | 1.3355E-05 | 9.5655E-09 | 6.788E-05 | 4.7237E-05 | 3.3833E-08 |
| W-20 | 3.9449E-05 | 2.745E-05 | 1.9662E-08 | 1.2439E-05 | 8.6559E-06 | 6.1999E-09 | 2.168E-05 | 1.5086E-05 | 1.0805E-08 | 5.7574E-05 | 4.0064E-05 | 2.8696E-08 |
| W-21 | 2.9888E-05 | 2.08E-05 | 1.4897E-08 | 1.0129E-05 | 7.0484E-06 | 5.0485E-09 | 2.275E-05 | 1.5828E-05 | 1.1337E-08 | 5.011E-05 | 3.4871E-05 | 2.4977E-08 |
| W-22 | 4.8689E-05 | 3.388E-05 | 2.4268E-08 | 2.3278E-05 | 1.6199E-05 | 1.1603E-08 | 2.346E-05 | 1.6323E-05 | 1.1691E-08 | 3.2376E-05 | 2.253E-05 | 1.6137E-08 |
| W-23 | 3.2767E-05 | 2.28E-05 | 1.6332E-08 | 6.7169E-06 | 4.6742E-06 | 3.3479E-09 | 2.346E-05 | 1.6323E-05 | 1.1691E-08 | 5.7929E-05 | 4.0312E-05 | 2.8874E-08 |
| W-24 | 4.6556E-05 | 3.24E-05 | 2.3205E-08 | 1.3078E-05 | 9.1011E-06 | 6.5187E-09 | 4.016E-05 | 2.7946E-05 | 2.0017E-08 | 7.25E-05 | 5.0452E-05 | 3.6136E-08 |
| W-25 | 1.9938E-05 | 1.387E-05 | 9.9375E-09 | 1.2901E-05 | 8.9774E-06 | 6.4301E-09 | 2.488E-05 | 1.7312E-05 | 1.24E-08 | 2.5873E-05 | 1.8004E-05 | 1.2896E-08 |
| W-26 | 1.7805E-05 | 1.239E-05 | 8.8746E-09 | 2.111E-05 | 1.469E-05 | 1.0522E-08 | 2.488E-05 | 1.7312E-05 | 1.24E-08 | 2.9426E-05 | 2.0477E-05 | 1.4667E-08 |
| W-27 | 1.617E-05 | 1.125E-05 | 8.0598E-09 | 1.7521E-05 | 1.2192E-05 | 8.7329E-09 | 3.27E-05 | 2.2753E-05 | 1.6297E-08 | 2.6192E-05 | 1.8227E-05 | 1.3055E-08 |
| W-28 | 1.3967E-05 | 9.719E-06 | 6.9615E-09 | 2.0435E-05 | 1.422E-05 | 1.0185E-08 | 1.919E-05 | 1.3355E-05 | 9.5655E-09 | 3.1061E-05 | 2.1615E-05 | 1.5482E-08 |
| W-29 | 1.5566E-05 | 1.083E-05 | 7.7587E-09 | 2.2994E-05 | 1.6001E-05 | 1.1461E-08 | 3.696E-05 | 2.572E-05 | 1.8422E-08 | 3.0564E-05 | 2.1269E-05 | 1.5234E-08 |
| W-30 | 1.6028E-05 | 1.115E-05 | 7.989E-09 | 1.4287E-05 | 9.9419E-06 | 7.121E-09 | 3.341E-05 | 2.3247E-05 | 1.6651E-08 | 2.3598E-05 | 1.6421E-05 | 1.1762E-08 |
| W-31 | 6.6458E-05 | 4.625E-05 | 3.3125E-08 | 2.3314E-05 | 1.6224E-05 | 1.162E-08 | 1.173E-05 | 8.1613E-06 | 5.8456E-09 | 3.6961E-05 | 2.572E-05 | 1.8422E-08 |
| W-32 | 2.2958E-05 | 1.598E-05 | 1.1443E-08 | 8.7782E-06 | 6.1086E-06 | 4.3753E-09 | 1.955E-05 | 1.3602E-05 | 9.7426E-09 | 2.0933E-05 | 1.4567E-05 | 1.0433E-08 |
| W-33 | 2.932E-05 | 2.04E-05 | 1.4614E-08 | 2.2319E-05 | 1.5531E-05 | 1.1124E-08 | 4.833E-05 | 3.3634E-05 | 2.4091E-08 | 3.1985E-05 | 2.2258E-05 | 1.5942E-08 |
| W-34 | 6.2904E-05 | 4.377E-05 | 3.1354E-08 | 6.0061E-05 | 4.1796E-05 | 2.9936E-08 | 1.848E-05 | 1.286E-05 | 9.2112E-09 | 7.712E-05 | 5.3667E-05 | 3.8439E-08 |
| W-35 | 3.8027E-05 | 2.646E-05 | 1.8954E-08 | 1.2936E-05 | 9.0021E-06 | 6.4478E-09 | 1.279E-05 | 8.9032E-06 | 6.377E-09 | 2.669E-05 | 1.8573E-05 | 1.3303E-08 |

**Table S2.** Continued

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| W-36 | 3.5539E-05 | 2.473E-05 | 1.7714E-08 | 1.3256E-05 | 9.2247E-06 | 6.6073E-09 | 1.919E-05 | 1.3355E-05 | 9.5655E-09 | 2.6548E-05 | 1.8474E-05 | 1.3232E-08 |
| W-37 | 3.5397E-05 | 2.463E-05 | 1.7643E-08 | 9.951E-06 | 6.9247E-06 | 4.9599E-09 | 8.529E-06 | 5.9355E-06 | 4.2513E-09 | 2.6121E-05 | 1.8177E-05 | 1.302E-08 |
| W-38 | 2.2567E-05 | 1.57E-05 | 1.1248E-08 | 3.1026E-05 | 2.159E-05 | 1.5464E-08 | 2.737E-05 | 1.9043E-05 | 1.364E-08 | 2.9178E-05 | 2.0304E-05 | 1.4543E-08 |
| W-39 | 4.0515E-05 | 2.819E-05 | 2.0194E-08 | 9.3468E-05 | 6.5043E-05 | 4.6587E-08 | 2.239E-05 | 1.5581E-05 | 1.116E-08 | 9.3468E-05 | 6.5043E-05 | 4.6587E-08 |
| W-40 | 4.2292E-05 | 2.943E-05 | 2.108E-08 | 1.3363E-05 | 9.2989E-06 | 6.6604E-09 | 2.346E-05 | 1.6323E-05 | 1.1691E-08 | 6.1483E-05 | 4.2785E-05 | 3.0645E-08 |
| W-41 | 2.2283E-05 | 1.551E-05 | 1.1107E-08 | 1.5246E-05 | 1.061E-05 | 7.5992E-09 | 2.594E-05 | 1.8054E-05 | 1.2931E-08 | 2.2034E-05 | 1.5333E-05 | 1.0983E-08 |
| W-42 | 4.6201E-05 | 3.215E-05 | 2.3028E-08 | 2.4167E-05 | 1.6817E-05 | 1.2045E-08 | 2.168E-05 | 1.5086E-05 | 1.0805E-08 | 3.0564E-05 | 2.1269E-05 | 1.5234E-08 |
| W-43 | 8.565E-05 | 5.96E-05 | 4.269E-08 | 9.3468E-06 | 6.5043E-06 | 4.6587E-09 | 6.752E-05 | 4.6989E-05 | 3.3656E-08 | 2.1643E-05 | 1.5061E-05 | 1.0788E-08 |
| W-44 | 0.00010058 | 6.999E-05 | 5.013E-08 | 9.4179E-06 | 6.5538E-06 | 4.6942E-09 | 3.874E-05 | 2.6957E-05 | 1.9308E-08 | 2.1075E-05 | 1.4666E-05 | 1.0504E-08 |
| W-45 | 9.5245E-05 | 6.628E-05 | 4.7473E-08 | 9.1691E-06 | 6.3806E-06 | 4.5702E-09 | 2.275E-05 | 1.5828E-05 | 1.1337E-08 | 2.4629E-05 | 1.7139E-05 | 1.2276E-08 |
| W-46 | 9.9865E-05 | 6.949E-05 | 4.9776E-08 | 1.0164E-05 | 7.0731E-06 | 5.0662E-09 | 3.447E-05 | 2.3989E-05 | 1.7182E-08 | 2.6832E-05 | 1.8672E-05 | 1.3374E-08 |
| W-47 | 9.5245E-05 | 6.628E-05 | 4.7473E-08 | 9.5245E-06 | 6.628E-06 | 4.7473E-09 | 1.599E-05 | 1.1129E-05 | 7.9712E-09 | 1.9227E-05 | 1.338E-05 | 9.5832E-09 |
| W-48 | 0.00010697 | 7.444E-05 | 5.3319E-08 | 1.0271E-05 | 7.1473E-06 | 5.1193E-09 | 9.951E-06 | 6.9247E-06 | 4.9599E-09 | 5.7574E-05 | 4.0064E-05 | 2.8696E-08 |
| W-49 | 0.00011479 | 7.988E-05 | 5.7216E-08 | 9.3468E-06 | 6.5043E-06 | 4.6587E-09 | 2.097E-05 | 1.4591E-05 | 1.0451E-08 | 5.5441E-05 | 3.8581E-05 | 2.7634E-08 |
| W-50 | 6.8235E-05 | 4.748E-05 | 3.4011E-08 | 1.0591E-05 | 7.3699E-06 | 5.2787E-09 | 1.564E-05 | 1.0882E-05 | 7.7941E-09 | 6.0417E-05 | 4.2043E-05 | 3.0114E-08 |
| W-51 | 7.2855E-05 | 5.07E-05 | 3.6313E-08 | 9.56E-06 | 6.6527E-06 | 4.765E-09 | 6.752E-06 | 4.6989E-06 | 3.3656E-09 | 5.5797E-05 | 3.8828E-05 | 2.7811E-08 |
| W-52 | 7.0723E-05 | 4.922E-05 | 3.5251E-08 | 1.3043E-05 | 9.0763E-06 | 6.501E-09 | 2.168E-05 | 1.5086E-05 | 1.0805E-08 | 6.0417E-05 | 4.2043E-05 | 3.0114E-08 |
| W-53 | 7.0012E-05 | 4.872E-05 | 3.4896E-08 | 1.8729E-05 | 1.3033E-05 | 9.3352E-09 | 2.95E-05 | 2.0527E-05 | 1.4703E-08 | 6.0772E-05 | 4.229E-05 | 3.0291E-08 |

**Table S3.** The fluoride concentration in groundwater

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sampling Points** | **Cw (mg L-1) Fluoride** | | | |
| Summer | Autumn | Winter | Spring |
| W-1 | 1.19 | 0.262 | 0.69 | 1.06 |
| W-2 | 1.19 | 0.308 | 0.66 | 1.03 |
| W-3 | 1.27 | 0.268 | 0.81 | 1.98 |
| W-4 | 1.3 | 0.325 | 0.81 | 1.11 |
| W-5 | 1.33 | 0.473 | 0.26 | 0.989 |
| W-6 | 1.1 | 0.416 | 0.63 | 1.29 |
| W-7 | 1.42 | 0.401 | 0.38 | 0.889 |
| W-8 | 1.22 | 0.309 | 0.66 | 0.596 |
| W-9 | 1.58 | 0.359 | 0.77 | 1.1 |
| W-10 | 3.29 | 0.271 | 1.13 | 1.65 |
| W-11 | 3.62 | 0.3 | 0.92 | 1.69 |
| W-12 | 1.88 | 0.322 | 0.66 | 1.13 |
| W-13 | 2.08 | 0.304 | 0.43 | 1.36 |
| W-14 | 2.01 | 0.445 | 0.37 | 0.585 |
| W-15 | 1.89 | 0.953 | 0.41 | 1.65 |
| W-16 | 2.53 | 0.374 | 0.11 | 1.57 |
| W-17 | 2.09 | 0.487 | 0.33 | 1.64 |
| W-18 | 0.764 | 0.369 | 0.79 | 1.94 |
| W-19 | 0.967 | 0.347 | 0.54 | 1.91 |
| W-20 | 1.11 | 0.35 | 0.61 | 1.62 |
| W-21 | 0.841 | 0.285 | 0.64 | 1.41 |
| W-22 | 1.37 | 0.655 | 0.66 | 0.911 |
| W-23 | 0.922 | 0.189 | 0.66 | 1.63 |
| W-24 | 1.31 | 0.368 | 1.13 | 2.04 |
| W-25 | 0.561 | 0.363 | 0.7 | 0.728 |
| W-26 | 0.501 | 0.594 | 0.7 | 0.828 |
| W-27 | 0.455 | 0.493 | 0.92 | 0.737 |

**Table S3.** Continued

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sampling Points** | **Cw (mg L-1) Fluoride** | | | |
| Summer | Autumn | Winter | Spring |
| W-28 | 0.393 | 0.575 | 0.54 | 0.874 |
| W-29 | 0.438 | 0.647 | 1.04 | 0.86 |
| W-30 | 0.451 | 0.402 | 0.94 | 0.664 |
| W-31 | 1.87 | 0.656 | 0.33 | 1.04 |
| W-32 | 0.646 | 0.247 | 0.55 | 0.589 |
| W-33 | 0.825 | 0.628 | 1.36 | 0.9 |
| W-34 | 1.77 | 1.69 | 0.52 | 2.17 |
| W-35 | 1.07 | 0.364 | 0.36 | 0.751 |
| W-36 | 1 | 0.373 | 0.54 | 0.747 |
| W-37 | 0.996 | 0.28 | 0.24 | 0.735 |
| W-38 | 0.635 | 0.873 | 0.77 | 0.821 |
| W-39 | 1.14 | 2.63 | 0.63 | 2.63 |
| W-40 | 1.19 | 0.376 | 0.66 | 1.73 |
| W-41 | 0.627 | 0.429 | 0.73 | 0.62 |
| W-42 | 1.3 | 0.68 | 0.61 | 0.86 |
| W-43 | 2.41 | 0.263 | 1.9 | 0.609 |
| W-44 | 2.83 | 0.265 | 1.09 | 0.593 |
| W-45 | 2.68 | 0.258 | 0.64 | 0.693 |
| W-46 | 2.81 | 0.286 | 0.97 | 0.755 |
| W-47 | 2.68 | 0.268 | 0.45 | 0.541 |
| W-48 | 3.01 | 0.289 | 0.28 | 1.62 |
| W-49 | 3.23 | 0.263 | 0.59 | 1.56 |
| W-50 | 1.92 | 0.298 | 0.44 | 1.7 |
| W-51 | 2.05 | 0.269 | 0.19 | 1.57 |
| W-52 | 1.99 | 0.367 | 0.61 | 1.7 |
| W-53 | 1.97 | 0.527 | 0.83 | 1.71 |

**Table S4.** Seasonal total hazard index scores for different age groups based on oral exposure in study area

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **WELLS** | **Total Hazard Index (THI)** | | | **Total Hazard Index (THI)** | | | **Total Hazard Index (THI)** | | | **Total Hazard Index (THI)** | | | |
| **Summer** | | | **Autumn** | | | **Winter** | | | **Spring** | | | |
| Children | Teenage | Adult | Children | Teenage | Adult | Children | Teenage | Adult | Children | Teenage | Adult |
| W-1 | 1.41 | 0.64 | 0.15 | 0.31 | 0.14 | 0.03 | 0.82 | 0.37 | 0.09 | 1.25 | 0.57 | 0.14 |
| W-2 | 1.41 | 0.64 | 0.15 | 0.36 | 0.17 | 0.04 | 0.78 | 0.36 | 0.09 | 1.22 | 0.55 | 0.13 |
| W-3 | 1.50 | 0.68 | 0.16 | 0.32 | 0.14 | 0.03 | 0.96 | 0.44 | 0.10 | 2.34 | 1.07 | 0.26 |
| W-4 | 1.54 | 0.70 | 0.17 | 0.38 | 0.18 | 0.04 | 0.96 | 0.44 | 0.10 | 1.31 | 0.60 | 0.14 |
| W-5 | 1.57 | 0.72 | 0.17 | 0.56 | 0.25 | 0.06 | 0.31 | 0.14 | 0.03 | 1.17 | 0.53 | 0.13 |
| W-6 | 1.30 | 0.59 | 0.14 | 0.49 | 0.22 | 0.05 | 0.74 | 0.34 | 0.08 | 1.52 | 0.69 | 0.17 |
| W-7 | 1.68 | 0.76 | 0.18 | 0.47 | 0.22 | 0.05 | 0.45 | 0.20 | 0.05 | 1.05 | 0.48 | 0.11 |
| W-8 | 1.44 | 0.66 | 0.16 | 0.36 | 0.17 | 0.04 | 0.78 | 0.36 | 0.09 | 0.70 | 0.32 | 0.08 |
| W-9 | 1.87 | 0.85 | 0.20 | 0.42 | 0.19 | 0.05 | 0.91 | 0.41 | 0.10 | 1.30 | 0.59 | 0.14 |
| W-10 | 3.89 | 1.77 | 0.43 | 0.32 | 0.15 | 0.04 | 1.33 | 0.61 | 0.15 | 1.95 | 0.89 | 0.21 |
| W-11 | 4.28 | 1.95 | 0.47 | 0.35 | 0.16 | 0.04 | 1.09 | 0.50 | 0.12 | 2.00 | 0.91 | 0.22 |
| W-12 | 2.22 | 1.01 | 0.24 | 0.38 | 0.17 | 0.04 | 0.78 | 0.36 | 0.09 | 1.33 | 0.61 | 0.15 |
| W-13 | 2.46 | 1.12 | 0.27 | 0.36 | 0.16 | 0.04 | 0.51 | 0.23 | 0.06 | 1.61 | 0.73 | 0.18 |
| W-14 | 2.37 | 1.08 | 0.26 | 0.53 | 0.24 | 0.06 | 0.44 | 0.20 | 0.05 | 0.69 | 0.32 | 0.08 |
| W-15 | 2.23 | 1.02 | 0.24 | 1.13 | 0.51 | 0.12 | 0.48 | 0.22 | 0.05 | 1.95 | 0.89 | 0.21 |
| W-16 | 2.99 | 1.36 | 0.33 | 0.44 | 0.20 | 0.05 | 0.13 | 0.06 | 0.01 | 1.85 | 0.85 | 0.20 |
| W-17 | 2.47 | 1.13 | 0.27 | 0.58 | 0.26 | 0.06 | 0.39 | 0.18 | 0.04 | 1.94 | 0.88 | 0.21 |
| W-18 | 0.90 | 0.41 | 0.10 | 0.44 | 0.20 | 0.05 | 0.93 | 0.43 | 0.10 | 2.29 | 1.04 | 0.25 |
| W-19 | 1.14 | 0.52 | 0.13 | 0.41 | 0.19 | 0.04 | 0.64 | 0.29 | 0.07 | 2.26 | 1.03 | 0.25 |
| W-20 | 1.31 | 0.60 | 0.14 | 0.41 | 0.19 | 0.05 | 0.72 | 0.33 | 0.08 | 1.91 | 0.87 | 0.21 |
| W-21 | 0.99 | 0.45 | 0.11 | 0.34 | 0.15 | 0.04 | 0.76 | 0.34 | 0.08 | 1.67 | 0.76 | 0.18 |
| W-22 | 1.62 | 0.74 | 0.18 | 0.77 | 0.35 | 0.08 | 0.78 | 0.36 | 0.09 | 1.08 | 0.49 | 0.12 |
| W-23 | 1.09 | 0.50 | 0.12 | 0.22 | 0.10 | 0.02 | 0.78 | 0.36 | 0.09 | 1.93 | 0.88 | 0.21 |
| W-24 | 1.55 | 0.71 | 0.17 | 0.43 | 0.20 | 0.05 | 1.33 | 0.61 | 0.15 | 2.41 | 1.10 | 0.26 |
| W-25 | 0.66 | 0.30 | 0.07 | 0.43 | 0.20 | 0.05 | 0.83 | 0.38 | 0.09 | 0.86 | 0.39 | 0.09 |
| W-26 | 0.59 | 0.27 | 0.06 | 0.70 | 0.32 | 0.08 | 0.83 | 0.38 | 0.09 | 0.98 | 0.45 | 0.11 |
| W-27 | 0.54 | 0.25 | 0.06 | 0.58 | 0.27 | 0.06 | 1.09 | 0.50 | 0.12 | 0.87 | 0.40 | 0.10 |
| W-28 | 0.46 | 0.21 | 0.05 | 0.68 | 0.31 | 0.07 | 0.64 | 0.29 | 0.07 | 1.03 | 0.47 | 0.11 |
| W-29 | 0.52 | 0.24 | 0.06 | 0.76 | 0.35 | 0.08 | 1.23 | 0.56 | 0.13 | 1.02 | 0.46 | 0.11 |
| W-30 | 0.53 | 0.24 | 0.06 | 0.47 | 0.22 | 0.05 | 1.11 | 0.51 | 0.12 | 0.78 | 0.36 | 0.09 |
| W-31 | 2.21 | 1.01 | 0.24 | 0.77 | 0.35 | 0.08 | 0.39 | 0.18 | 0.04 | 1.23 | 0.56 | 0.13 |
| W-32 | 0.76 | 0.35 | 0.08 | 0.29 | 0.13 | 0.03 | 0.65 | 0.30 | 0.07 | 0.70 | 0.32 | 0.08 |
| W-33 | 0.97 | 0.44 | 0.11 | 0.74 | 0.34 | 0.08 | 1.61 | 0.73 | 0.18 | 1.06 | 0.48 | 0.12 |
| W-34 | 2.09 | 0.95 | 0.23 | 2.00 | 0.91 | 0.22 | 0.61 | 0.28 | 0.07 | 2.56 | 1.17 | 0.28 |
| W-35 | 1.26 | 0.58 | 0.14 | 0.43 | 0.20 | 0.05 | 0.43 | 0.19 | 0.05 | 0.89 | 0.40 | 0.10 |
| W-36 | 1.18 | 0.54 | 0.13 | 0.44 | 0.20 | 0.05 | 0.64 | 0.29 | 0.07 | 0.88 | 0.40 | 0.10 |

**Table S4.** Continued

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| W-37 | 1.18 | 0.54 | 0.13 | 0.33 | 0.15 | 0.04 | 0.28 | 0.13 | 0.03 | 0.87 | 0.40 | 0.10 |
| W-38 | 0.75 | 0.34 | 0.08 | 1.03 | 0.47 | 0.11 | 0.91 | 0.41 | 0.10 | 0.97 | 0.44 | 0.11 |
| W-39 | 1.35 | 0.61 | 0.15 | 3.11 | 1.42 | 0.34 | 0.74 | 0.34 | 0.08 | 3.11 | 1.42 | 0.34 |
| W-40 | 1.41 | 0.64 | 0.15 | 0.44 | 0.20 | 0.05 | 0.78 | 0.36 | 0.09 | 2.04 | 0.93 | 0.22 |
| W-41 | 0.74 | 0.34 | 0.08 | 0.51 | 0.23 | 0.06 | 0.86 | 0.39 | 0.09 | 0.73 | 0.33 | 0.08 |
| W-42 | 1.54 | 0.70 | 0.17 | 0.80 | 0.37 | 0.09 | 0.72 | 0.33 | 0.08 | 1.02 | 0.46 | 0.11 |
| W-43 | 2.85 | 1.30 | 0.31 | 0.31 | 0.14 | 0.03 | 2.24 | 1.02 | 0.25 | 0.72 | 0.33 | 0.08 |
| W-44 | 3.34 | 1.52 | 0.37 | 0.31 | 0.14 | 0.03 | 1.29 | 0.59 | 0.14 | 0.70 | 0.32 | 0.08 |
| W-45 | 3.17 | 1.44 | 0.35 | 0.30 | 0.14 | 0.03 | 0.76 | 0.34 | 0.08 | 0.82 | 0.37 | 0.09 |
| W-46 | 3.32 | 1.51 | 0.36 | 0.34 | 0.15 | 0.04 | 1.15 | 0.52 | 0.13 | 0.89 | 0.41 | 0.10 |
| W-47 | 3.17 | 1.44 | 0.35 | 0.32 | 0.14 | 0.03 | 0.53 | 0.24 | 0.06 | 0.64 | 0.29 | 0.07 |
| W-48 | 3.56 | 1.62 | 0.39 | 0.34 | 0.16 | 0.04 | 0.33 | 0.15 | 0.04 | 1.91 | 0.87 | 0.21 |
| W-49 | 3.82 | 1.74 | 0.42 | 0.31 | 0.14 | 0.03 | 0.70 | 0.32 | 0.08 | 1.84 | 0.84 | 0.20 |
| W-50 | 2.27 | 1.03 | 0.25 | 0.35 | 0.16 | 0.04 | 0.52 | 0.24 | 0.06 | 2.01 | 0.92 | 0.22 |
| W-51 | 2.42 | 1.10 | 0.27 | 0.32 | 0.14 | 0.03 | 0.22 | 0.10 | 0.02 | 1.85 | 0.85 | 0.20 |
| W-52 | 2.35 | 1.07 | 0.26 | 0.43 | 0.20 | 0.05 | 0.72 | 0.33 | 0.08 | 2.01 | 0.92 | 0.22 |
| W-53 | 2.33 | 1.06 | 0.25 | 0.62 | 0.28 | 0.07 | 0.98 | 0.45 | 0.11 | 2.02 | 0.92 | 0.22 |