

Table S1. Schedule of sampling during premonsoon and post monsoon.

| Date of Sampling (Premonsoon) | Date of Sampling (Postmonsoon) | Name of Sample Points | Sample No |
|----------------------------------|-----------------------------------|---|---|
| 15/04/2018 | 07/11/2018 | Noorpur Bet, Baga Khurd, Ayali Kalan,Baddowal, Jodhan | 1,13,24,45,56 |
| 18/04/2018 | 09/11/2018 | Jand, Jand Village, Maherna, Nansakar jageda, Lehra,Syan Kalan Dhandra, Jwadi, Bharat Nagar Chowk, Choni Mahalla | 71,72,83,84,70 ,57,44,26,27,2, 8, |
| 20/04/2018 | 13/11/2018 | Barsal, Talwandi Kalan, Mullanpur, Mohi, Jassowal, Rajoana Khurd, Leel | 48,47,46,55,54 ,74,73 |
| 23/04/2018 | 17/11/2018 | Kalsian, Johlan,Gobindgarh, Raikot, Basian, Chajjewal, Hans Kalan | 82,95,96,81,80 ,75,53 |
| 24/04/2018 | 20/11/2018 | Galib Kalan, Malsian Bajan, Bhadar Ke, Madhepur, Sadarpura, Swaddi Khurd, Jagron, Agwar Lopan, | 50,20,19,18,21 ,49,52,51 |
| 27/04/2018 | 21/11/2018 | Randhir Garh, Jattपुरa, Hathur, Dhrkot, Burj Kulara, Chakkar, Raswalpur, Lohara, Bhuta | 76,79,98,97,94 ,78,77,42,58 |
| 01/05/2018 | 24/11/2018 | Butari, Pandher Kheri, Sohian, Uksi, Ber Khurd, Ghaloti | 69,85,94,93,86 ,68 |
| 03/05/2018 | 28/11/2018 | Doburji, Dharur, Budhewal, Muewal, Togar, Sasrali Colny, Sirah, Basti Jodhewal | 59,41,31,10,3, 2,11,12 |
| 06/05/2018 | 2/12/2018 | Jmalpur Awana, Industrial Area Phase 8, Dhandari Kalan, Deep Nagar, Ghudani Khurd, Alunia Maina, | 26,30,43,60,67 ,87 |
| 10/05/2018 | 06/12/2108 | Sirthala, Malakpur, Rohono Kalan, Gazipur Singh, Dhindsa, Ghulal, Bhama Kalan, Mahel Ghumana | 92,91,88,66,61 ,39,33,8 |
| 12/05/2018 | 08/12/2018 | Chaunta, Partapgarh, Rampur,Baho Majra, Khattra, Alour, Ramgarh, Sarwarpur, Todarpur | 9,32,40,65,89, 90,64, 63,37 |
| 15/05/2018 | 12/12/2018 | Nurpur, Chak Lohat, Kothala Bet, Rod Majri, Mand Jodhewal, Mithewal, Machiwara, Ghelewal | 35,36,6,5,4,7,3 4,38 |
| 20/05/2018 | 16/12/2018 | Bardhalan, Jamalpur Leli, Khudai Chak, Gorsian Khan Md., Walipur Khurd, Purain, Burj Man Kaur, Issewal | 62,13,22,17,16 ,23,15,24 |

Table S2. Description of exposure parameters for calculation of health risk assessment.

| Exposure Parameters | Description | Units | Value | Reference |
|-----------------------------|----------------------------|-------------------|--|------------------------|
| C | Concentration | mg /L | - | - |
| EF | Exposure frequency | days/year | 365 | [47] |
| ED | Exposure Duration | Years | 70 for adults and 6 for children | [47] |
| BW | Body weight | kg | 60 for adults and 15 for children | [47] |
| AT | Average Time | Days | 25550 for adults and 2190 for children | AT= ED × 365 days/year |
| IR _{ingestion} | Ingestion Rate | L/day | 2 for adults and 1 for children | [25] |
| ET | Exposure Time | Hours/day | 0.58 for adults and 1 for children | [49] |
| CF | Conversion factor | L/cm ³ | 0.001 | [19] |
| EV | Event frequency | Event/day | 1 for adults and 1 for children | [49] |
| Intake _{ingestion} | Intake through ingestion | dose mg/kg/day | Calculated value | Equation (5) |
| Intake _{dermal} | Intake through dermal | dose mg/kg/day | Calculated value | Equation (6) |
| K _p | Skin permeability constant | cm/h | Table S3 | [47] |

Table S3. Reference dose ingestion value for heavy metals.

| Element | RfD _{ingestion} (mg/kg/day) | Reference |
|---------|--------------------------------------|-----------|
| Al | 1 | [47] |
| As | 3×10 ⁻⁴ | [47] |
| Cr | 3 ×10 ⁻³ | [47] |
| Fe | 7×10 ⁻¹ | [47] |
| Hg | 3×10 ⁻⁴ | [47] |
| Ni | 2 ×10 ⁻² | [47] |
| Pb | 3.5×10 ⁻³ | [45] |
| Se | 5 ×10 ⁻³ | [46,47] |

Table S4. Reference dose dermal, skin permeability constant and cancer slope factor value for heavy metals.

| Element | GIABS | RfD _{dermal} = RfD _{ingestion} × GIABS (mg/kg/day) | Skin permeability constant (K _p) (cm/h) | CSF for ingestion (mg/kg/day) | CSF for dermal (mg/kg/day) | Reference |
|---------|----------------------|---|--|--|----------------------------------|-----------|
| Al | 1 | 1 | 1×10 ⁻⁴ | - | - | [47] |
| As | 1 | 3×10 ⁻⁴ | 1×10 ⁻³ | 1.5 | 1.5 | [47] |
| Cr | 1.3×10 ⁻² | 3.9×10 ⁻⁵ | 1×10 ⁻³ | 5×10 ⁻¹ | 5×10 ⁻¹ | [47] |
| Fe | 1 | 7×10 ⁻¹ | 1×10 ⁻³ | - | - | [47] |
| Hg | 7×10 ⁻² | 2.1×10 ⁻⁵ | 1×10 ⁻³ | - | - | [47] |
| Ni | 4×10 ⁻² | 8×10 ⁻⁴ | 1×10 ⁻³ | - | - | [47] |
| Pb | 1 | 3.5×10 ⁻³ | 1×10 ⁻³ | 8.5×10 ⁻³ | 8.5×10 ⁻³ | [47] |
| Se | 1 | 5×10 ⁻³ | 1×10 ⁻³ | - | - | [47] |

Table S5. Paired sample t – test for heavy metals during pre and postmonsoon periods.

| Paired Samples Test | | | | | | | | | |
|----------------------------|------------|----------|----------------|-----------------|---|----------|--------|----|-------------------------|
| Paired Differences | | | | | | | | | |
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | t | df | P value Sig. (2-tailed) |
| | | | | | Lower | Upper | | | |
| Pair 1 | Fe* - Fe** | -.040838 | .151466 | .015223 | -.071048 | -.010629 | -2.683 | 98 | .009 |
| Pair 2 | Pb* - Pb** | -.028778 | .047752 | .004799 | -.038302 | -.019254 | -5.996 | 98 | .000 |
| Pair 3 | Ni* - Ni** | -.048556 | .106697 | .010723 | -.069836 | -.027275 | -4.528 | 98 | .000 |
| Pair 4 | Al* - Al** | -.091465 | .126118 | .012675 | -.116618 | -.066311 | -7.216 | 98 | .000 |
| Pair 5 | Se* - Se** | .001051 | .004181 | .000420 | .000217 | .001884 | 2.500 | 98 | .014 |
| Pair 6 | Cr* - Cr** | -.012889 | .033014 | .003318 | -.019473 | -.006304 | -3.884 | 98 | .000 |
| Pair 7 | As* - As** | -.000828 | .003169 | .000318 | -.001460 | -.000196 | -2.601 | 98 | .011 |
| Pair 8 | Hg* -Hg** | -.000061 | .000667 | .000067 | -.000194 | .000072 | -.904 | 98 | .368 |

*- Premonsoon period **- Postmonsoon period