**Pollution index and the modified degree of contamination**

The limitations of single metal indices led to the development of multi-metal indices. The two most widely used such indices, developed by Hakinson (1980) and Nemerow (1991), include the modified degree of contamination (*mCd*) and the pollution index (PI). Brady et al. (2015) developed a modified pollution index (MPI) considering enrichment factor. The highest PI values were observed of 29.59 and 22.71 in winter and rainy season respectively, both in Shitalakshya river indicating heavily polluted condition (PI>3). In all five rivers the PI values were >3 indicating heavily polluted condition in all five rivers having heavily pollution sequence of Shitalakshya > Buriganga > Turag > Dhaleshwari > Balu in both seasons. The maximum *mCd* values were observed in Shitalakshya river in both seasons having the values of 9.2 and 6.67 in winter and rainy season respectively, indicating severely polluted (8< *mCd* < 16) which is also observed in Buriganga in winter season having value of 8.15. In winter Turag and in rainy season Buriganga were moderately polluted to heavily polluted (4< *mCd* <8). Dhaleshwari and Balu were moderately polluted (2< *mCd* <4) in winter which was also in Turag in rainy season. Dhaleshwari and Balu in rainy season were slightly polluted (1.5<*mCd* <2). According to MPI, Shitalakshya and Buriganga were in heavily polluted condition in both seasons (MPI>10). In Turag and Dhaleshwari in winter season the MPI values indicated severely polluted (5<MPI<10). In Dhaleshwari, Turag, Balu in rainy season were moderately to heavily polluted (3<MPI<5) which was also in Balu in winter season. According to MPI, the sequence of rivers was Shitalakshya > Buriganga > Turag ≥ Dhaleshwari > Balu in both seasons.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rivers | PLI | | PI | | MPI | | *mCd* | |
| Winter | Rainy | Winter | Rainy | Winter | Rainy | Winter | Rainy |
| Balu | 1.08 | 0.78 | 4.76 | 3.82 | 4.75 | 3.94 | 2.08 | 1.52 |
| Buriganga | 3.54 | 2.56 | 19.94 | 16.48 | 14.49 | 11.31 | 8.15 | 6.07 |
| Dhaleshwari | 1.94 | 1.27 | 6.61 | 4.53 | 6.62 | 4.72 | 3.03 | 1.98 |
| Shitalakshya | 3.08 | 2.07 | 29.59 | 22.71 | 29.5 | 23.23 | 9.2 | 6.67 |
| Turag | 2.06 | 1.45 | 10.12 | 7.1 | 6.96 | 4.57 | 4.91 | 3.23 |
| Maximum (*Mmax*) | 3.54 | 2.56 | 29.59 | 22.71 | 29.5 | 23.23 | 9.2 | 6.67 |
| Minimum (*Mmin*) | 1.08 | 0.78 | 4.76 | 3.82 | 4.75 | 3.94 | 2.08 | 1.52 |
| Mean (N=5) | 2.34 | 1.63 | 14.20 | 10.93 | 12.46 | 9.55 | 5.47 | 3.90 |

Ecological Risk Index (RI)

Toxic risk index (TRI)

Modified Hazard Quotient (mHQ)

Mean ERM quotient (mERMQ)

Contamination severity index (CSI)