

SUPPLEMENTAL TABLES FOR:

**Integrated Assessment of Artisanal and Small-Scale Gold Mining in Ghana - Part 2:  
Natural Sciences Review**

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Table S1. Total mercury (Hg) levels in soils near Ghanaian small-scale gold mining sites and reference non-mining sites.

| Study location                                                                                      | Year collected | Dry/wet season | Sample size (n) | Mean Hg (ng/g) | SD Hg (ng/g) | Min. Hg (ng/g) | Max. Hg (ng/g) | Reference | Notes                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------|----------------|----------------|-----------------|----------------|--------------|----------------|----------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dumasi Area (soil from active amalgamation site), Wassa West District, Western Region               | 2001           | -              | 2               | 6092           | -            | -              | -              | [1]       | Data has been extracted from a book chapter that was contributed to by the authors.                                                                                                         |
| Dumasi area (soil from a miner's house with roasting activity), Wassa West District, Western Region | 2001           | -              | 2               | 21639          | -            | -              | -              | [1]       | Data has been extracted from a book chapter that was contributed to by the authors.                                                                                                         |
| Dumasi, Wassa West District, Western Region                                                         | -              | -              | 12              | 240            | 100          | 130            | 420            | [2]       | Samples measured from farms near large-scale and ASGM; 5.5 km from mines. Nine surface samples and four samples taken from three soil depths (0-5cm, 5-15cm, and 15-30cm) at each site.     |
| Dumasi, Wassa West District, Western Region                                                         | -              | -              | 9               | 210            | 90           | 100            | 350            | [2]       | Samples measured from farms near large-scale and ASGM; 6.0 km from mines. Nine surface samples and four samples taken from three soil depths (0-5cm, 5-15cm, and 15-30cm) at each site.     |
| Bogoso, Wassa West District, Western Region                                                         | -              | -              | 12              | 230            | 50           | 120            | 280            | [2]       | Samples taken from farms near entrance of Bogoso Gold Ltd; 1.5 km from mines. Nine surface samples and four samples taken from three soil depths (0-5cm, 5-15cm, and 15-30cm) at each site. |
| Bogo, Wassa West District, Western Region                                                           | -              | -              | 12              | 190            | 70           | 90             | 350            | [2]       | Samples measured from farms near large-scale and ASGM; 8.4 km from mines. Nine surface samples and four samples taken from three soil depths (0-5cm, 5-15cm, and 15-30cm) at each site.     |
| Prestea Ankroba, Wassa West District, Western Region                                                | -              | -              | 12              | 280            | 70           | 170            | 400            | [2]       | Samples measured from farms near large-scale and ASGM; 14.0 km from mines. Nine surface samples and four samples taken from three soil depths (0-5cm, 5-15cm, and 15-30cm) at each site.    |

ND = Not detectable or below the detection limit.

Table S1. Total mercury (Hg) levels in soils near Ghanaian small-scale gold mining sites and reference non-mining sites.

| Study location                                                                                 | Year collected | Dry/wet season | Sample size (n) | Mean Hg (ng/g) | SD Hg (ng/g) | Min. Hg (ng/g) | Max. Hg (ng/g) | Reference | Notes                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------|----------------|----------------|-----------------|----------------|--------------|----------------|----------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prestea Old Mine, Wassa West District, Western Region                                          | -              | -              | 12              | 310            | 50           | 220            | 400            | [2]       | Samples measured from farms near large-scale and ASGM; 16.0 km from mines. Nine surface samples and four samples taken from three soil depths (0-5cm, 5-15cm, and 15-30cm) at each site.                                                                                                           |
| Tarkwa area (soil from abandoned mining/ processing site), Wassa West District, Western Region | 2001           | -              | 2               | 185,938        | -            | -              | -              | [1]       | Data has been extracted from a book chapter that was contributed to by the authors.                                                                                                                                                                                                                |
| Dompem, Wassa West District, Western Region                                                    | 2006 - 2007    | w/d            | 36              | 320            | 80           | 260            | 410            | [3]       | Samples were collected monthly (for 10 months; Sep. 2006 to Jun. 2007) from farms sites where large and small-scale mining occurs, at three depths (0-5cm, 10-15cm, and 25-30cm).                                                                                                                  |
| Tarkwa, Wassa West District, Western Region                                                    |                | w/d            | 36              | 370            | 140          | 210            | 480            |           |                                                                                                                                                                                                                                                                                                    |
| Aboso, Wassa West District, Western Region                                                     |                | w/d            | 36              | 2400           | 610          | 1700           | 2800           |           |                                                                                                                                                                                                                                                                                                    |
| Huni Valley, Wassa West District                                                               |                | w/d            | 36              | 290            | 40           | 260            | 330            |           |                                                                                                                                                                                                                                                                                                    |
| Atieku, Wassa West District, Western Region                                                    |                | w/d            | 36              | 120            | 20           | 100            | 130            |           |                                                                                                                                                                                                                                                                                                    |
| Wassa West District, Western Region                                                            | -              | -              | 5               | 792            | 61.4         | 750            | 900            | [4]       | Data from five mining communities Iduaprem, Odumasi, Hemang, Huni Valley, and Damang.                                                                                                                                                                                                              |
| River Ankobra, Western Region                                                                  | -              | -              | 7               | 150            | -            | 51             | 366            | [5]       | This work was carried using the atomic absorption spectrum. Results were compared with literature and found to be consistent. Surface soil samples (0-10 cm) collected close to the main River Ankobra and its major tributaries at Ankobra, Bonsa, Subri, Beppoh, Bawdie, Terebebie, and Efuanta. |
| Bibiani, Western Region                                                                        | 2007           | w              | 10              | 31             | 21           | 7              | 63             | [6]       | Data from farms/gardens in four communities with small and large-scale mining (Hwenampori, Lineso, New Town, Old Town) in Sept. 2007, up to 15-20cm depth.                                                                                                                                         |

ND = Not detectable or below the detection limit.

Table S1. Total mercury (Hg) levels in soils near Ghanaian small-scale gold mining sites and reference non-mining sites.

| Study location                                                                                                             | Year collected | Dry/wet season | Sample size (n) | Mean Hg (ng/g) | SD Hg (ng/g) | Min. Hg (ng/g) | Max. Hg (ng/g) | Reference | Notes                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------|----------------|----------------|-----------------|----------------|--------------|----------------|----------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ajumamu in Dunkwa area (soil at amalgamation site near river bank), Upper Denkyira East Municipal District, Central Region | 2001           | -              | 2               | 933.31         | -            | -              | -              | [1]       | Data has been extracted from a book chapter that was contributed to by the authors.                                                                                                                           |
| Obuasi, Ashanti Region                                                                                                     | 1992 - 1993    | w/d            | 168             | 900            | 600          | 300            | 2500           | [7]       | Samples collected once a month (Mar 1992 - Feb 1993) from from 14 sites located 0.31 - 17.5 km from Pompora (water) Treatment Plant. Both large and small-scale mining occurs nearby. Three samples per site. |
| River Pra Basin, Western, Central & Ashanti Regions                                                                        | 2002           | w              | 27              | 427            | 1,310        | 11             | 5,547          | [8]       | Samples taken from the Rivers Offin, Upper Pra and Lower Pra, once in the wet & dry season each.                                                                                                              |
|                                                                                                                            | 2003           | d              | 11              | 20             | 10           | 6              | 37             |           |                                                                                                                                                                                                               |
| River Pra Basin, Western, Central & Ashanti Regions                                                                        | 2005 - 2006    | -              | 5               | 84             | 38           | 42             | 145            | [9]       | Data from five mining communities at the River Pra (Awisam, Twifo Praso, Twifo Mampong, Daboase, and Beposo).                                                                                                 |
| Kejetia ASG mine, Talensi District, Upper East Region                                                                      | 2010           | w              | 17              | 4785.2         | 9780.5       | 95.65          | 40,969.60      | [10]      | Household soil samples collected in May-June 2010 from the top 1-2 cm of soil.                                                                                                                                |
| Kejetia ASG mine, Talensi District, Upper East Region                                                                      | 2011           | w              | 54              | 15,550         | 46,890       | 296.7          | 330,040        | [10]      | Household soil samples collected in June-July 2011 from the top 1-2 cm of soil.                                                                                                                               |
| ASGM gold refinery, Bolgatanga, Upper East Region                                                                          | 2012           | w              | 4               | 57,752.7       | 58,217.0     | 5430.0         | 116,440.20     | [10]      | Samples taken from a refinery in Bolgatanga in August 2012 from the top 1-2 cm of soil. Samples were collected from within the refinery and at 3 and 6 meters away.                                           |

ND = Not detectable or below the detection limit.

Table S1. Total mercury (Hg) levels in soils near Ghanaian small-scale gold mining sites and reference non-mining sites.

| Study location                                      | Year collected | Dry/wet season | Sample size (n) | Mean Hg (ng/g) | SD Hg (ng/g) | Min. Hg (ng/g) | Max. Hg (ng/g) | Reference | Notes                                                                                                                                                                                                                         |
|-----------------------------------------------------|----------------|----------------|-----------------|----------------|--------------|----------------|----------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference sites: Non-mining locations               |                |                |                 |                |              |                |                |           |                                                                                                                                                                                                                               |
| Wassa West District, Western Region                 | 2006 - 2007    | w/d            | 108             | 134            | 54           | 60             | 210            | [3]       | Samples were collected monthly (for 10 months; Sep. 2006 to Jun. 2007) from farms sites where no mining activity occurs (Agric farm, Shama Junction, Takarodi, Agona Nkwanta), at three depths (0-5cm, 10-15cm, and 25-30cm). |
| Wassa West District, Western Region                 | -              | -              | 3               | ND             | ND           | ND             | ND             | [4]       | Data from three non-mining communities: Ayanfuri, Wassa Asikuma, and Krofofrum (all not detectable levels; no level of detection given).                                                                                      |
| Otsew, Gomoa West District, Central Region          | 2010           | w              | 1               | 190            | 20           | -              | -              | [11]      | Sample of earthenware clay soil was purchased from a market in November 2010.                                                                                                                                                 |
| Otsew, Gomoa West District, Central Region          | 2010           | w              | 10              | 140            | -            | 30             | 310            | [11]      | Samples from earthenware clay soil deposits from 30cm depth in November 2010.                                                                                                                                                 |
| River Pra Basin, Western, Central & Ashanti Regions | 2002           | w              | 7               | 99.0           | 102          | 8              | 260            | [8]       | Samples taken from the Rivers Offin, Upper Pra and Lower Pra in non-mining areas, once in the wet & dry seasons each.                                                                                                         |
|                                                     | 2003           | d              | 7               | 170            | 413          | 7              | 1106           |           |                                                                                                                                                                                                                               |
| Gorogo, Nabdam District, Upper East Region          | 2011           | w              | 26              | 41             | 23           | 13             | 114            | [10]      | Household soil samples collected in July 2011 from top 1-2 cm of soil.                                                                                                                                                        |

ND = Not detectable or below the detection limit.

Table S2. Total mercury (Hg) levels in edible plants near Ghanaian small-scale gold mining sites.

| Study location                                       | Year collected | Dry/wet season | Species (common name)                   | Sample size (n) | Mean Hg (µg/g) | SD Hg (µg/g) | Min. Hg (µg/g) | Max. Hg (µg/g) | Reference | Notes                                                                                                                                                              |
|------------------------------------------------------|----------------|----------------|-----------------------------------------|-----------------|----------------|--------------|----------------|----------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Obuasi, Ashanti Region                               | 1992 - 1993    | w/d            | Manihot esculenta (cassava)             | 144             | 0.7083         | -            | -              | -              | [7]       | Samples collected once a month from Mar to Feb from 12 villages around the Pompora Treatment Plant at Obuasi (3 samples per site).                                 |
| Wassa West District, Western Region                  | -              | -              | Manihot esculenta (cassava)             | 8               | 0.2            | 0.203        | 0              | 0.56           | [4]       | Samples collected from farms at 5 gold mining towns (Iduapreim, Odumasi, Hemang, Huni Valley, Damang) and 3 non-mining towns (Ayanfuri, Wassa Asikuma, Krofofrom). |
| Bogoso, Wassa West District, Western Region          | -              | -              | Manihot esculenta (flesh only; cassava) | 4               | 0.13           | 0.03         | 0.10           | 0.16           | [2]       | Samples taken from farms near entrance of Bogoso Gold Ltd; 1.5 km from mines. Tubers collected from three plants.                                                  |
| Dumasi, Wassa West District, Western Region          | -              | -              | Manihot esculenta (flesh only; cassava) | 4               | 0.17           | 0.01         | 0.15           | 0.18           | [2]       | Samples measured from farms near large-scale and ASGM; 6.0 km from mines. Tubers collected from three plants.                                                      |
| Bogo, Wassa West District, Western Region            | -              | -              | Manihot esculenta (flesh only; cassava) | 4               | 0.12           | 0.04         | 0.08           | 0.17           | [2]       | Samples measured from farms near large-scale and ASGM; 8.4 km from mines. Tubers collected from three plants.                                                      |
| Prestea Ankraba, Wassa West District, Western Region | -              | -              | Manihot esculenta (flesh only; cassava) | 4               | 0.15           | 0.02         | 0.13           | 0.18           | [2]       | Samples measured from farms near large-scale and ASGM; 14.0 km from mines. Tubers taken from three plants.                                                         |
| Tarkwa, Western Region                               | -              | -              | Xanthosoma sagittifolium (cocoyam)      | 1               | 0.003          | -            | -              | -              | [12]      | Samples collected from a mining town (Efuantah).                                                                                                                   |
| Wassa West District, Western Region                  | -              | -              | Xanthosoma sagittifolium (cocoyam)      | 8               | 0.375          | 0.323        | 0              | 0.67           | [4]       | Samples collected from farms at 8 gold mining towns (Iduapreim, Odumasi, Hemang, Huni Valley, Damang, Ayanfuri, Wassa Asikuma, and Krofofrom).                     |
| Tarkwa, Western Region                               | -              | -              | Colocasia esculenta (water cocoyam)     | 2               | 0.0035         | 0.002        | 0.002          | 0.005          | [12]      | Samples collected from 2 mining towns (Nsuta, and Tamso),                                                                                                          |
| Wassa West District, Western Region                  | -              | -              | Colocasia esculenta (water cocoyam)     | 8               | 0.374          | 0.315        | 0              | 0.66           | [4]       | Samples collected from farms at 8 gold mining towns (Iduapreim, Odumasi, Hemang, Huni Valley, Damang, Ayanfuri, Wassa Asikuma, and Krofofrom).                     |

Table S2. Total mercury (Hg) levels in edible plants near Ghanaian small-scale gold mining sites.

| Study location                      | Year collected | Dry/wet season | Species (common name)                 | Sample size (n) | Mean Hg (µg/g) | SD Hg (µg/g) | Min. Hg (µg/g) | Max. Hg (µg/g) | Reference | Notes                                                                                                                                                              |
|-------------------------------------|----------------|----------------|---------------------------------------|-----------------|----------------|--------------|----------------|----------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Obuasi, Ashanti Region              | 1992 - 1993    | w/d            | Musa paradisiaca (plantain)           | 156             | 0.6846         | -            | -              | -              | [7]       | Samples collected once a month from Mar to Feb from 13 villages around the Pompora Treatment Plant at Obuasi (3 samples per site).                                 |
| Wassa West District, Western Region | -              | -              | Musa paradisiaca (plantain)           | 8               | 0.283          | 0.279        | 0              | 0.65           | [4]       | Samples collected from farms at 5 gold mining towns (Iduapreim, Odumasi, Hemang, Huni Valley, Damang) and 3 non-mining towns (Ayanfuri, Wassa Asikuma, Krofofrom). |
| Obuasi, Ashanti Region              | 1992 - 1993    | w/d            | Ceratopteris cornuta (water fern)     | 168             | 3.4214         | -            | -              | -              | [7]       | Samples collected once a month from Mar to Feb from 14 villages around the Pompora Treatment Plant at Obuasi (3 samples per site).                                 |
| Obuasi, Ashanti Region              | 1992 - 1993    | w/d            | Pennisetum purpureum (elephant grass) | 120             | 2.580          | -            | -              | -              | [7]       | Samples collected once a month from Mar to Feb from 10 villages around the Pompora Treatment Plant at Obuasi (3 samples per site).                                 |



Table S3. Total mercury (Hg) levels in sediment near Ghanaian small-scale gold mining sites and reference non-mining sites.

| Study location                                                                                    | Year collected | Dry/wet season | Sample size (n) | Mean Hg (ng/g) | SD Hg (ng/g) | Min. Hg (ng/g) | Max. Hg (ng/g) | Reference | Notes                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------|----------------|----------------|-----------------|----------------|--------------|----------------|----------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dumasi, Wassa West District, Western Region                                                       | 2000           | d              | -               | -              | -            | 640            | 8500           | [13]      | Samples were taken from the Rivers Apopre and Rora in April 2000.                                                                                                                                                                                                                                       |
| Dumasi Area (sediment from River Apopre), Wassa West District, Western Region                     | 2001           | -              | 2               | 4338           | -            | -              | -              | [1]       | Data has been extracted from a book chapter(12) that was contributed to by the authors of the article. Galamsey tailing pond discharges into River Apopre.                                                                                                                                              |
| Prestea, Wassa West District, Western Region                                                      | 2002 - 2003    | d              | 13              | 25,600         | 23250        | 1200           | 84300          | [14]      | Samples collected from Jan. through Apr. (Water & sediment samples were collected together.) The top 10-15 cm of sediment were collected. Six sample replicates were measured at each site (13 sites; 4 from Dagarti compound, 9 from Bondae; samples higher at Dagarti where galamsey is more common). |
| Tarkwa area (sediment from a fishing pond near galamsy site), Wassa West District, Western Region | 2001           | -              | 2               | 40,848         | -            | -              | -              | [1]       | Data has been extracted from a book chapter(12) that was contributed to by the authors of the article.                                                                                                                                                                                                  |
| River Angonabeng, Tarkwa, Western Region                                                          | 2008 - 2009    | d              | 5               | 212            | 149          | -              | -              | [15]      | Samples collected once a month from Sep. 2008 to Jan. 2009 from the stream.                                                                                                                                                                                                                             |
| River Bediadedwu, Tarkwa, Western Region                                                          | 2008 - 2009    | d              | 5               | 54             | 38           | -              | -              | [15]      | Samples collected once a month from Sep. 2008 to Jan. 2009 from the stream.                                                                                                                                                                                                                             |
| Spring 2, Teberebie Goldfields Limited, Tarkwa, Western Region                                    | 2008 - 2009    | d              | 5               | 60             | 20           | -              | -              | [15]      | Samples collected once a month from Sep. 2008 to Jan. 2009 from springs at Mile 7 and Teberebie in Tarkwa.                                                                                                                                                                                              |
| Spring 3, Teberebie Goldfields Limited, Tarkwa, Western Region                                    | 2008 - 2009    | d              | 5               | 10             | 10           | -              | -              | [15]      | Samples collected once a month from Sep. 2008 to Jan. 2009 from springs at Mile 7 and Teberebie in Tarkwa.                                                                                                                                                                                              |
| Mile 7, Iduapriem Anglogold Ashanti Mines, Tarkwa, Western Region                                 | 2008 - 2009    | d              | 5               | ND             | -            | -              | -              | [15]      | Samples collected once a month from Sep. 2008 to Jan. 2009 from springs at Mile 7 and Teberebie in Tarkwa.                                                                                                                                                                                              |

ND = Not detectable or below the detection limit.

Table S3. Total mercury (Hg) levels in sediment near Ghanaian small-scale gold mining sites and reference non-mining sites.

| Study location                                                                                             | Year collected | Dry/wet season | Sample size (n) | Mean Hg (ng/g) | SD Hg (ng/g) | Min. Hg (ng/g) | Max. Hg (ng/g) | Reference | Notes                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------|----------------|----------------|-----------------|----------------|--------------|----------------|----------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| River Ankobra, Western Region                                                                              | 2001           | w              | -               | -              | -            | 60             | 1630           | [16]      | Samples collected in Sep. 2001 and Feb. 2002 from five areas on the River Ankobra: Ankwaso, Prestea, Dombase (all on the main River Ankobra), Beppo (Manse tributary) and Bonsaso (Bonsa tributary), and one area at Anwiaso (10km from the source).                                               |
| River Ankobra, Western Region                                                                              | 2002           | d              | -               | -              | -            | 60             | 3340           | [16]      | Samples collected in Sep. 2001 and Feb. 2002 from five areas on the River Ankobra: Ankwaso, Prestea, Dombase (all on the main River Ankobra), Beppo (Manse tributary) and Bonsaso (Bonsa tributary), and one area at Anwiaso (10km from the source).                                               |
| River Ankroba basin, Wassa West District, Western Region                                                   | -              | -              | 6               | 139            | 87.65        | 63             | 270            | [17]      | Sediment from channel-bed alluvium. Samples were collected in the mining towns of Nsuta, Tarkwa, Damang, Abooso, Bogoso, and Prestea, in a tropical rainforest corridor. Large, small-scale and illegal mining occurs in the area.                                                                 |
| Bibiani, Anwiaso, Bekwai District; Western Region                                                          | 2008 - 2009    | d              | -               | 482            | 427          | 198            | 1115           | [18]      | Samples collected from waterways in the dry season from Oct 2008 to Mar 2009 in four sites affected by mining (at Mpokwampa, Kyereyar, Pamonu stream, and Lake Amponsah). Surface sediments (0 to ~10 cm) were taken where water samples were also collected (~60 samples total for entire study). |
| Dunkwa-on-Offin & Keniago, River Offin, Central Region                                                     | 2000           | w/d            | -               | 546            | 523          | 30             | 1631           | [19]      | Samples were collected once in July, Aug., Sep., and Feb. from each river edge with 2-3 feet PVC tubing immersed to the bottom sediment, with 6 samples at each riverbank on the Rivers Pra (2 sites), Fum (1 site), and Offin (3 sites).                                                          |
| Ajumamu in Dunkwa area (sediment from River Offin), Upper Denkyira East Municipal District, Central Region | 2001           | -              | 2               | 133.94         | -            | -              | -              | [1]       | Data has been extracted from a book chapter(12) that was contributed to by the authors of the article.                                                                                                                                                                                             |

ND = Not detectable or below the detection limit.

Table S3. Total mercury (Hg) levels in sediment near Ghanaian small-scale gold mining sites and reference non-mining sites.

| Study location                                                          | Year collected | Dry/wet season | Sample size (n) | Mean Hg (ng/g) | SD Hg (ng/g) | Min. Hg (ng/g) | Max. Hg (ng/g) | Reference | Notes                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------|----------------|----------------|-----------------|----------------|--------------|----------------|----------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dunkwa-on-Offin, Upper Denkyira East Municipal District, Central Region | 2006           | d/w            | 4               | 186.15         | 77.18        | -              | -              | [20]      | Samples collected from town along River Offin in Feb. and Jul. 2006.                                                                                                                                                                      |
| Awisam, Central Region                                                  | 2006           | d/w            | 4               | 96.11          | 30.7         | -              | -              | [20]      | Samples collected from town along River Offin in Feb. and Jul. 2006                                                                                                                                                                       |
| Nkotumso, Central Region                                                | 2006           | d/w            | 4               | 1010.08        | 102.89       | -              | -              | [20]      | Samples collected from town along River Offin in Feb. and Jul. 2006                                                                                                                                                                       |
| Twifo Praso, River Pra, Central Region                                  | 2000           | w/d            | -               | 622            | 679          | 41             | 1797           | [19]      | Samples were collected once in July, Aug., Sep., and Feb. from each river edge with 2-3 feet PVC tubing immersed to the bottom sediment, with 6 samples at each riverbank on the Rivers Pra (2 sites), Fum (1 site), and Offin (3 sites). |
| River Pra Basin, Western, Central & Ashanti Regions                     | 2002           | w              | 11              | 171            | 71           | 22             | 678            | [8]       | Samples were collected in the wet and dry seasons of the year to observe the variation in (total) mercury levels during these two major seasons.                                                                                          |
|                                                                         | 2003           | d              | 11              | 14             | 7            | 2              | 43             |           |                                                                                                                                                                                                                                           |
| River Pra Basin; Western, Central & Ashanti Regions                     | 2005 - 2006    | w/d            | 5               | 536            | 116          | 390            | 707            | [9]       | Data from five mining communities at the River Pra (Awisam, Twifo Praso, Twifo Mampong, Daboase, and Beposo) between Aug. 2005 and Jan. 2006.                                                                                             |
| Buabenso, Ashanti Region                                                | 2006           | d/w            | 4               | 424.3          | 260.12       | -              | -              | [20]      | Samples collected from town along River Offin in Feb. and Jul. 2006                                                                                                                                                                       |
| Dominase, Bekwai Municipal District, Ashanti Region                     | 2006           | d/w            | 4               | 144.55         | 38.21        | -              | -              | [20]      | Samples collected from town along River Offin in Feb. and Jul. 2006                                                                                                                                                                       |
| Fumso, River Fum, Ashanti Region                                        | 2000           | w/d            | -               | 463            | 475          | 47             | 1127           | [19]      | Samples were collected once in July, Aug., Sep., and Feb. from each river edge with 2-3 feet PVC tubing immersed to the bottom sediment, with 6 samples at each riverbank on the Rivers Pra (2 sites), Fum (1 site), and Offin (3 sites). |

ND = Not detectable or below the detection limit.

Table S3. Total mercury (Hg) levels in sediment near Ghanaian small-scale gold mining sites and reference non-mining sites.

| Study location                                                                                                                  | Year collected | Dry/wet season | Sample size (n) | Mean Hg (ng/g) | SD Hg (ng/g) | Min. Hg (ng/g) | Max. Hg (ng/g) | Reference | Notes                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|-----------------|----------------|--------------|----------------|----------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Birim North District, Eastern Region                                                                                            | 2009           | w              | 6               | 427            | 194          | 134            | 732            | [21]      | Samples collected upstream once during wet months (Apr - Aug).                                                                                                                                                                                            |
|                                                                                                                                 | 2009 - 2010    | d              | 6               | 860            | 604          | 381            | 1880           |           | Samples collected upstream once during dry months (Oct - Feb).                                                                                                                                                                                            |
|                                                                                                                                 | 2009           | w              | 6               | 1380           | 710          | 401            | 2320           |           | Samples collected downstream once during wet months (Apr - Aug).                                                                                                                                                                                          |
|                                                                                                                                 | 2009 - 2010    | d              | 6               | 3300           | 1400         | 1420           | 4890           |           | Samples collected downstream once during dry months (Oct - Feb).                                                                                                                                                                                          |
| Talensi District, Upper East Region                                                                                             | 2010           | w              | 14              | 35.53          | 61.63        | 4.949          | 247.5          | [10]      | Samples were collected in May-June 2010 near ASGM mining sites from a stream and reservoir.                                                                                                                                                               |
| Reference sites: Non-mining locations                                                                                           |                |                |                 |                |              |                |                |           |                                                                                                                                                                                                                                                           |
| Bibiani, Anwiaso, Bekwai District; Western Region                                                                               | 2008 - 2009    | d              | -               | 169            | -            | -              | -              | [18]      | Samples collected in the dry season from Oct 2008 to Mar 2009 from Asusuo and Abubayenyunu, areas with no known mining activity. Surface sediments (0 to ~10 cm) were taken where water samples were also collected (~60 samples total for entire study). |
| Shama, Western Region (Pra); and Elmina (Benya), Cape Coast (Fosu), and Saltpong Beach (Narkwa), Central Region, Gulf of Guinea | -              | w              | 16              | 5              | 5            | 0              | 17             | [22]      | Samples collected from Pra Estuary, Benya Lagoon, Fosu Lagoon, and Narkwa Lagoon during wet and dry season.                                                                                                                                               |
|                                                                                                                                 | -              | d              | 16              | 9              | 15           | 0              | 55             |           |                                                                                                                                                                                                                                                           |
| River Kakum, Central Region                                                                                                     | 2008 - 2009    | d              | 5               | ND             | -            | -              | -              | [15]      | Samples collected once a month from Sep. 2008 to Jan. 2009 from the stream.                                                                                                                                                                               |
| River Pra Basin, Western, Central & Ashanti Regions                                                                             | 2002           | w              | 7               | 494            | 79           | 18             | 2,917          | [8]       | Samples taken from the Rivers Offin, Upper Pra and Lower Pra in non-mining areas, once in the wet & dry seasons each.                                                                                                                                     |
|                                                                                                                                 | 2003           | d              | 7               | 12             | 8            | 2              | 43             |           |                                                                                                                                                                                                                                                           |
| Ada and Aveglo, Volta Estuary, Volta Region                                                                                     | 2008 - 2009    | w/d            | -               | -              | -            | 6.9            | 24.0           | [23]      | Samples were collected at two sample sites during monthly intervals between March 2008 and August 2009.                                                                                                                                                   |

ND = Not detectable or below the detection limit.

Table S4. Total mercury (Hg) levels in water near Ghanaian small-scale gold mining sites and reference non-mining sites.

| Study location                                         | Year collected | Dry/wet season | Water type    | Water source   | Sample size (n) | Mean Hg (µg/L) | SD Hg (µg/L) | Min. Hg (µg/L) | Max. Hg (µg/L) | Reference | Notes                                                                                                                                                                                                                                                            |
|--------------------------------------------------------|----------------|----------------|---------------|----------------|-----------------|----------------|--------------|----------------|----------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| River Angonabeng, Tarkwa, Western Region               | 2008 - 2009    | d              | Surface water | Stream         | 5               | 1484           | 256          | -              | -              | [15]      | Samples collected once a month from Sep. 2008 to Jan. 2009 from the stream.                                                                                                                                                                                      |
| River Bediadedwu, Tarkwa, Western Region               | 2008 - 2009    | d              | Surface water | Stream         | 5               | 522            | 510          | -              | -              | [15]      | Samples collected once a month from Sep. 2008 to Jan. 2009 from the stream.                                                                                                                                                                                      |
| River Ankobra Basin, Western Region                    | 2001           | w              | Surface water | River          | -               | -              | -            | 0.05           | 21             | [16]      | Samples collected in Sep. 2001 and Feb. 2002 from five areas on the River Ankobra Basin: Ankwaso, Prestea, Dombase, Beppo and Bonsaso, and one area at Anwiaso.                                                                                                  |
| River Ankobra Basin, Western Region                    | 2002           | d              | Surface water | River          | -               | -              | -            | 0.053          | 0.185          | [16]      | Samples collected in Sep. 2001 and Feb. 2002 from five areas on the River Ankobra Basin: Ankwaso, Prestea, Dombase, Beppo and Bonsaso, and one area at Anwiaso.                                                                                                  |
| Tarkwa, Western Region                                 | 2004           | d              | Surface water | Rivers/streams | 12              | 0.4            | -            | -              | 0.4            | [24]      | Samples collected in March 2004 from rivers/streams. No samples recorded levels above the detection limit of 0.5 µg/L. Values reflect detection limit/sqrt(2).                                                                                                   |
| River Pra basin; Western, Central, and Ashanti Regions | 2002           | w              | Surface water | River          | 14              | 0.187          | 0.137        | 0.034          | 0.420          | [8]       | Samples collected in wet season of 2002 and dry season of 2003 from samples at the Lower Pra, Offin, and Upper Pra.                                                                                                                                              |
|                                                        | 2003           | d              | Surface water | River          | 13              | 0.187          | 0.132        | 0.046          | 0.462          |           |                                                                                                                                                                                                                                                                  |
| Prestea, Western Region                                | 2002 - 2003    | d              | Surface water | River          | 13              | 7160           | 4900         | 500            | 19820          | [14]      | Samples collected from Jan. through Apr. (Water & sediment samples were collected together.) Six sample replicates were measured at each site (13 sites; 4 from Dagarti compound, 9 from Bondae; samples higher at Dagarti where galamsey is more common).       |
| River Pra, Dunkwa-on-Offin                             | 2000           | w/d            | Surface water | River          | -               | 0.932          | 0.796        | 0.104          | 1.974          | [19]      | Data from 2 bridge sites on the river (Twifo Praso, Praso) collected once per month in July, Aug., Sept. and Feb. Nine samples were collected at each bridge site--6 analyzed in a lab and 3 analyzed with a Hg thermometer in the field--at 0.8 and 2 m depths. |
| River Fum, Dunkwa-on-Offin                             | 2000           | w/d            | Surface water | River          | -               | 0.783          | 0.756        | 0.019          | 1.818          | [19]      | Data from 1 bridge site on the river collected once per month in July, Aug., Sept. and Feb. Nine samples were collected at each bridge site--6 analyzed in a lab and 3 analyzed with a Hg thermometer in the field--at 0.8 and 2 m depths.                       |
| River Oda, Dunkwa-on-Offin                             | 2000           | w/d            | Surface water | River          | -               | 0.817          | 0.888        | 0.105          | 2.112          | [19]      | Data from 1 bridge site on the river collected once per month in July, Aug., Sept. and Feb. Nine samples were collected at each bridge site--6 analyzed in a lab and 3 analyzed with a Hg thermometer in the field--at 0.8 and 2 m depths.                       |

ND = Not detectable or below the detection limit.

Table S4. Total mercury (Hg) levels in water near Ghanaian small-scale gold mining sites and reference non-mining sites.

| Study location                                      | Year collected | Dry/wet season | Water type            | Water source                         | Sample size (n) | Mean Hg (µg/L) | SD Hg (µg/L) | Min. Hg (µg/L) | Max. Hg (µg/L) | Reference | Notes                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------|----------------|----------------|-----------------------|--------------------------------------|-----------------|----------------|--------------|----------------|----------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bibiani, Anwiaso, Bekwai District, Western Region   | 2008 - 2009    | d              | Surface water         | Streams                              | -               | 0.452          | 0.514        | 0.124          | 1.341          | [18]      | Samples collected from waterways in the dry season from Oct 2008 to Mar 2009 in five sites affected by mining (at Mpokwampa, Kyereyar, Pamonu stream, Lake Amponsah, and a galamsey tailing site). Surface sediments (0 to ~10 cm) were taken where water samples were also collected (~60 samples total for entire study). |
| Birim North District, Eastern Region                | 2009           | w              | Surface water         | Stream (upstream)                    | 6               | 0.180          | 0.110        | 0.045          | 0.358          | [21]      | Samples collected over 11 month period (Apr - Feb), once in the wet and once in the dry season.                                                                                                                                                                                                                             |
|                                                     | 2009 - 2010    | d              |                       | Stream (upstream)                    | 6               | 0.339          | 0.057        | 0.248          | 0.412          |           |                                                                                                                                                                                                                                                                                                                             |
|                                                     | 2009           | w              |                       | Stream (downstream)                  | 6               | 0.553          | 0.212        | 0.282          | 0.872          |           |                                                                                                                                                                                                                                                                                                                             |
|                                                     | 2009 - 2010    | d              |                       | Stream (downstream)                  | 6               | 0.860          | 0.269        | 0.643          | 1.343          |           |                                                                                                                                                                                                                                                                                                                             |
| Obuasi, Ashanti Region                              | 2008           | w              | Surface water         | Rivers                               | -               | 0.287          | 0.42         | 0.018          | 1.002          | [25]      | Samples collected during wet season (Mar - Jun), once per month (4 times) at 7 sites (Rivers Kaw, Kwabrafo, Pompo, Akopori, Jimi, Akyerempe, and Supu).                                                                                                                                                                     |
| Dumasi, Wassa West District, Western Region         | 2000           | d              | Surface water         | Rivers                               | 5               | -              | -            | 0.18           | 0.76           | [13]      | Samples were taken from the Rivers Apopre and Rora in April 2000.                                                                                                                                                                                                                                                           |
| River Ankroba Basin, Western Region                 | -              | d              | Surface water         | Streams                              | 89              | 1.276          | -            | 0.70           | 8.00           | [17]      | Data from 4 stream sites (Iduapriem, Tarkwa, Nsuta [a manganese mining company area], and Damang), collected during the dry season (Nov-Feb) from areas with large and/or small-scale mining.                                                                                                                               |
| River Ankroba Basin, Western Region                 | -              | -              | Surface & groundwater | Streams, boreholes, & hand-dug wells | 70              | 1.5            | 1.25         | <1             | 8              | [17]      | Samples collected from streams, boreholes, and hand-dug wells. Samples were collected in the mining towns of Nsuta, Tarkwa, Damang, Abosso, Bogoso, and Prestea, in a tropical rainforest corridor. Large, small-scale, and illegal mining occurs in the area.                                                              |
| Nangodi, Talensi-Nabdam District, Upper East Region | 2010 - 2011    | d              | Surface & groundwater | Borehole, dug wells, & dugouts       | 30              | 38.4           | 58.05        | <5             | 190            | [26]      | Samples collected between Nov 2010 to Apr 2011. One site from a borehole (Kalin), 2 from dug wells (Nadpadana, Nakpalig), and 2 from dugouts (Kolikpenge, Debahe).                                                                                                                                                          |
| Tinga, Bole-Bamboi District, Northern Region        | 2011 - 2012    | d              | Surface & groundwater | Stream & boreholes                   | 42              | 50             | 40           | 10             | 172            | [27]      | Samples collected monthly between Oct. 2011 and April 2012 from stream (drinking water and gold ore washing) and 4 boreholes.                                                                                                                                                                                               |

ND = Not detectable or below the detection limit.

Table S4. Total mercury (Hg) levels in water near Ghanaian small-scale gold mining sites and reference non-mining sites.

| Study location                                                    | Year collected | Dry/wet season | Water type             | Water source                         | Sample size (n) | Mean Hg (µg/L) | SD Hg (µg/L) | Min. Hg (µg/L) | Max. Hg (µg/L) | Reference | Notes                                                                                                                                                                                     |
|-------------------------------------------------------------------|----------------|----------------|------------------------|--------------------------------------|-----------------|----------------|--------------|----------------|----------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Konongo-Odumasi, Asante Akim North District, Ashanti Region       | 2011 - 2012    | d              | Surface & ground water | River, streams, wells, & mine pits   | 36              | 20             | 10           | 2              | 66             | [28]      | Samples collected upstream, midstream, and downstream in River Owere in addition to streams, wells, and mine pits between Nov. 2011 and April 2012. Large and small-scale mining present. |
| Obuasi, Ashanti Region                                            | 2009           | d/w            | Surface & tap water    | Surface & tap water                  | 48              | 4.0363         | 5.10287      | 0.001          | 25.3           | [29]      | Samples collected from Feb - Jun. in the Obuasi mining area.                                                                                                                              |
| Obuasi, Ashanti Region                                            | 2008           | w              | Groundwater            | Rivers                               | -               | 0.02           | 0.001        | 0.019          | 0.021          | [25]      | Samples collected during wet season (Mar - Jun), once per month (4 times) at 7 sites (Rivers Kaw, Kwabrafo, Pompo, Akopori, Jimi, Akyerempe, and Supu).                                   |
| Tarkwa, Western Region                                            | 2004           | d              | Groundwater            | Boreholes                            | 12              | 0.4            | -            | 0.4            | 2.3            | [24]      | Samples collected from boreholes in March. Hg detected above detection level of 0.5 in only one sample.                                                                                   |
| Tarkwa, Western Region                                            | 2004           | d              | Groundwater            | Wells                                | 6               | 0.4            | -            | 0.4            | 0.5            | [24]      | Samples collected from wells (n=6) in March. Hg detected above detection level of 0.5 in only one sample.                                                                                 |
| Spring 2, Teberebie Goldfields Limited, Tarkwa, Western Region    | 2008 - 2009    | d              | Groundwater            | Springs                              | 5               | 14             | 10           | -              | -              | [15]      | Samples collected once a month from Sep. 2008 to Jan. 2009 from springs at Mile 7 and Teberebie in Tarkwa.                                                                                |
| Spring 3, Teberebie Goldfields Limited, Tarkwa, Western Region    | 2008 - 2009    | d              | Groundwater            | Springs                              | 5               | ND             | -            | -              | -              | [15]      | Samples collected once a month from Sep. 2008 to Jan. 2009 from springs at Mile 7 and Teberebie in Tarkwa.                                                                                |
| Mile 7, Iduapriem Anglogold Ashanti Mines, Tarkwa, Western Region | 2008 - 2009    | d              | Groundwater            | Springs                              | 5               | ND             | -            | -              | -              | [15]      | Samples collected once a month from Sep. 2008 to Jan. 2009 from springs at Mile 7 and Teberebie in Tarkwa.                                                                                |
| Dumasi, Wassa West District, Western Region                       | 2000           | d              | Groundwater            | Springs                              | 8               | -              | -            | 0.12           | 0.27           | [13]      | Samples were taken from boreholes near Dumasi in April 2000.                                                                                                                              |
| River Lower Offin Basin, Central Region                           | 2004           | d              | Groundwater            | Boreholes, hand-dug wells, & springs | 148             | 0.18           | 1.8          | 0.4            | 3.85           | [30]      | Samples collected during dry season (Dec) from boreholes, hand-dug wells and springs. Minimum below detection level of 0.5 µg/L.                                                          |
| Birim North District, Eastern Region                              | 2009           | w              | Groundwater            | Boreholes                            | 6               | 0.291          | 0.193        | 0.078          | 0.619          | [21]      | Samples collected from boreholes, over 11 month period (Apr - Feb), once in the wet & once in the dry season.                                                                             |
|                                                                   | 2009 - 2010    | d              |                        | Boreholes                            | 6               | 0.420          | 0.067        | 0.301          | 0.482          |           |                                                                                                                                                                                           |

ND = Not detectable or below the detection limit.

Table S4. Total mercury (Hg) levels in water near Ghanaian small-scale gold mining sites and reference non-mining sites.

| Study location                                                                                                                  | Year collected | Dry/wet season | Water type    | Water source      | Sample size (n) | Mean Hg (µg/L) | SD Hg (µg/L) | Min. Hg (µg/L) | Max. Hg (µg/L) | Reference | Notes                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|---------------|-------------------|-----------------|----------------|--------------|----------------|----------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference sites: Non-mining locations                                                                                           |                |                |               |                   |                 |                |              |                |                |           |                                                                                                                                                         |
| River Kakum, Central Region                                                                                                     | 2008 - 2009    | d              | Surface water | Stream            | 5               | ND             | -            | -              | -              | [15]      | Samples collected once a month from Sep. 2008 to Jan. 2009 from the stream.                                                                             |
| Shama, Western Region (Pra); and Elmina (Benya), Cape Coast (Fosu), and Saltpong Beach (Narkwa), Central Region, Gulf of Guinea | -              | w              | Surface water | Estuary & lagoons | 16              | 0.001          | 0.001        | 0              | 0.003          | [22]      | Samples collected from Pra Estuary, Benya Lagoon, Fosu Lagoon, and Narkwa Lagoon during wet and dry seasons.                                            |
|                                                                                                                                 |                | d              |               | Estuary & lagoons | 16              | 0.002          | 0.002        | 0              | 0.005          |           |                                                                                                                                                         |
| River Pra basin; Western, Central, and Ashanti Regions                                                                          | 2002           | w              | Surface water | River             | 7               | 0.119          | 0.110        | 0.029          | 0.296          | [8]       | Samples collected in wet season of 2002 and dry season of 2003 from samples at the Lower Pra, Offin, and Upper Pra.                                     |
|                                                                                                                                 | 2003           | d              | Surface water | River             | 7               | 0.115          | 0.046        | 0.072          | 0.188          |           |                                                                                                                                                         |
| Bibiani, Anwiaso, Bekwai District; Western Region                                                                               | 2008 - 2009    | d              | Surface water | Streams           | 60              | 0.164          | 0.055        | 0.125          | 0.203          | [18]      | Samples collected twice in the dry season from Oct 2008 to Mar 2009 from Asusuo and Abubayenyunu, at streams with no known mining activity (0 - ~10cm). |
| Accra, Greater Accra Region                                                                                                     | 2004           | d              | Groundwater   | Standpipe (tap)   | 1               | 0.4            | -            | -              | -              | [24]      | Samples collected from a standpipe (tap) in Accra in March. No samples over detection level of 0.5 µg/L.                                                |

ND = Not detectable or below the detection limit.



Table S5. Total mercury (Hg) levels in fish and shellfish in Ghana and the Gulf of Guinea. Hg concentrations are presented in wet weight (dry weight values were converted to w.w. assuming 80% moisture [32]).

| Study location/<br>Sample collection                                             | Year<br>collected | Dry/Wet<br>Season | Species                                                                             | Common<br>name(s)           | Fresh or<br>Marine | Trophic<br>Level <sup>c</sup> | Sample<br>size (n) | Mean Hg<br>(µg/g) | SD Hg<br>(µg/g) | Min. Hg<br>(µg/g) | Max. Hg<br>(µg/g) | Reference | Notes                                                                                                                                      |
|----------------------------------------------------------------------------------|-------------------|-------------------|-------------------------------------------------------------------------------------|-----------------------------|--------------------|-------------------------------|--------------------|-------------------|-----------------|-------------------|-------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Fish                                                                             |                   |                   |                                                                                     |                             |                    |                               |                    |                   |                 |                   |                   |           |                                                                                                                                            |
| Upper Volta Basin at<br>Yeji, Brong-Ahafo<br>Region                              | 2006 - 2007       | d                 | <i>Distichodus rostratus</i>                                                        | Grass-eater,<br>Perch       | F                  | 2                             | 7                  | 0.02052           | -               | 0.01639           | 0.02583           | [31]      | Samples were collected from<br>commercial catches at Yeji from<br>Oct. 2006 to Mar. 2007.                                                  |
| River Pra Basin,<br>Western, Central, and<br>Ashanti Regions                     | 2005 - 2006       | w/d               | <i>Labeo coubie</i>                                                                 | African carp,<br>Black carp | F                  | 2                             | 45                 | 0.049             | 0.019           | <0.001            | 0.136             | [9]       | Samples collected from Twifo<br>Praso, Awisam, Beposo, and<br>Daboase between Aug. 2005 to<br>Jan. 2006 from fishermen.                    |
| Nkotumso, Central<br>Region                                                      | 2006              | d/w               | <i>Labeo coubie</i>                                                                 | African carp,<br>Black carp | F                  | 2                             | 6                  | 0.12135           | 0.03433         | 0.10083           | 0.19076           | [20]      | Samples collected from fishermen<br>at town along River Offin in Feb.<br>and Jul. 2006                                                     |
| Dunkwa-on-Offin,<br>Upper Denkyira East<br>Municipal District,<br>Central Region | 2006              | d/w               | <i>Labeo coubie</i>                                                                 | African carp,<br>Black carp | F                  | 2                             | 5                  | 0.14377           | 0.01649         | 0.12075           | 0.15790           | [20]      | Samples collected from fishermen<br>at town along River Offin in Feb.<br>and Jul. 2006                                                     |
| Dominase, Bekwai<br>Municipal District,<br>Ashanti Region                        | 2006              | d/w               | <i>Oreochromis niloticus</i>                                                        | Nile tilapia                | F                  | 2                             | 3                  | 0.16531           | 0.06969         | 0.09079           | 0.22887           | [20]      | Samples collected from fishermen<br>at town along River Offin in Feb.<br>and Jul. 2006                                                     |
| Nkotumso, Central<br>Region                                                      | 2006              | d/w               | <i>Oreochromis niloticus</i>                                                        | Nile tilapia                | F                  | 2                             | 14                 | 0.13213           | 0.05351         | 0.05979           | 0.24751           | [20]      | Samples collected from fishermen<br>at town along River Offin in Feb.<br>and Jul. 2006                                                     |
| Dunkwa-on-Offin,<br>Upper Denkyira East<br>Municipal District,<br>Central Region | 2006              | d/w               | <i>Oreochromis niloticus</i>                                                        | Nile tilapia                | F                  | 2                             | 10                 | 0.14539           | 0.06861         | 0.06392           | 0.25976           | [20]      | Samples collected from fishermen<br>at town along River Offin in Feb.<br>and Jul. 2006                                                     |
| Sakumo Lagoon,<br>Greater Accra Region                                           | 2009              | d                 | <i>Sarotherodon melanothron</i>                                                     | Blackchin<br>tilapia        | F                  | 2                             | 20                 | 0.007             | 0.006           | < 0.01            | 0.017             | [32]      | Samples collected from fisherman<br>between Sept. and Nov. 2009.,<br>adjusted to wet weight based on<br>moisture content given in article. |
| River Pra River,<br>Western, Central, and<br>Ashanti Regions                     | 2003              | d                 | <i>Sarotherodon melanothron</i>                                                     | Blackchin<br>tilapia        | F                  | 2                             | 4                  | 0.016             | --              | -                 | --                | [8]       | Dry fish samples were purchased<br>from local fisherman during<br>January 2003 (dry season).                                               |
| Dominase, Bekwai<br>Municipal District,<br>Ashanti Region                        | 2006              | d/w               | <i>Sarotherodon melanothron</i>                                                     | Blackchin<br>tilapia        | F                  | 2.5                           | 4                  | 0.14633           | 0.11359         | 0.08272           | 0.31642           | [20]      | Samples collected from fishermen<br>at town along River Offin in Feb.<br>and Jul. 2006                                                     |
| Lake Bosomtwi,<br>Ashanti Region                                                 | 2004 - 2005       | d/w               | <i>Tilapia busumana</i>                                                             | -                           | F                  | 2.3                           | 16                 | 0.021             | -               | 0.009             | 0.049             | [33]      | Samples collected from commercial<br>catches from fisherman in villages<br>along the Lake from Feb. through<br>Dec.                        |
| River Pra Basin,<br>Western, Central, and<br>Ashanti Regions                     | 2005 - 2006       | w/d               | <i>Tilapia multifasciata</i><br>(synonym: <i>sarotherodon</i><br><i>galilaeus</i> ) | Mango tilapia               | F                  | 2                             | 15                 | 0.040             | 0.019           | 0.013             | 0.163             | [9]       | Samples collected from Beposo<br>and Daboase between Aug. 2005<br>to Jan. 2006 from fishermen.                                             |
| Lake Bosomtwi,<br>Ashanti Region                                                 | 2004 - 2005       | d/w               | <i>Tilapia multifasciata</i><br>(synonym: <i>sarotherodon</i><br><i>galilaeus</i> ) | Mango tilapia               | F                  | 2                             | 39                 | 0.008             | -               | <0.001            | 0.070             | [33]      | Samples collected from commercial<br>catches from fisherman in villages<br>along the Lake from Feb. through<br>Dec.                        |
| Akosombo Reservoir,<br>Eastern Region                                            | 2004 - 2005       | d/w               | <i>Tilapia zillii</i>                                                               | Redbelly tilapia            | F                  | 2                             | 39                 | 0.012             | -               | <0.001            | 0.028             | [33]      | Samples collected from commercial<br>catches from fisherman in villages<br>along the reservoir from Feb.<br>through Dec.                   |

ND = Not detectable.

a Trophic level from Oppong et al. 2010 [9].

b Trophic level is for *Clarias angularis* for Donkor et al., 2006 [8].

c All other trophic levels from FishBase [40].

Table S5. Total mercury (Hg) levels in fish and shellfish in Ghana and the Gulf of Guinea. Hg concentrations are presented in wet weight (dry weight values were converted to w.w. assuming 80% moisture [32]).

| Study location/<br>Sample collection                                             | Year<br>collected | Dry/Wet<br>Season | Species                                                                                    | Common<br>name(s)                           | Fresh or<br>Marine | Trophic<br>Level <sup>c</sup> | Sample<br>size (n) | Mean Hg<br>(µg/g) | SD Hg<br>(µg/g) | Min. Hg<br>(µg/g) | Max. Hg<br>(µg/g) | Reference | Notes                                                                                                           |
|----------------------------------------------------------------------------------|-------------------|-------------------|--------------------------------------------------------------------------------------------|---------------------------------------------|--------------------|-------------------------------|--------------------|-------------------|-----------------|-------------------|-------------------|-----------|-----------------------------------------------------------------------------------------------------------------|
| Kpong Reservoir,<br>Eastern Region                                               | 2004 - 2005       | d/w               | Tilapia zilli                                                                              | Redbelly tilapia                            | F                  | 2                             | 9                  | 0.030             | -               | 0.016             | 0.076             | [33]      | Samples collected from commercial catches from fisherman in villages along the reservoir from Feb. through Dec. |
| River Pra Basin,<br>Western, Central, and<br>Ashanti Regions                     | 2005 - 2006       | w/d               | Tilapia zilli                                                                              | Redbelly tilapia                            | F                  | 2                             | 16                 | 0.044             | 0.022           | 0.019             | 0.109             | [9]       | Samples collected from Twifo Praso and Daboase between Aug. 2005 to Jan. 2006 from fishermen.                   |
| Dominase, Bekwai<br>Municipal District,<br>Ashanti Region                        | 2006              | d/w               | Tilapia zilli                                                                              | Redbelly tilapia                            | F                  | 2                             | 13                 | 0.22180           | 0.08599         | 0.09330           | 0.40305           | [20]      | Samples collected from fishermen at town along River Offin in Feb. and Jul. 2006                                |
| Nkotumso, Central<br>Region                                                      | 2006              | d/w               | Tilapia zilli                                                                              | Redbelly tilapia                            | F                  | 2                             | 6                  | 0.07897           | 0.01971         | 0.05716           | 0.09760           | [20]      | Samples collected from fishermen at town along River Offin in Feb. and Jul. 2006                                |
| Buabenso, Ashanti<br>Region                                                      | 2006              | d/w               | Tilapia zilli                                                                              | Redbelly tilapia                            | F                  | 2                             | 2                  | 0.16646           | 0.01815         | 0.15363           | 0.17929           | [20]      | Samples collected from fishermen at town along River Offin in Feb. and Jul. 2006                                |
| Lake Bosomtwi,<br>Ashanti Region                                                 | 2004 - 2005       | d/w               | Tilapia discolor (synonym:<br>Coptodon discolor)                                           | -                                           | F                  | 2.2                           | 30                 | 0.017             | -               | 0.066             | 0.047             | [33]      | Samples collected from commercial catches from fisherman in villages along the Lake from Feb. through Dec.      |
| Dunkwa-on-Offin,<br>Upper Denkyira East<br>Municipal District,<br>Central Region | 2006              | d/w               | Brycinus sp.                                                                               | Robber tetra                                | F                  | 2.2 - 3.3                     | 3                  | 0.14158           | 0.03916         | 0.09790           | 0.17352           | [20]      | Samples collected from fishermen at town along River Offin in Feb. and Jul. 2006                                |
| Kpong Reservoir,<br>Eastern Region                                               | 2004 - 2005       | d/w               | Pelmatochromis guntheri<br>(synonym: chromidotilapia<br>guntheri, hemichromis<br>guntheri) | Guenther's<br>mouthbrooder                  | F                  | 2.4                           | 8                  | 0.159             | -               | 0.011             | 0.275             | [33]      | Samples collected from commercial catches from fisherman in villages along the reservoir from Feb. through Dec. |
| Upper Volta Basin at<br>Yeji, Brong-Ahafo<br>Region                              | 2006 - 2007       | d                 | Chrysichthys nigrodigitatus                                                                | Bagrid catfish,<br>mudfish                  | F                  | 2.6                           | 29                 | 0.02569           | -               | 0.01048           | 0.06190           | [31]      | Samples were collected from commercial catches at Yeji from Oct. 2006 to Mar. 2007.                             |
| Dominase, Bekwai<br>Municipal District,<br>Ashanti Region                        | 2006              | d/w               | Chrysichthys nigrodigitatus                                                                | Bagrid catfish,<br>mudfish                  | F                  | 2.6                           | 5                  | 0.31135           | 0.08307         | 0.18275           | 0.40949           | [20]      | Samples collected from fishermen at town along River Offin in Feb. and Jul. 2006                                |
| Dunkwa-on-Offin,<br>Upper Denkyira East<br>Municipal District,<br>Central Region | 2006              | d/w               | Chrysichthys nigrodigitatus                                                                | Bagrid catfish,<br>mudfish                  | F                  | 2.6                           | 5                  | 0.47324           | 0.21327         | 0.26439           | 0.75683           | [20]      | Samples collected from fishermen at town along River Offin in Feb. and Jul. 2006                                |
| Buabenso, Ashanti<br>Region                                                      | 2006              | d/w               | Chrysichthys nigrodigitatus                                                                | Bagrid catfish,<br>mudfish                  | F                  | 2.6                           | 3                  | 0.29940           | 0.10208         | 0.21106           | 0.41116           | [20]      | Samples collected from fishermen at town along River Offin in Feb. and Jul. 2006                                |
| Kpong Reservoir,<br>Eastern Region                                               | 2004 - 2005       | d/w               | Chrysichthys auratus                                                                       | Golden Nile<br>catfish, Long fin<br>catfish | F                  | 2.7                           | 10                 | 0.041             | -               | 0.026             | 0.079             | [33]      | Samples collected from commercial catches from fisherman in villages along the reservoir from Feb. through Dec. |
| River Pra Basin,<br>Western, Central, and<br>Ashanti Regions                     | 2003              | d                 | Synodontis sp.                                                                             | Catfish                                     | F                  | 2.7 - 3.4                     | 4                  | 0.192             | --              | --                | --                | [8]       | Dry fish samples were purchased from local fisherman during January 2003 (dry season).                          |
| Buabenso, Ashanti<br>Region                                                      | 2006              | d/w               | Synodontis sp.                                                                             | Catfish                                     | F                  | 2.7 - 3.4                     | 23                 | 0.25714           | 0.13271         | 0.11546           | 0.64940           | [20]      | Samples collected from fishermen at town along River Offin in Feb. and Jul. 2006                                |
| Awisam, Central<br>Region                                                        | 2006              | d/w               | Synodontis sp.                                                                             | Catfish                                     | F                  | 2.7 - 3.4                     | 30                 | 0.28976           | 0.12560         | 0.14086           | 0.79594           | [20]      | Samples collected from fishermen at town along River Offin in Feb. and Jul. 2006                                |

ND = Not detectable.

a Trophic level from Oppong et al. 2010 [9].

b Trophic level is for *Clarias anguilaris* for Donkor et al., 2006 [8].

c All other trophic levels from FishBase [40].

Table S5. Total mercury (Hg) levels in fish and shellfish in Ghana and the Gulf of Guinea. Hg concentrations are presented in wet weight (dry weight values were converted to w.w. assuming 80% moisture [32]).

| Study location/<br>Sample collection                                             | Year<br>collected | Dry/Wet<br>Season | Species                                                                                       | Common<br>name(s)                                                          | Fresh or<br>Marine | Trophic<br>Level <sup>a</sup> | Sample<br>size (n) | Mean Hg<br>(µg/g) | SD Hg<br>(µg/g) | Min. Hg<br>(µg/g) | Max. Hg<br>(µg/g) | Reference | Notes                                                                                                                                   |
|----------------------------------------------------------------------------------|-------------------|-------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------|-------------------------------|--------------------|-------------------|-----------------|-------------------|-------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Upper Volta Basin at<br>Yeji, Brong-Ahafo<br>Region                              | 2006 - 2007       | d                 | <i>Synodontis gambiensis</i><br>(synonym: <i>synodontis schall</i> )                          | Catfish, Mandi,<br>Nile squeaker,<br>Shield-headed<br>catfish,<br>Wahrindi | F                  | 2.9                           | 14                 | 0.06951           | -               | 0.04417           | 0.08588           | [31]      | Samples were collected from<br>commercial catches at Yeji from<br>Oct. 2006 to Mar. 2007.                                               |
| Akosombo Reservoir,<br>Eastern Region                                            | 2004 - 2005       | d/w               | <i>Synodontis guntheri</i><br>(synonym: <i>synodontis<br/>membranaceus</i> )                  | Catfish                                                                    | F                  | 3.1                           | 6                  | 0.028             | -               | 0.020             | 0.042             | [33]      | Samples collected from commercial<br>catches from fisherman in villages<br>along the reservoir from Feb.<br>through Dec.                |
| Upper Volta Basin at<br>Yeji, Brong-Ahafo<br>Region                              | 2006 - 2007       | d                 | <i>Synodontis membranaceus</i>                                                                | Catfish                                                                    | F                  | 3.1                           | 9                  | 0.04315           | -               | 0.00326           | 0.07993           | [31]      | Samples were collected from<br>commercial catches at Yeji from<br>Oct. 2006 to Mar. 2007.                                               |
| Upper Volta Basin at<br>Yeji, Brong-Ahafo<br>Region                              | 2006 - 2007       | d                 | <i>Synodontis ocellifer</i>                                                                   | Catfish                                                                    | F                  | 3.1                           | 16                 | 0.02452           | -               | 0.01311           | 0.03864           | [31]      | Samples were collected from<br>commercial catches at Yeji from<br>Oct. 2006 to Mar. 2007.                                               |
| Kpong Reservoir,<br>Eastern Region                                               | 2004 - 2005       | d/w               | <i>Amphilius grammatorphorus</i><br>(synonym: <i>amphilius platychir</i> )                    | Mountain<br>barbel (catfish)                                               | F                  | 3                             | 4                  | 0.170             | -               | 0.141             | 0.208             | [33]      | Samples collected from commercial<br>catches from fisherman in villages<br>along the reservoir from Feb.<br>through Dec.                |
| Upper Volta Basin at<br>Yeji, Brong-Ahafo<br>Region                              | 2006 - 2007       | d                 | <i>Gnathonemus senegalensis</i><br>(synonym: <i>marcusenius<br/>senegalensis</i> )            | Trunkfish (an<br>elephant fish)                                            | F                  | 3.1                           | 15                 | 0.01921           | -               | 0.01233           | 0.02418           | [31]      | Samples were collected from<br>commercial catches at Yeji from<br>Oct 2006 to Mar 2007.                                                 |
| Dominase, Bekwai<br>Municipal District,<br>Ashanti Region                        | 2006              | d/w               | <i>Heterobranchus</i> sp.                                                                     | Catfish                                                                    | F                  | 3.2 - 3.7                     | 5                  | 0.03579           | 0.00142         | 0.03477           | 0.03828           | [20]      | Samples collected from fishermen<br>at town along River Offin in Feb.<br>and Jul. 2006                                                  |
| Nkotumso, Central<br>Region                                                      | 2006              | d/w               | <i>Heterobranchus</i> sp.                                                                     | Catfish                                                                    | F                  | 3.2 - 3.7                     | 4                  | 0.08869           | 0.07958         | 0.00102           | 0.16844           | [20]      | Samples collected from fishermen<br>at town along River Offin in Feb.<br>and Jul. 2006                                                  |
| Dunkwa-on-Offin,<br>Upper Denkyira East<br>Municipal District,<br>Central Region | 2006              | d/w               | <i>Heterobranchus</i> sp.                                                                     | Catfish                                                                    | F                  | 3.2 - 3.7                     | 1                  | 0.06572           | -               | -                 | -                 | [20]      | Samples collected from fishermen<br>at town along River Offin in Feb.<br>and Jul. 2006                                                  |
| Obuasi, Ashanti<br>Region                                                        | 1992 - 1993       | w/d               | <i>Heterobranchus bidorsalis</i>                                                              | African catfish;<br>Eel-like fattyfin<br>catfish; Mudfish                  | F                  | 3.7                           | 33                 | 0.131             | 0.114           | 0.040             | 0.400             | [7]       | Samples collected once a month<br>from Mar to Feb from 14 villages (3<br>at each site) around the Pompora<br>Treatment Plant at Obuasi. |
| River Pra Basin,<br>Western, Central, and<br>Ashanti Regions                     | 2005 - 2006       | w/d               | <i>Heterobranchus longifillilis</i> (alt.<br>spelling: <i>Heterobranchus<br/>longifilis</i> ) | Sampa                                                                      | F                  | 3.7                           | 3                  | 0.165             | -               | 0.142             | 0.187             | [9]       | Samples collected from Twifo<br>Praso between Aug. 2005 to Jan.<br>2006 from fishermen.                                                 |
| River Pra Basin,<br>Western, Central, and<br>Ashanti Regions                     | 2005 - 2006       | w/d               | <i>Alestes imberi</i><br>(synonym: <i>Brycinus imberi</i> )                                   | Characin, spot-<br>tail tetra/robber                                       | F                  | 3.3                           | 53                 | 0.049             | 0.014           | 0.014             | 0.216             | [9]       | Samples collected from Twifo<br>Praso, Twifo Mampong, and<br>Beposo between Aug. 2005 to Jan.<br>2006 from fishermen.                   |
| Kpong Reservoir,<br>Eastern Region                                               | 2004 - 2005       | d/w               | <i>Apistogramma trifasciata</i>                                                               | Three-striped<br>apisto (cichlid)                                          | F                  | 3.3                           | 3                  | 0.011             | -               | 0.010             | 0.011             | [33]      | Samples collected from commercial<br>catches from fisherman in villages<br>along the reservoir from Feb.<br>through Dec.                |
| Buabenso, Ashanti<br>Region                                                      | 2006              | d/w               | <i>Schilbe mystus</i>                                                                         | African butter<br>catfish                                                  | F                  | 3.3                           | 2                  | 0.10902           | 0.00524         | 0.10532           | 0.11273           | [20]      | Samples collected from fishermen<br>at town along River Offin in Feb.<br>and Jul. 2006                                                  |
| River Pra Basin,<br>Western, Central, and<br>Ashanti Regions                     | 2005 - 2006       | w/d               | <i>Chrysichthys</i> sp.                                                                       | Catfish                                                                    | F                  | 3.4 <sup>a</sup>              | 28                 | 0.169             | 0.017           | 0.069             | 0.370             | [9]       | Samples collected from Twifo<br>Praso, Beposo, and Daboase<br>between Aug. 2005 to Jan. 2006<br>from fishermen.                         |

ND = Not detectable.

a Trophic level from Oppong et al. 2010 [9].

b Trophic level is for *Clarias anguilaris* for Donkor et al., 2006 [8].

c All other trophic levels from FishBase [40].

Table S5. Total mercury (Hg) levels in fish and shellfish in Ghana and the Gulf of Guinea. Hg concentrations are presented in wet weight (dry weight values were converted to w.w. assuming 80% moisture [32]).

| Study location/<br>Sample collection                                             | Year<br>collected | Dry/Wet<br>Season | Species                  | Common<br>name(s)                              | Fresh or<br>Marine | Trophic<br>Level <sup>c</sup> | Sample<br>size (n) | Mean Hg<br>(µg/g) | SD Hg<br>(µg/g) | Min. Hg<br>(µg/g) | Max. Hg<br>(µg/g) | Reference | Notes                                                                                                                                           |
|----------------------------------------------------------------------------------|-------------------|-------------------|--------------------------|------------------------------------------------|--------------------|-------------------------------|--------------------|-------------------|-----------------|-------------------|-------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| River Pra Basin,<br>Western, Central, and<br>Ashanti Regions                     | 2003              | d                 | Clarias sp.              | Catfish,<br>Mudfish                            | F                  | 3.4 <sup>b</sup>              | 2                  | 0.208             | --              | --                | --                | [8]       | Dry fish samples were purchased<br>from local fisherman during<br>January 2003 (dry season).                                                    |
| Dunkwa-on-Offin,<br>Upper Denkyira East<br>Municipal District,<br>Central Region | 2006              | d/w               | Papyrocranus afer        | Reticulate<br>knifefish                        | F                  | 3.6                           | 1                  | 0.05329           | -               | -                 | -                 | [20]      | Samples collected from fishermen<br>at town along River Offin in Feb.<br>and Jul. 2006                                                          |
| Upper Volta Basin at<br>Yeji, Brong-Ahafo<br>Region                              | 2006 - 2007       | d                 | Bagrus docmak            | Sudan catfish;<br>silver catfish;<br>Semutundu | F                  | 4.1                           | 19                 | 0.06703           | -               | 0.04080           | 0.09030           | [31]      | Samples were collected from<br>commercial catches at Yeji from<br>Oct. 2006 to Mar. 2007.                                                       |
| River Pra Basin,<br>Western, Central, and<br>Ashanti Regions                     | 2003              | d                 | Hepsetus odoe            | Kafue pike,<br>African pike,<br>Pike characid  | F                  | 4.5                           | 2                  | 0.895             | --              | --                | --                | [8]       | Dry fish samples were purchased<br>from local fisherman during<br>January 2003 (dry season).                                                    |
| Dunkwa-on-Offin,<br>Upper Denkyira East<br>Municipal District,<br>Central Region | 2006              | d/w               | Hepsetus odoe            | Kafue pike,<br>African pike,<br>Pike characid  | F                  | 4.5                           | 2                  | 0.58704           | 0.29352         | 0.37950           | 0.97459           | [20]      | Samples collected from fishermen<br>at town along River Offin in Feb.<br>and Jul. 2006                                                          |
| Dunkwa-on-Offin,<br>Upper Denkyira East<br>Municipal District,<br>Central Region | 2006              | d/w               | Mormyrus sp.             | Elephantfish                                   | F                  | -                             | 1                  | 0.04681           | -               | -                 | -                 | [20]      | Samples collected from fishermen<br>at town along River Offin in Feb.<br>and Jul. 2006                                                          |
| Kejetia ASG mine,<br>Talensi District, Upper<br>East Region                      | 2010              | w                 | unknown                  | unknown                                        | F                  | -                             | 12                 | 0.0141            | 0.0115          | 0.0049            | 0.0444            | [10]      | Samples collected from streams<br>and reservoirs surrounding ASGM<br>communities. Dry weight was<br>converted using 80% moisture<br>assumption. |
| Gulf of Guinea                                                                   | 2004              | d                 | Auxis thazard thazard    | Frigate tuna                                   | M                  | 4.3                           | 21                 | 0.108             | -               | 0.044             | 0.201             | [34]      | Samples collected from commercial<br>catches at the Tema Fishing<br>Harbour in Apr. 2004.                                                       |
| Jamestown, Accra,<br>Greater Accra Region                                        | 2003 - 2004       | d                 | Auxis thazard thazard    | Frigate tuna                                   | M                  | 4.3                           | 1                  | 0.117             | -               | -                 | -                 | [35]      | Samples collected from commercial<br>catches at the James Town fishing<br>port in Accra between Nov. 2003<br>and Feb. 2004.                     |
| Gulf of Guinea                                                                   | 2004              | w                 | Auxis thazard thazard    | Frigate tuna                                   | M                  | 4.3                           | 9                  | 0.112             | 0.044           | 0.053             | 0.197             | [36]      | Samples collected from commercial<br>catches from the Tema Fishing<br>Harbour in May 2004.                                                      |
| Jamestown, Accra,<br>Greater Accra Region                                        | 2003 - 2004       | d                 | Brachydeuterus auritus   | Bigeye grunt                                   | M                  | 3                             | 5                  | 0.037             | 0.017           | -                 | -                 | [37]      | Samples collected from commercial<br>catches at James Town, Accra<br>between Nov. 2003 and Jan. 2004.                                           |
| Jamestown, Accra,<br>Greater Accra Region                                        | 2003 - 2004       | d                 | Caranx crysos            | Blue runner                                    | M                  | 4.4                           | 3                  | 0.035             | -               | 0.026             | 0.041             | [35]      | Samples collected from commercial<br>catches at the James Town fishing<br>port in Accra between Nov. 2003<br>and Feb. 2004.                     |
| Jamestown, Accra,<br>Greater Accra Region                                        | 2003 - 2004       | d                 | Caranx hippos            | Creville jack                                  | M                  | 3.5                           | 3                  | 0.063             | -               | 0.050             | 0.072             | [35]      | Samples collected from commercial<br>catches at the James Town fishing<br>port in Accra between Nov. 2003<br>and Feb. 2004.                     |
| Jamestown, Accra,<br>Greater Accra Region                                        | 2003 - 2004       | d                 | Chloroscombrus chrysurus | Atlantic bumper                                | M                  | 3.2                           | 3                  | 0.112             | -               | 0.094             | 0.129             | [35]      | Samples collected from commercial<br>catches at the James Town fishing<br>port in Accra between Nov. 2003<br>and Feb. 2004.                     |

ND = Not detectable.

a Trophic level from Oppong et al. 2010 [9].

b Trophic level is for *Clarias anguilaris* for Donkor et al., 2006 [8].

c All other trophic levels from FishBase [40].

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| Study location/<br>Sample collection      | Year<br>collected | Dry/Wet<br>Season | Species                                                          | Common<br>name(s)                                    | Fresh or<br>Marine | Trophic<br>Level <sup>c</sup> | Sample<br>size (n) | Mean Hg<br>(µg/g) | SD Hg<br>(µg/g) | Min. Hg<br>(µg/g) | Max. Hg<br>(µg/g) | Reference | Notes                                                                                                              |
|-------------------------------------------|-------------------|-------------------|------------------------------------------------------------------|------------------------------------------------------|--------------------|-------------------------------|--------------------|-------------------|-----------------|-------------------|-------------------|-----------|--------------------------------------------------------------------------------------------------------------------|
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Cynoglossus cadenati</i>                                      | Ghanaian<br>tonguesole                               | M                  | 3.4                           | 3                  | 0.033             | -               | 0.027             | 0.042             | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Decapterus punctatus</i>                                      | Round scad                                           | M                  | 4.3                           | 2                  | 0.009             | -               | 0.008             | 0.010             | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Decapterus rhonchus</i><br>(synonym: <i>Caranx rhonchus</i> ) | False scad                                           | M                  | 3.6                           | 5                  | 0.430             | 0.020           | -                 | -                 | [37]      | Samples collected from commercial catches at James Town, Accra between Nov. 2003 and Jan. 2004.                    |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Dentex canariensis</i>                                        | Canary porgy,<br>Canary dentex                       | M                  | 3.6                           | 2                  | 0.099             | -               | 0.075             | 0.122             | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Diplodus puntazzo</i>                                         | Sharp snout<br>seabream                              | M                  | 2.9                           | 4                  | 0.070             | 0.013           | -                 | -                 | [37]      | Samples collected from commercial catches at James Town, Accra between Nov. 2003 and Jan. 2004.                    |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Galeoides decadactylus</i>                                    | Guinean<br>threadfin,<br>Lesser African<br>threadfin | M                  | 3.6                           | 5                  | 0.041             | 0.020           | -                 | -                 | [37]      | Samples collected from commercial catches at James Town, Accra between Nov. 2003 and Jan. 2004.                    |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Galeoides decadactylus</i>                                    | Guinean<br>threadfin,<br>Lesser African<br>threadfin | M                  | 3.6                           | 4                  | 0.041             | -               | 0.024             | 0.065             | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |
| Jamestown, Accra,<br>Greater Accra Region | 2004 - 2004       | d                 | <i>Gerres nigri</i>                                              | Guinean<br>striped mojarra                           | M                  | 3.2                           | 5                  | 0.056             | 0.024           | -                 | -                 | [37]      | Samples collected from commercial catches at James Town, Accra between Nov. 2003 and Jan. 2004.                    |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Hemiramphus brasiliensis</i>                                  | Ballyhoo,<br>Ballyhoo<br>halfbeak                    | M                  | 2.5                           | 3                  | 0.022             | -               | 0.016             | 0.031             | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Lagocephalus lagocephalus</i>                                 | Oceanic puffer                                       | M                  | 3.7                           | 4                  | 0.066             | 0.023           | -                 | -                 | [37]      | Samples collected from commercial catches at James Town, Accra between Nov. 2003 and Jan. 2004.                    |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Parapristipoma humile</i>                                     | Guinean grunt                                        | M                  | 3.6                           | 3                  | 0.122             | 0.021           | -                 | -                 | [37]      | Samples collected from commercial catches at James Town, Accra between Nov. 2003 and Jan. 2004.                    |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Pomatomus saltatrix</i>                                       | Bluefish                                             | M                  | 4.5                           | 1                  | 0.126             | -               | -                 | -                 | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Pseudotolithus senegalensis</i>                               | Captainfish,<br>Cassava<br>croaker                   | M                  | 3.8                           | 3                  | 0.031             | 0.025           | -                 | -                 | [37]      | Samples collected from commercial catches at James Town, Accra between Nov. 2003 and Jan. 2004.                    |

ND = Not detectable.

a Trophic level from Oppong et al. 2010 [9].

b Trophic level is for *Clarias angularis* from Donkor et al., 2006 [8].

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| Study location/<br>Sample collection      | Year<br>collected | Dry/Wet<br>Season | Species                          | Common<br>name(s)                                 | Fresh or<br>Marine | Trophic<br>Level <sup>c</sup> | Sample<br>size (n) | Mean Hg<br>(µg/g) | SD Hg<br>(µg/g) | Min. Hg<br>(µg/g) | Max. Hg<br>(µg/g) | Reference | Notes                                                                                                              |
|-------------------------------------------|-------------------|-------------------|----------------------------------|---------------------------------------------------|--------------------|-------------------------------|--------------------|-------------------|-----------------|-------------------|-------------------|-----------|--------------------------------------------------------------------------------------------------------------------|
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Pseudolithus senegalensis</i> | Captainfish,<br>Cassava<br>croaker                | M                  | 3.8                           | 3                  | 0.031             | -               | 0.010             | 0.059             | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Pseudolithus typus</i>        | Flathead<br>captainfish,<br>Longneck<br>croaker   | M                  | 3.7                           | 3                  | 0.160             | -               | 0.116             | 0.191             | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Pseudupeneus prayensis</i>    | West African<br>goatfish                          | M                  | 3.2                           | 3                  | 0.081             | -               | 0.054             | 0.097             | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Sardinella aurita</i>         | Spanish<br>sardine, Round<br>sardinella           | M                  | 3.4                           | 3                  | 0.009             | -               | 0.007             | 0.012             | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Scomber japonicus</i>         | Chub mackerel,<br>Pacific chub<br>mackerel        | M                  | 3.1                           | 2                  | 0.041             | -               | 0.037             | 0.045             | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Selene dorsalis</i>           | Guinean<br>moonfish,<br>African<br>moonfish       | M                  | 4.1                           | 5                  | 0.034             | -               | 0.014             | 0.061             | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Selene dorsalis</i>           | Guinean<br>moonfish,<br>African<br>moonfish       | M                  | 4.1                           | 5                  | 0.034             | 0.023           | -                 | -                 | [37]      | Samples collected from commercial catches at James Town, Accra between Nov. 2003 and Jan. 2004.                    |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Sphyræna guachancho</i>       | Guachanche<br>barracuda                           | M                  | 3.9                           | 3                  | 0.013             | -               | 0.009             | 0.015             | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Stromateus fiatola</i>        | Blue butterflyfish                                | M                  | 4                             | 4                  | 0.004             | 0.003           | -                 | -                 | [37]      | Samples collected from commercial catches at James Town, Accra between Nov. 2003 and Jan. 2004.                    |
| Gulf of Guinea                            | 2004              | w                 | <i>Thunnus albacares</i>         | Yellowfin tuna                                    | M                  | 4.3                           | 11                 | 0.061             | 0.021           | 0.036             | 0.090             | [36]      | Samples collected from commercial catches from the Tema Fishing Harbour in May 2004.                               |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Trachinotus goreensis</i>     | Longfin<br>pompano                                | M                  | 3.7                           | 3                  | 0.027             | -               | 0.012             | 0.049             | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Trachurus trecae</i>          | Smallscale<br>scad, Cunene<br>horse mackerel      | M                  | 3.5                           | 2                  | 0.092             | -               | 0.087             | 0.097             | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |
| Jamestown, Accra,<br>Greater Accra Region | 2003 - 2004       | d                 | <i>Trichiurus lepturus</i>       | Atlantic<br>cutlassfish,<br>Largehead<br>hairtail | M                  | 4.5                           | 3                  | 0.013             | -               | 0.009             | 0.017             | [35]      | Samples collected from commercial catches at the James Town fishing port in Accra between Nov. 2003 and Feb. 2004. |

ND = Not detectable.

a Trophic level from Oppong et al. 2010 [9].

b Trophic level is for *Clarias angularis* from Donkor et al., 2006 [8].

c All other trophic levels from FishBase [40].

Table S5. Total mercury (Hg) levels in fish and shellfish in Ghana and the Gulf of Guinea. Hg concentrations are presented in wet weight (dry weight values were converted to w.w. assuming 80% moisture [32]).

| Study location/<br>Sample collection                | Year<br>collected | Dry/Wet<br>Season | Species                                       | Common<br>name(s)          | Fresh or<br>Marine | Trophic<br>Level <sup>c</sup> | Sample<br>size (n) | Mean Hg<br>(µg/g) | SD Hg<br>(µg/g) | Min. Hg<br>(µg/g) | Max. Hg<br>(µg/g) | Reference | Notes                                                                                                                           |
|-----------------------------------------------------|-------------------|-------------------|-----------------------------------------------|----------------------------|--------------------|-------------------------------|--------------------|-------------------|-----------------|-------------------|-------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------|
| Shellfish                                           |                   |                   |                                               |                            |                    |                               |                    |                   |                 |                   |                   |           |                                                                                                                                 |
| Ada and Aveglo, Volta<br>Estuary, Volta Region      | 2008-2009         | d/w               | Galatea paradoxa                              | Clam                       | F                  | -                             | -                  | -                 | -               | 0.006             | 0.015             | [23]      | Samples were collected from<br>fisherman at two sample sites<br>during monthly intervals between<br>March 2008 and August 2009. |
| Sakumo Lagoon,<br>Greater Accra Region              | 1997              | d                 | Anadara senilis (synonym:<br>Senilia senilis) | Clam                       | M                  | -                             | 30                 | 0.032<br>(median) | -               | 0.02              | 0.09              | [38]      | Samples collected in Feb. 1997.                                                                                                 |
| Sakumo Lagoon,<br>Greater Accra Region              | 1996              | w                 | Anadara senilis (synonym:<br>Senilia senilis) | Clam                       | M                  | -                             | 38                 | 0.022<br>(median) | -               | 0.01              | 0.08              | [38]      | Samples collected in Oct. 1996.                                                                                                 |
| Benya and Ningo<br>Lagoons, Greater<br>Accra Region | 1997              | d                 | Anadara senilis (synonym:<br>Senilia senilis) | Clam                       | M                  | -                             | 81                 | 0.066<br>(median) | -               | 0.03              | 0.18              | [38]      | Samples collected in Feb. 1997.                                                                                                 |
| Benya and Ningo<br>Lagoons, Greater<br>Accra Region | 1996              | w                 | Anadara senilis (synonym:<br>Senilia senilis) | Clam                       | M                  | -                             | 45                 | 0.038<br>(median) | -               | 0.02              | 0.07              | [38]      | Samples collected in Oct. 1996.                                                                                                 |
| Jamestown, Accra,<br>Greater Accra Region           | 2003 - 2004       | d                 | Calappa rubroguttata                          | Crab                       | M                  | -                             | 5                  | 0.057             | 0.022           | -                 | -                 | [37]      | Samples collected from commercial<br>catches at James Town, Accra<br>between Nov. 2003 and Jan. 2004.                           |
| Jamestown, Accra,<br>Greater Accra Region           | 2003 - 2004       | d                 | Panulirus argus                               | Caribbean<br>spiny lobster | M                  | -                             | 5                  | 0.035             | 0.015           | -                 | -                 | [37]      | Samples collected from commercial<br>catches at James Town, Accra<br>between Nov. 2003 and Jan. 2004.                           |
| Benya Lagoon,<br>Greater Accra Region               | 1996              | w                 | Perna perna                                   | Brown mussel               | M                  | -                             | 30                 | 0.40<br>(median)  | --              | 0.02              | 0.06              | [39]      | Data from samples collected in the<br>wet and dry seasons at Benya<br>Lagoon (open).                                            |
| Benya Lagoon,<br>Greater Accra Region               | 1997              | d                 | Perna perna                                   | Brown mussel               | M                  | -                             | 30                 | 0.74<br>(median)  | --              | 0.04              | 0.13              | [39]      | Data from samples collected in the<br>wet and dry seasons at Benya<br>Lagoon (open).                                            |
| Sakumo Lagoon,<br>Greater Accra Region              | 1996              | w                 | Perna perna                                   | Brown mussel               | M                  | -                             | 18                 | 0.052<br>(median) | --              | 0.03              | 0.15              | [39]      | Data from samples collected in the<br>wet and dry seasons at Sakuma<br>Lagoon (closed).                                         |
| Sakumo Lagoon,<br>Greater Accra Region              | 1997              | d                 | Perna perna                                   | Brown mussel               | M                  | -                             | 19                 | 0.066<br>(median) | --              | 0.04              | 0.11              | [39]      | Data from samples collected in the<br>wet and dry seasons at Sakuma<br>Lagoon (closed).                                         |
| Benya Lagoon,<br>Greater Accra Region               | 1996              | w                 | Crassostrea tulipa                            | Mangrove<br>oyster         | M                  | -                             | 24                 | 0.028<br>(median) | --              | 0.02              | 0.06              | [39]      | Data from samples collected in the<br>wet and dry seasons at Benya<br>Lagoon (open).                                            |
| Benya Lagoon,<br>Greater Accra Region               | 1997              | d                 | Crassostrea tulipa                            | Mangrove<br>oyster         | M                  | -                             | 59                 | 0.042<br>(median) | --              | 0.02              | 0.09              | [39]      | Data from samples collected in the<br>wet and dry seasons at Benya<br>Lagoon (open).                                            |
| Ningo Lagoon, Greater<br>Accra Region               | 1996              | w                 | Crassostrea tulipa                            | Mangrove<br>oyster         | M                  | -                             | 12                 | 0.026<br>(median) | --              | 0.02              | 0.03              | [39]      | Data from samples collected in the<br>wet and dry seasons at Ningo<br>Lagoon (open).                                            |
| Ningo Lagoon, Greater<br>Accra Region               | 1997              | d                 | Crassostrea tulipa                            | Mangrove<br>oyster         | M                  | -                             | 31                 | 0.032<br>(median) | --              | 0.01              | 0.05              | [39]      | Data from samples collected in the<br>wet and dry seasons at Ningo<br>Lagoon (open).                                            |
| Sakumo Lagoon,<br>Greater Accra Region              | 1996              | w                 | Crassostrea tulipa                            | Mangrove<br>oyster         | M                  | -                             | 55                 | 0.024<br>(median) | --              | 0.01              | 0.05              | [39]      | Data from samples collected in the<br>wet and dry seasons at Sakuma<br>Lagoon (closed).                                         |
| Sakumo Lagoon,<br>Greater Accra Region              | 1997              | d                 | Crassostrea tulipa                            | Mangrove<br>oyster         | M                  | -                             | 25                 | 0.026<br>(median) | --              | 0.02              | 0.04              | [39]      | Data from samples collected in the<br>wet and dry seasons at Sakuma<br>Lagoon (closed).                                         |

ND = Not detectable.

a Trophic level from Oppong et al. 2010 [9].

b Trophic level is for *Clarias anguilaris* for Donkor et al., 2006 [8].

c All other trophic levels from FishBase [40].

Table S6. Total mercury (Hg) levels in lichen and seaweed bioindicators and tailings in Ghana and from the Gulf of Guinea.

| Study location                                                                  | Year collected | Dry/wet season | Media / species name                   | Sample size (n) | Mean Hg (µg/g) | SD Hg (µg/g) | Min. Hg (µg/g) | Max. Hg (µg/g) | Reference | Notes                                                                                                                                                  |
|---------------------------------------------------------------------------------|----------------|----------------|----------------------------------------|-----------------|----------------|--------------|----------------|----------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| LICHENS & SEAWEED (BIOINDICATORS)                                               |                |                |                                        |                 |                |              |                |                |           |                                                                                                                                                        |
| Tarkwa, Wassa West District, Western Region                                     | 2008-2009      | d              | Lichens: <i>Parmelia sulcat</i>        | 50              | -              | -            | 0.16           | 1.24           | [41]      | In situ lichens were sampled once per month from Sep. to Jan. from 10 sampling points from the barks of trees, 1.5-2 m above the ground.               |
| Obuasi, Ashanti Region                                                          | 2002-2003      | w              | Lichens: <i>Parmelia</i>               | -               | 3.5            | -            | 1.2            | 5.2            | [42]      | In situ lichens were collected from June 2002 to Aug. 2003 from tree barks, at least 1.0 m above the ground.                                           |
| Prestea, Western Region                                                         | 2002-2003      | w              | Lichens: <i>Parmelia</i>               | -               | 6.2            | -            | 1              | 14.5           | [42]      | In situ lichens were collected from June 2002 to Aug. 2003 from tree barks, at least 1.0 m above the ground.                                           |
| Reference sites: Non-mining locations                                           |                |                |                                        |                 |                |              |                |                |           |                                                                                                                                                        |
| Afianya & Doryum, Greater Accra Region                                          | 2002-2003      | w              | Lichens: <i>Parmelia</i>               | -               | 0.01           | -            | -              | -              | [42]      | In situ lichens were collected from June 2002 to Aug. 2003 from tree barks, at least 1.0 m above the ground. Afianya & Doryum are industrial areas.    |
| Samreboi, Greater Accra Region                                                  | 2002-2003      | w              | Lichens: <i>Parmelia</i>               | -               | 0.78           | -            | 0.5            | 1.4            | [42]      | In situ lichens were collected from June 2002 to Aug. 2003 from tree barks, at least 1.0 m above the ground. Samreboi and Akim Tafo are farming areas. |
| Akim Tafo, Greater Accra Region                                                 | 2002-2003      | w              | Lichens: <i>Parmelia</i>               | -               | 2.2            | -            | 0.55           | 4.5            | [42]      | In situ lichens were collected from June 2002 to Aug. 2003 from tree barks, at least 1.0 m above the ground. Samreboi and Akim Tafo are farming areas. |
| University of Cape Coast, Central Region                                        | 2008-2009      | d              | Lichens: <i>Parmelia sulcata</i>       | 5               | ND             | -            | -              | -              | [41]      | In situ lichens were sampled once per month from Sep. to Jan. from 1 sampling point from the barks of trees, 1.5-2 m above the ground.                 |
| Prampram, Nungua, Winneba, Cape Coast, Sekondi and Axim beaches, Gulf of Guinea | 1996-1998      | d/w            | Seaweed: <i>Enteromorpha flexuosa</i>  | 8*              | ND             | -            | -              | -              | [43]      | Samples collected bimonthly from rocky shores on beaches, at 2 sites 8 times.                                                                          |
|                                                                                 |                | d/w            | Seaweed: <i>Ulva fasciata</i>          | 8*              | 0.13           | 0.02         | -              | -              |           | Samples collected bimonthly from rocky shores on beaches, at 3 sites 5 times and 6 sites 3 times.                                                      |
|                                                                                 |                | d/w            | Seaweed: <i>Chaetomorpha antennina</i> | 6               | ND             | -            | -              | -              |           | Samples collected bimonthly from rocky shores on beaches, at 1 site 6 times.                                                                           |
|                                                                                 |                | d/w            | Seaweed: <i>Chaetomorpha linum</i>     | 8*              | 0.31           | 0.09         | -              | -              |           | Samples collected bimonthly from rocky shores on beaches, at 1 site 4 times, and at 4 sites 4 times.                                                   |
|                                                                                 |                | d/w            | Seaweed: <i>Caulerpa taxifolia</i>     | 7               | 0.65           | 0.01         | -              | -              |           | Samples collected bimonthly from rocky shores on beaches, at 1 site 7 times.                                                                           |
|                                                                                 |                | d/w            | Seaweed: <i>Bachelotia antillarum</i>  | 6*              | 0.052          | 0.003        | -              | -              |           | Samples collected bimonthly from rocky shores on beaches, at 1 site 2 times and at 2 sites 4 times.                                                    |
|                                                                                 |                | d/w            | Seaweed: <i>Padina durvilliae</i>      | 3*              | 0.054          | 0.007        | -              | -              |           | Samples collected bimonthly from rocky shores on beaches, at 2 sites 1 time, and at 4 sites 2 times.                                                   |
|                                                                                 |                | d/w            | Seaweed: <i>Sargassum vulgare</i>      | 13*             | 0.02           | 0.002        | -              | -              |           | Samples collected bimonthly from rocky shores on beaches, at 3 sites 7 times, and at 4 sites 6 times.                                                  |

ND = Not detectable or below the detection limit.



Table S6. Total mercury (Hg) levels in lichen and seaweed bioindicators and tailings in Ghana and from the Gulf of Guinea.

| Study location                                                                                                             | Year collected | Dry/wet season | Media / species name            | Sample size (n) | Mean Hg (µg/g) | SD Hg (µg/g) | Min. Hg (µg/g) | Max. Hg (µg/g) | Reference | Notes                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------|----------------|----------------|---------------------------------|-----------------|----------------|--------------|----------------|----------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prampram, Nungua, Winneba, Cape Coast, Sekondi, and Axim beaches, Gulf of Guinea                                           | 1996-1998      | d/w            | Seaweed: Polycavernousa dentata | 13*             | 0.100          | 0.008        | -              | -              | [44]      | Samples collected bimonthly from rocky shores on beaches, at 3 sites 7 times and 6 sites 6 times.                                                                                                                      |
|                                                                                                                            |                | d/w            | Seaweed: Gigartina acicularis   | 6               | 0.058          | 0.006        | -              | -              |           | Samples collected bimonthly from rocky shores on beaches, at 1 site 6 times.                                                                                                                                           |
|                                                                                                                            |                | d/w            | Seaweed: Centroceras clavulatum | 5               | 0.220          | 0.009        | -              | -              |           | Samples collected bimonthly from rocky shores on beaches, at 1 site 5 times.                                                                                                                                           |
|                                                                                                                            |                | d/w            | Seaweed: Bryoclidia thysigera   | 8*              | ND             | -            | -              | -              |           | Samples collected bimonthly from rocky shores on beaches, at 1 site 3 times and 2 sites 5 times.                                                                                                                       |
|                                                                                                                            |                | d/w            | Seaweed: Jania rubens           | 4               | ND             | -            | -              | -              |           | Samples collected bimonthly from rocky shores on beaches, at 1 site 4 times.                                                                                                                                           |
|                                                                                                                            |                | d/w            | Seaweed: Hypnea musciformis     | 4*              | 0.11           | 0.007        | -              | -              |           | Samples collected bimonthly from rocky shores on beaches, at 2 sites 4 times.                                                                                                                                          |
| *sample sizes may be greater than listed                                                                                   |                |                |                                 |                 |                |              |                |                |           |                                                                                                                                                                                                                        |
| TAILINGS                                                                                                                   |                |                |                                 |                 |                |              |                |                |           |                                                                                                                                                                                                                        |
| River Ankroba Basin, Wassa West District, Western Region                                                                   | 666            | -              | Tailings                        | 6               | 0.795          | 1.155        | 0.033          | 2.500          | [17]      | Old mine tailing dumps. Samples were collected in the mining towns of Nsuta, Tarkwa, Damang, Abosso, Bogoso, and Prestea, in a tropical rainforest corridor. Large, small-scale and illegal mining occurs in the area. |
| River Pra Basin; Western, Central, and Ashanti Regions                                                                     | 2002           | w              | Sediment tailings               | 3               | 0.079          | 0.050        | 0.032          | 0.132          | [8]       | Tailings in sediments. Samples taken from the Rivers Offin, Upper Pra and Lower Pra, once in the wet & dry seasons each.                                                                                               |
|                                                                                                                            | 2002           | d              | Sediment tailings               | 3               | 0.054          | 0.057        | 0.008          | 0.118          |           |                                                                                                                                                                                                                        |
| Dumasi Area (sediment from a galamsay tailing pond that discharges into Apopre river), Wassa West District, Western Region | 2001           | -              | Sediment tailings               | 2               | 19.296         | -            | -              | -              | [1]       | Data has been extracted from a book chapter(12) that was contributed to by the authors of the article                                                                                                                  |
| River Pra Basin; Western, Central, and Ashanti Regions                                                                     | 2002           | w              | Soil tailings                   | 3               | 1.642          | 2.800        | 0.015          | 4.876          | [8]       | Tailings in soil. Samples taken from the Rivers Offin, Upper Pra and Lower Pra, once in the wet & dry seasons each.                                                                                                    |
|                                                                                                                            | 2003           | d              | Soil tailings                   | 2               | 0.019          | 0.013        | 0.010          | 0.028          |           |                                                                                                                                                                                                                        |
| Bibiani District, Western Region                                                                                           | 2007           | w              | Tailings                        | 4               | 0.011          | 0.006        | 0.007          | 0.020          | [6]       | Tailings from tailings dams of the Central African Goldmine. Samples collected in Sep. Samples collected from 0 to 15-20 cm depth. Two sites recorded levels below the detection limit (0.01 µg/g)                     |
| Bibiani District, Western Region                                                                                           | 2008 - 2009    | d              | Tailings                        | 4               | 0.373          | 0.301        | 0.102          | 0.786          | [21]      | Duplicate samples collected from surface, 20, 40, and 60cm depths at Bibiani north galamsey tailings dump (old) during the dry season (Oct - Mar).                                                                     |

ND = Not detectable or below the detection limit.

Table S6. Total mercury (Hg) levels in lichen and seaweed bioindicators and tailings in Ghana and from the Gulf of Guinea.

| Study location                                        | Year collected | Dry/wet season | Media / species name | Sample size (n) | Mean Hg (µg/g) | SD Hg (µg/g) | Min. Hg (µg/g) | Max. Hg (µg/g) | Reference | Notes                                                                                                                                                                                                                         |
|-------------------------------------------------------|----------------|----------------|----------------------|-----------------|----------------|--------------|----------------|----------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bibiani, Anwiaso, Bekwai District, Western Region     | 2008 -2009     | d              | Tailings             | 4               | 2.643          | 2.213        | 0.472          | 4.998          | [21]      | Duplicate samples collected from surface, 20, 40, and 60cm depths at galamsey tailings dump (current) during the dry season (Oct - Mar).                                                                                      |
| Bibiani, Anwiaso, Bekwai District; Western Region     | 2008 - 2009    | d              | Tailings             | -               | 1.739          | -            | -              | -              | [18]      | Samples collected from waterway in the dry season from Oct 2008 to Mar 2009 a galamsey tailing site. Surface sediments (0 to ~10 cm) were taken where water samples were also collected (~60 samples total for entire study). |
| Bibiani, Anwiaso, Bekwai District, Western Region     | 2008 - 2009    | d              | Tailings             | 4               | 0.898          | 0.133        | 0.721          | 1.024          | [21]      | Duplicate samples collected from surface, 20, 40, and 60cm depths at abandoned galamsey tailings dump during the dry season (Oct - Mar).                                                                                      |
| Kejetia ASG mine, Talensi District, Upper East Region | 2011           | w              | Tailings             | 1               | 0.4203         | -            | -              | -              | [10]      | Tailing collected from a sluicing pond in June 2011.                                                                                                                                                                          |

ND = Not detectable or below the detection limit.

Table S7. Total arsenic (As) levels in soils near Ghanaian small-scale mining sites and reference non-mining sites.

| Study Location                                                                                                            | Year collected | Dry/wet season | Sample size (n) | Mean As (ng/g) | SD As (ng/g) | Min. As (ng/g) | Max. As (ng/g) | Reference | Notes                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------|----------------|----------------|-----------------|----------------|--------------|----------------|----------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Obuasi, Ashanti Region                                                                                                    | 1992-1993      | w/d            | 168             | 12900          | 17500        | 2100           | 48900          | [7]       | Samples collected once a month (Mar 1992 - Feb 1993) from from 14 sites located 0.31 - 17.5 km from Pompura (water) Treatment Plant. Both large and small-scale mining occurs nearby. Three samples per site.                                                                 |
| Wassa West, Western Region                                                                                                | -              | -              | 5               | 13360          | 970.6        | 12280          | 14840          | [4]       | Samples collected from farms at 5 gold mining towns (Iduapreim, Odumasi, Hemang, Huni Valley, Damang).                                                                                                                                                                        |
| Abosso Goldfield Ltd.-Daamang, Western Region                                                                             | -              | d              | 36              | 1800           | -            | -              | -              | [45]      | Samples collected at 10cm depth from a variety of soil sites at each mine (Goldfields Ghana Limited - Tarkwa, Abosso Goldfields Limited - Daamang, Anglogold Ashanti - Iduapriem, Bogosu Gold Limited), including topsoil, waste dumps, tailings, and undisturbed vegetation. |
| Bogosu Gold Ltd., Western Region                                                                                          |                |                | 20              | 227000         | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |
| Anglogold Ashanti-Iduapriem Mine, Western Region                                                                          |                |                | 24              | 1100           | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |
| Goldfields Ghana Ltd.-Tarkwa, Western Region                                                                              |                |                | 42              | 1900           | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |
| Reference sites: Non-mining locations                                                                                     |                |                |                 |                |              |                |                |           |                                                                                                                                                                                                                                                                               |
| Abonse, Eastern Region                                                                                                    | 2002           | w              | 40              | 2050           | 390          | 1620           | 2540           | [46]      | Sampling done at 3-month intervals (Mar to Dec), at a depth of 10-20 cm                                                                                                                                                                                                       |
| Mamfe, Eastern Region                                                                                                     |                |                | 40              | 1080           | 220          | 850            | 1360           |           |                                                                                                                                                                                                                                                                               |
| Pepease, Eastern Region                                                                                                   |                |                | 40              | 3860           | 1330         | 2130           | 5190           |           |                                                                                                                                                                                                                                                                               |
| Otsew, Gomoa West District, Central Region                                                                                | 2010           | d              | 1               | 6730           | 100          | -              | -              | [11]      | Sample of earthenware clay soil was purchased from a market in November 2010.                                                                                                                                                                                                 |
| Otsew, Gomoa West District, Central Region                                                                                | 2010           | d              | 10              | 9480           | -            | ND             | 18470          | [11]      | Samples from 10 sites for earthenware clay soil deposits from 30cm depth in November 2010.                                                                                                                                                                                    |
| Wassa West, Western Region                                                                                                | -              | -              | 3               | 7403           | 487.6        | 6850           | 7770           | [4]       | Samples collected from farms at 3 non-mining towns (Ayanfuri, Wassa Asikuma, and Krofofrom).                                                                                                                                                                                  |
| Duabone and Nwowam, Brong-Ahafo Region                                                                                    | -              | -              | 6               | 100            | -            | -              | -              | [45]      | 3 to 15 random samples of paddy soil samples were collected in inland valley or irrigated paddy fields at a 10cm depth.                                                                                                                                                       |
| Ejura, Kobriti, Biemso (at 2 sites), Odumase, and Nobewam, Ashanti Region                                                 |                | -              | 27              | 10500          | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |
| Assin Dansame and Assin Akropong, Central Region                                                                          |                | -              | 9               | 700            | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |
| Abenase, Oda Nkwanta, and Kpong, Eastern Region                                                                           |                | -              | 36              | 700            | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |
| Sefwi Asafo, Sefwi Anyinabrim, Mempeasem, Aduku Tanoso, Yirase, Simpa Krutu/Anikorkor, and Kobina Anokrom, Western Region |                | -              | 42              | 1300           | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |

ND = Not detectable or below the detection limit.

Table S8. Total arsenic (As) levels in edible plants near Ghanaian small-scale mining sites.

| Study Location                          | Year collected | Dry/wet season | Species (common name)                 | Sample size (n) | Mean As (µg/g) | SD As (µg/g) | Min. As (µg/g) | Max. As (µg/g) | Reference | Notes                                                                                                                                                              |
|-----------------------------------------|----------------|----------------|---------------------------------------|-----------------|----------------|--------------|----------------|----------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wassa West District, Western Region     | -              | -              | Manihot esculentus (cassava)          | 8               | 6.87           | 2.89         | 2.98           | 9.84           | [4]       | Samples collected from farms at 5 gold mining towns (Iduapreim, Odumasi, Hemang, Huni Valley, Damang) and 3 non-mining towns (Ayanfuri, Wassa Asikuma, Krofofrom). |
| Wassa West District, Western Region     | -              | -              | Xanthosoma sagittifolium (cocoyam)    | 8               | 6.065          | 2.478        | 2.74           | 8.51           | [4]       | Samples collected from farms at 5 gold mining towns (Iduapreim, Odumasi, Hemang, Huni Valley, Damang) and 3 non-mining towns (Ayanfuri, Wassa Asikuma, Krofofrom). |
| Wassa West District, Western Region     | -              | -              | Colocasia esculenta (water cocoyam)   | 8               | 6.411          | 2.202        | 3.69           | -              | [4]       | Samples collected from farms at 5 gold mining towns (Iduapreim, Odumasi, Hemang, Huni Valley, Damang) and 3 non-mining towns (Ayanfuri, Wassa Asikuma, Krofofrom). |
| Wassa West District, Western Region     | -              | -              | Musa paradisiacal (plantain)          | 8               | 6.014          | 2.004        | 3.12           | 8.43           | [4]       | Samples collected from farms at 5 gold mining towns (Iduapreim, Odumasi, Hemang, Huni Valley, Damang) and 3 non-mining towns (Ayanfuri, Wassa Asikuma, Krofofrom). |
| Obuasi, Ashanti Region                  | 1992-1993      | w/d            | Musa paradisiacal (plantain)          | 156             | 1.862          | -            | 0.5            | 4.3            | [7]       | Samples collected once a month from Mar to Feb from 13 villages around the Pompora Treatment Plant at Obuasi (3 samples per site).                                 |
| Obuasi, Ashanti Region                  | 1992-1993      | w/d            | Ceratopteris cornuta (fern)           | 168             | 24.05          | -            | 2.1            | 78.7           | [7]       | Samples collected once a month from Mar to Feb from 14 villages around the Pompora Treatment Plant at Obuasi (3 samples per site).                                 |
| Obuasi, Ashanti Region                  | 1992-1993      | w/d            | Pennisetum purpureum (elephant grass) | 120             | 6.72           | -            | 1.3            | 27.4           | [7]       | Samples collected once a month from Mar to Feb from 10 villages around the Pompora Treatment Plant at Obuasi (3 samples per site).                                 |
| Obuasi, Ashanti Region                  | 1992-1993      | w/d            | Manihot esculenta (cassava)           | 144             | 1.283          | -            | 0.7            | 2.6            | [7]       | Samples collected once a month from Mar to Feb from 12 villages around the Pompora Treatment Plant at Obuasi (3 samples per site).                                 |
| Efuantah, Tarkwa, Western Region        | -              | -              | Xanthosoma sagittifolium (cocoyam)    | 1               | 146            | -            | -              | -              | [12]      | Samples collected from a mining town (Efuantah)                                                                                                                    |
| Nsuta and Tamso, Tarkwa, Western Region | -              | -              | Colocasia esculenta (water cocoyam)   | 2               | 383.5          | 24.7         | 366            | 401            | [12]      | Samples collected from 2 mining towns (Nsuta, and Tamso)                                                                                                           |

Table S9. Total arsenic (As) levels in sediment near Ghanaian small-scale mining sites and reference non-mining sites.

| Study Location                                                                                                                  | Year collected | Dry/wet season | Sample size (n) | Mean As (ng/g) | SD As (ng/g) | Min. As (ng/g) | Max. As (ng/g) | Reference | Notes                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|-----------------|----------------|--------------|----------------|----------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| River Ankobra, Western Region                                                                                                   | 2001-2002      | w/d            | -               | 61800          | 92700        | 1150           | 183,000        | [16]      | Samples collected in Sep. 2001 and Feb. 2002 from five areas on the River Ankobra: Ankwaso, Prestea, Dombase (all on the main Ankobra River), Beppo (Manse tributary) and Bonsaso (Bonsa tributary), and one area at Anwiaso (10km from the source). |
| Mining area, River Pra Basin; Western, Ashanti, Central Regions                                                                 | 2002-2003      | d              | 14              | 684            | 1291         | 88             | 5076           | [47]      | 14 sampling sites along the River Pra (2 downstream--1 past ASGM--and 12 upstream), collected during the wet season of 2002 and dry season of 2003.                                                                                                  |
|                                                                                                                                 |                | w              | 14              | 322            | 215          | 79             | 714            |           |                                                                                                                                                                                                                                                      |
| Reference sites: Non-mining locations                                                                                           |                |                |                 |                |              |                |                |           |                                                                                                                                                                                                                                                      |
| Non-mining area, River Pra Basin; Western, Central, Ashanti Regions                                                             | 2002-2003      | d              | 7               | 230            | 108          | 103            | 371            | [47]      | 7 sites from non-mining areas along the River Pra (5 are from downstream and 2 upstream), collected during the wet season of 2002 and dry season of 2003.                                                                                            |
|                                                                                                                                 |                | w              | 7               | 266            | 132          | 125            | 414            |           |                                                                                                                                                                                                                                                      |
| Shama, Western Region (Pra); and Elmina (Benya), Cape Coast (Fosu), and Saltpong Beach (Narkwa), Central Region, Gulf of Guinea | -              | w              | 32              | 311.1          | 439.7        | 0              | 1432.0         | [22]      | Samples collected from Pra Estuary, Benya Lagoon, Fosu Lagoon, and Narkwa Lagoon during wet and dry season.                                                                                                                                          |
| Shama, Western Region (Pra); and Elmina (Benya), Cape Coast (Fosu), and Saltpong Beach (Narkwa), Central Region, Gulf of Guinea | -              | d              | 32              | 80.6           | 222.3        | 0              | 910.0          |           |                                                                                                                                                                                                                                                      |
| River Subin, Kumasi, Ashanti Region                                                                                             | 2005           | d/w            | 10              | -              | -            | 2340           | 7650           | [48]      | Samples were collected bi-monthly form Jan. to Sep. 2005                                                                                                                                                                                             |

Table S10. Total arsenic (As) levels in water near Ghanaian small-scale mining sites and reference non-mining sites.

| Study Location                                                     | Year collected | Dry/wet season | Water type                  | Water source                     | Sample Size (n) | Mean As (µg/L) | SD As (µg/L) | Min. As (µg/L) | Max. As (µg/L) | Reference | Notes                                                                                                                                                              |
|--------------------------------------------------------------------|----------------|----------------|-----------------------------|----------------------------------|-----------------|----------------|--------------|----------------|----------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tarkwa, Western Region                                             | 2004           | d              | Groundwater                 | Borehole                         | 12              | 1.3            | 1.1          | 0.5            | 4              | [24]      | Drinking water samples taken from around Tarkwa in March 2004.                                                                                                     |
| Tarkwa, Western Region                                             | 2004           | d              | Groundwater                 | Well                             | 6               | 0.2            | 0.4          | 0.07           | 1              | [24]      | Drinking water samples taken from around Tarkwa in March 2004.                                                                                                     |
| Tereribe, Anglogold Ashanti-Iduapriem Mine, Tarkwa, Western Region | 2010           | d              | Groundwater                 | Boreholes                        | 3               | 330            | -            | < 1            | 860            | [49]      | Samples collected in March 2010 from boreholes.                                                                                                                    |
| Mile 7, Anglogold Ashanti-Iduapriem Mine, Tarkwa, Western Region   | 2010           | d              | Groundwater                 | Boreholes                        | 2               | 310            | -            | 80             | 530            | [49]      | Samples collected in March 2010 from boreholes.                                                                                                                    |
| Abekoase, Gold Fields Ghana Ltd., Tarkwa, Western Region           | 2010           | d              | Groundwater                 | Boreholes                        | 5               | 270            | -            | < 1            | 960            | [49]      | Samples collected in March 2010 from boreholes.                                                                                                                    |
| Huniso, Gold Fields Ghana Ltd., Tarkwa, Western Region             | 2010           | d              | Groundwater                 | Boreholes                        | 2               | 20             | -            | < 1            | 40             | [49]      | Samples collected in March 2010 from boreholes.                                                                                                                    |
| Dumasi, Wassa West District, Western Region                        | 2004-2005      | d/w            | Groundwater                 | Boreholes                        | 160             | 5390           | 860.0        | 4520           | 6521           | [50]      | Samples were collected from 4 boreholes (40 samples at each borehole) between Aug. 2004 and Jun. 2005. Values here are the means from each borehole.               |
| Obuasi, Ashanti Region                                             | 2008           | -              | Groundwater                 | Tap                              | 8               | 1.44           | 2.12         | 0.28           | 6.63           | [51]      | Samples were collected from around Obuasi based on the water demand of the surrounding communities (as a reference to an e-waste worker study).                    |
|                                                                    |                |                |                             | Borehole                         | 12              | 2.73           | 4.83         | 0.16           | 16.6           |           |                                                                                                                                                                    |
|                                                                    |                |                |                             | Spring                           | 1               | 1.2            | --           | --             | --             |           |                                                                                                                                                                    |
|                                                                    |                |                |                             | Well                             | 14              | 0.77           | 0.8          | <0.1           | 3.04           |           |                                                                                                                                                                    |
| Kejetia ASGM community, Talensi District, Upper East Region        | 2011           | d              | Groundwater                 | Borehole                         | 2               | 11.095         | 15.5         | 0.13           | 22.06          | [52]      | Samples collected in June and July 2011 from drinking water sources cited by ASGM community members.                                                               |
|                                                                    |                |                |                             | Bottled/sachet                   | 2               | 0.845          | 0.43         | 0.54           | 1.15           |           |                                                                                                                                                                    |
| Nangodi, Talensi-Nabdam District, Upper East Region                | 2010-2011      | d              | Groundwater & surface water | Borehole, dug-wells, and dugouts | 30              | -              | -            | 12.02          | 65.3           | [26]      | Samples collected between Nov 2010 to Apr 2011. One site from a borehole (Kalin), 2 from dug wells (Nadpadana, Nakpalig), and 2 from dugouts (Kolikpenge, Debahe). |
| Kejetia ASGM community, Talensi District, Upper East Region        | 2011           | d              | Surface water               | Mine pit water                   | 3               | 135.48         | 88.9         | 33.62          | 197.12         | [52]      | Samples collected in June and July 2011 from drinking water sources cited by ASGM community members.                                                               |
|                                                                    |                |                |                             | Rain water                       | 1               | 0.17           | -            | -              | -              |           |                                                                                                                                                                    |
|                                                                    |                |                |                             | Stream                           | 9               | 17.83          | 8.02         | 7.45           | 28.69          |           |                                                                                                                                                                    |
| Obuasi, Ashanti Region                                             | 2009           | d/w            | Surface & tap water         |                                  | 48              | 6600.4         | 6940.47      | 5              | 3460           | [29]      | Samples collected from Feb - Jun. in the Obuasi mining area, from surface water and tap water.                                                                     |
| Obuasi, Ashanti Region                                             | 2010           | w              | Surface water               | Process effluent                 | 75              | 7200           | 2700         | -              | -              | [53]      | Samples collected between Jun. and Sep. 2010 in the morning over 75 days.                                                                                          |
|                                                                    |                |                |                             | Process effluent                 | 75              | 7100           | 2600         | -              | -              |           | Samples collected between Jun. and Sep. 2010 in the afternoon over 75 days.                                                                                        |
|                                                                    |                |                |                             | Tailings dam                     | 75              | 10100          | 2100         | -              | -              |           | Samples collected between Jun. and Sep. 2010 in the morning over 75 days.                                                                                          |
|                                                                    |                |                |                             | Tailings dam                     | 75              | 9900           | 2000         | -              | -              |           | Samples collected between Jun. and Sep. 2010 in the afternoon over 75 days.                                                                                        |

ND = Not detectable or below the detection limit.

Table S10. Total arsenic (As) levels in water near Ghanaian small-scale mining sites and reference non-mining sites.

| Study Location                                                                                                                  | Year collected | Dry/wet season | Water type    | Water source                                          | Sample Size (n) | Mean As (µg/L) | SD As (µg/L) | Min. As (µg/L) | Max. As (µg/L) | Reference | Notes                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|---------------|-------------------------------------------------------|-----------------|----------------|--------------|----------------|----------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tarkwa, Western Region                                                                                                          | 2004           | d              | Surface water | Stream/river                                          | 12              | 18             | 24           | 0.5            | 73             | [24]      | Drinking water samples taken from around Tarkwa in March 2004.                                                                                                       |
| River Ankobra Basin, Western Region                                                                                             | 2002           | d              | Surface water | Rivers                                                | -               | 9.61           | 11.7         | 0.79           | 25.56          | [16]      | Samples collected in February 2002 from five areas on the Ankobra Rive Basin: Ankwaso, Prestea, Dombase, Beppo and Bonsaso, and one area at Anwiaso. Total arsenic.  |
| Obuasi, Ashanti Region                                                                                                          | -              | w              | Surface water | Stream                                                | 8               | 720            | -            | ND             | 2200           | [54]      | Samples from 8 sites at the Pompora Treatment Plant (the old pyrometallurgical pre-treatment plant).                                                                 |
|                                                                                                                                 |                | d              |               |                                                       | 8               | 1800           | -            | 10             | 4500           |           |                                                                                                                                                                      |
| Tereribe, Anglogold Ashanti-Iduapriem Mine, Tarkwa, Western Region                                                              | 2010           | d              | Surface water | Streams                                               | 2               | < 1            | -            | < 1            | < 1            | [49]      | Samples collected in March 2010 from Etheni and Drobo Streams.                                                                                                       |
| Abekoase, Gold Fields Ghana Ltd., Tarkwa, Western Region                                                                        | 2010           | d              | Surfacewater  | River                                                 | 2               | < 1            | -            | < 1            | < 1            | [49]      | Samples collected in March 2010 from River Essumang.                                                                                                                 |
| Huniso, Gold Fields Ghana Ltd., Tarkwa, Western Region                                                                          | 2010           | d              | Surfacewater  | River                                                 | 1               | 30             | -            | -              | -              | [49]      | Samples collected in March 2010 from River Huni.                                                                                                                     |
| Obuasi, Ashanti Region                                                                                                          | 2008           | -              | Surface water | Stream                                                | 1               | 17.3           | --           | --             | --             | [51]      | Samples were collected from around Obuasi based on the water demand of the surrounding communities (as a reference to an e-waste worker study).                      |
| Reference sites: Non-mining locations                                                                                           |                |                |               |                                                       |                 |                |              |                |                |           |                                                                                                                                                                      |
| Across Ghana                                                                                                                    | 2007           | w              | Groundwater   | Boreholes, wells, and some standpipes & trucked water | 195             | 1.93           | -            | < 0.003        | 169.5          | [55]      | Samples collected from boreholes and wells mainly, but also from some standpipes and trucked water during the 2007 rainy season (Jul/Aug) from Regions across Ghana. |
| Shama, Western Region (Pra); and Elmina (Benya), Cape Coast (Fosu), and Saltpong Beach (Narkwa), Central Region, Gulf of Guinea | -              | w              | Surface water | Lagoons & estuary                                     | 32              | 0.017          | 0.028        | 0.000          | 0.096          | [22]      | Samples collected from Pra Estuary, Benya Lagoon, Fosu Lagoon, and Narkwa Lagoon during wet and dry seasons.                                                         |
| Shama, Western Region (Pra); and Elmina (Benya), Cape Coast (Fosu), and Saltpong Beach (Narkwa), Central Region, Gulf of Guinea | -              | d              | Surface water | Lagoons & estuary                                     | 32              | 0.027          | 0.048        | 0.000          | 0.152          |           |                                                                                                                                                                      |
| Accra, Greater Accra Region                                                                                                     | 2004           | d              | Groundwater   | Standpipe (tap)                                       | 1               | < 0.1          | -            | -              | -              | [24]      | Sample collected in March 2004. Sample was not over the detection limit of 0.1 µg/L.                                                                                 |

ND = Not detectable or below the detection limit.

Table S10. Total arsenic (As) levels in water near Ghanaian small-scale mining sites and reference non-mining sites.

| Study Location                                                          | Year collected | Dry/wet season | Water type    | Water source                                                     | Sample Size (n) | Mean As (µg/L) | SD As (µg/L) | Min. As (µg/L) | Max. As (µg/L) | Reference | Notes                                                                                                                                                                                                      |
|-------------------------------------------------------------------------|----------------|----------------|---------------|------------------------------------------------------------------|-----------------|----------------|--------------|----------------|----------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Konongo (Konongo-Odumase), Asante Akim Central District, Ashanti Region | 1995-1996      | w/d            | Groundwater   | Boreholes, pipeborne water, spring, well, & underground old mine | 64              | -              | -            | ND             | 12200          | [56]      | Samples collected from in Konongo and surroundings towns (Odumase, Petriensa, & Obenemase), at 6 sampling sites (water from an underground old mine shaft, boreholes, pipe borne water, spring, and well). |
| Konongo (Konongo-Odumase), Asante Akim Central District, Ashanti Region | 1995-1996      | w/d            | Surface water | Rivers & tailing dams                                            | 64              | -              | -            | 30             | 6900           | [56]      | Samples collected from in Konongo and surroundings towns (Odumase, Petriensa, & Obenemase), at 10 sampling sites (water from River Owerri, ponds on River Awerekye, and tailing dams).                     |
| Accra, Greater Accra Region                                             | 2008           | -              | Groundwater   | Tap                                                              | 10              | 0.34           | 0.21         | 0.1            | 0.76           | [51]      | Samples were collected randomly from the environment (tap water) in Accra.                                                                                                                                 |

ND = Not detectable or below the detection limit.



Table S11. Total cadmium (Cd) levels in soils near Ghanaian small-scale mining sites and reference non-mining sites.

| Study location                                                                                                            | Year collected | Dry/wet season | Sample size (n) | Mean Cd (ng/g) | SD Cd (ng/g) | Min. Cd (ng/g) | Max. Cd (ng/g) | Reference | Notes                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------|----------------|----------------|-----------------|----------------|--------------|----------------|----------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wassa West, Western Region                                                                                                | -              | -              | 5               | 3958.00        | 1189.70      | 2870.00        | 5930           | [4]       | Samples collected from farms at 5 gold mining towns (Iduapreim, Odumasi, Hemang, Huni Valley, Damang).                                                                                                                                                                        |
| Obuasi, Ashanti Region                                                                                                    | -              | -              | 36              | 11.0           | 3.0          | -              | -              | [57]      | Samples collected at 20cm depth from mined, rehabilitaed soil within the Anglogold Ashanti concessions in Obuasi.                                                                                                                                                             |
|                                                                                                                           |                |                | 36              | 10.0           | 4.0          | -              | -              |           | Samples collected at 20cm depth from rehabilitated waste dump soil within the Anglogold Ashanti concessions in Obuasi.                                                                                                                                                        |
|                                                                                                                           |                |                | 36              | 20.0           | 2.0          | -              | -              |           | Samples collected at 20cm depth from unrehabilitated waste dump soil within the Anglogold Ashanti concessions in Obuasi.                                                                                                                                                      |
|                                                                                                                           |                |                | 36              | 19.0           | 3.0          | -              | -              |           | Samples collected at 20cm depth from mined, unrehabilitaed soil within the Anglogold Ashanti concessions in Obuasi.                                                                                                                                                           |
| Abosso Goldfield Ltd.-Daamang, Western Region                                                                             | -              | d              | 36              | 30.0           | -            | -              | < 100          | [45]      | Samples collected at 10cm depth from a variety of soil sites at each mine (Goldfields Ghana Limited - Tarkwa, Abosso Goldfields Limited - Daamang, Anglogold Ashanti - Iduapriem, Bogosu Gold Limited), including topsoil, waste dumps, tailings, and undisturbed vegetation. |
| Bogosu Gold Ltd., Western Region                                                                                          |                |                | 20              | 10.0           | -            | -              | < 100          |           |                                                                                                                                                                                                                                                                               |
| Anglogold Ashanti-Iduapriem Mine, Western Region                                                                          |                |                | 24              | 20.0           | -            | -              | < 100          |           |                                                                                                                                                                                                                                                                               |
| Goldfields Ghana Ltd.-Tarkwa, Western Region                                                                              |                |                | 42              | 2210           | -            | -              | 69100          |           |                                                                                                                                                                                                                                                                               |
| Reference sites: Non-mining locations                                                                                     |                |                |                 |                |              |                |                |           |                                                                                                                                                                                                                                                                               |
| Wassa West, Western Region                                                                                                | -              | -              | 3               | 1710.00        | 270.00       | 1420.00        | 1960           | [4]       | Samples collected from farms at 3 non-mining towns (Ayanfuri, Wassa Asikuma, and Krofofrom).                                                                                                                                                                                  |
| Obuasi, Ashanti Region                                                                                                    | -              | -              | 36              | 15.0           | 2.0          | -              | -              | [57]      | Samples collected at 20cm depth from unmined, native soil within the Anglogold Ashanti concessions in Obuasi.                                                                                                                                                                 |
| Duabone and Nwowam, Brong-Ahafo Region                                                                                    | -              | -              | 6               | 0              | -            | -              | -              | [45]      | 3 to 15 random samples of paddy soil samples were collected in inland valley or irrigated paddy fields at a 10cm depth.                                                                                                                                                       |
| Ejura, Kobriti, Biemso (at 2 sites), Odumase, and Nobewam, Ashanti Region                                                 |                |                | 27              | 210            | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |
| Assin Dansame and Assin Akropong, Central Region                                                                          |                |                | 9               | 20             | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |
| Abenase, Oda Nkwanta, and Kpong, Eastern Region                                                                           |                |                | 36              | 40             | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |
| Sefwi Asafo, Sefwi Anyinabrim, Mempeasem, Aduku Tanoso, Yirase, Simpa Krutu/Anikorkor, and Kobina Anokrom, Western Region |                |                | 42              | 10             | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |

Table S12. Total cadmium (Cd) levels in edible plants near Ghanaian small-scale mining sites.

| Study location                              | Year collected | Dry/wet season | Species (common name)               | Sample size (n) | Mean Cd (µg/g) | SD Cd (µg/g) | Min. Cd (µg/g) | Max. Cd (µg/g) | Reference | Notes                                                                                                                                                              |
|---------------------------------------------|----------------|----------------|-------------------------------------|-----------------|----------------|--------------|----------------|----------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wassa West District, Western Region         | -              | -              | Colocasia esculenta (water cocoyam) | 8               | 1.755          | 1.411        | 0.34           | 4.93           | [4]       | Samples collected from farms at 5 gold mining towns (Iduapreim, Odumasi, Hemang, Huni Valley, Damang) and 3 non-mining towns (Ayanfuri, Wassa Asikuma, Krofofrom). |
| Tarkwa, Wassa West District, Western Region | -              | -              | Colocasia esculenta (water cocoyam) | 2               | 182            | 131          | 89             | 274            | [12]      | Samples collected from 2 mining towns (Nsuta, and Tamso)                                                                                                           |
| Wassa West District, Western Region         | -              | -              | Manihot esculentus (cassava)        | 8               | 1.99           | 0.87         | 0.76           | 2.97           | [4]       | Samples collected from farms at 5 gold mining towns (Iduapreim, Odumasi, Hemang, Huni Valley, Damang) and 3 non-mining towns (Ayanfuri, Wassa Asikuma, Krofofrom). |
| Wassa West District, Western Region         | -              | -              | Musa paradisiacal (plantain)        | 8               | 2.204          | 1.498        | 0.12           | 4.22           | [4]       | Samples collected from farms at 5 gold mining towns (Iduapreim, Odumasi, Hemang, Huni Valley, Damang) and 3 non-mining towns (Ayanfuri, Wassa Asikuma, Krofofrom). |
| Wassa West District, Western Region         | -              | -              | Xanthosoma sagittifolium (cocoyam)  | 8               | 2.03           | 1.484        | 0.54           | 4.51           | [4]       | Samples collected from farms at 5 gold mining towns (Iduapreim, Odumasi, Hemang, Huni Valley, Damang) and 3 non-mining towns (Ayanfuri, Wassa Asikuma, Krofofrom). |
| Tarkwa, Wassa West District, Western Region | -              | -              | Xanthosoma sagittifolium (cocoyam)  | 1               | 43             | -            | -              | -              | [12]      | Samples collected from Efuantah mining town.                                                                                                                       |

Table S13. Total cadmium (Cd) levels in sediment at reference non-mining sites.

| Study location                                                                                                                  | Year collected | Dry/wet season | Sample size (n) | Mean Cd (ng/g) | SD Cd (ng/g) | Min. Cd (ng/g) | Max. Cd (ng/g) | Reference | Notes                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|-----------------|----------------|--------------|----------------|----------------|-----------|------------------------------------------------------------------------------------------------------------------------------|
| Shama, Western Region (Pra); and Elmina (Benya), Cape Coast (Fosu), and Saltpong Beach (Narkwa), Central Region, Gulf of Guinea | -              | w              | 32              | 74             | 70           | 0              | 253            | [22]      | Samples collected from Pra Estuary, Benya Lagoon, Fosu Lagoon, and Narkwa Lagoon during wet and dry season. Non-mining site. |
|                                                                                                                                 |                | d              |                 | 211            | 373          | 0              | 852            |           |                                                                                                                              |
| River Subin, Kumasi, Ashanti Region                                                                                             | 2005           | d/w            | 10              | -              | -            | 280            | 1420           | [48]      | Samples were collected bi-monthly from Jan. to Sep. 2005. Non-mining site.                                                   |

Table S14. Total cadmium (Cd) levels in water near Ghanaian small-scale mining sites and reference non-mining sites.

| Study location                                                     | Year collected | Dry/wet season | Water type                  | Water source                   | Sample size (n) | Mean Cd (µg/L) | SD Cd (µg/L) | Min. Cd (µg/L) | Max. Cd (µg/L) | Reference | Notes                                                                                                                                                              |
|--------------------------------------------------------------------|----------------|----------------|-----------------------------|--------------------------------|-----------------|----------------|--------------|----------------|----------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dumasi, Wassa West District, Western Region                        | 2004-2005      | d/w            | Groundwater                 | Boreholes                      | 160             | 3.5            | 1.29         | 2              | 5              | [50]      | Samples were collected from 4 boreholes (40 samples at each borehole) between Aug. 2004 and Jun. 2005. Values here are the means from each borehole.               |
| Obuasi, Ashanti Region                                             | 2008           | -              | Groundwater                 | Tap                            | 8               | 0.04           | 0.03         | 0.01           | 0.1            | [51]      | Samples were collected from around Obuasi based on the water demand of the surrounding communities (as a reference to an e-waste worker study).                    |
|                                                                    |                |                |                             | Borehole                       | 11              | 0.04           | 0.02         | < 0.01         | 0.09           |           |                                                                                                                                                                    |
|                                                                    |                |                |                             | Spring                         | 1               | 0.04           | -            | -              | -              |           |                                                                                                                                                                    |
|                                                                    |                |                |                             | Well                           | 14              | 0.05           | 0.05         | < 0.01         | 0.19           |           |                                                                                                                                                                    |
| Tarkwa, Western Region                                             | 2004           | d              | Groundwater                 | Borehole                       | 12              | 0.06           | 0.05         | 0.01           | 0.16           | [24]      | Drinking water samples taken from around Tarkwa in March 2004.                                                                                                     |
|                                                                    |                |                |                             | Well                           | 6               | 0.06           | 0.01         | 0.04           | 0.08           |           |                                                                                                                                                                    |
| Tereribe, Anglogold Ashanti-Iduapriem Mine, Tarkwa, Western Region | 2010           | d              | Groundwater                 | Boreholes                      | 4               | < 10           | -            | < 10           | < 10           | [49]      | Samples collected in March 2010 from boreholes.                                                                                                                    |
| Mile 7, Anglogold Ashanti-Iduapriem Mine, Tarkwa, Western Region   | 2010           | d              | Groundwater                 | Boreholes                      | 2               | 120            | -            | < 10           | 220            | [49]      | Samples collected in March 2010 from boreholes.                                                                                                                    |
| Abekoase, Gold Fields Ghana Ltd., Tarkwa, Western Region           | 2010           | d              | Groundwater                 | Boreholes                      | 5               | 140            | -            | < 10           | 370            | [49]      | Samples collected in March 2010 from boreholes.                                                                                                                    |
| Huniso, Gold Fields Ghana Ltd., Tarkwa, Western Region             | 2010           | d              | Groundwater                 | Boreholes                      | 2               | < 10           | -            | < 10           | < 10           | [49]      | Samples collected in March 2010 from boreholes.                                                                                                                    |
| Kejetia ASGM community, Talensi District, Upper East Region        | 2011           | d              | Groundwater                 | Borehole                       | 2               | 0.035          | 0.02         | 0.02           | 0.035          | [52]      | Samples collected in June and July 2011 from drinking water sources cited by ASGM community members.                                                               |
|                                                                    |                |                |                             | Bottled/sachet                 | 2               | 0.02           | 0.014        | 0.01           | 0.03           |           |                                                                                                                                                                    |
| Nangodi, Talensi-Nabdam District, Upper East Region                | 2010-2011      | d              | Groundwater & surface water | Borehole, dug-wells, & dugouts | 30              | -              | -            | 266.5          | 533            | [26]      | Samples collected between Nov 2010 to Apr 2011. One site from a borehole (Kalin), 2 from dug wells (Nadpadana, Nakpalig), and 2 from dugouts (Kolikpenge, Debahe). |
| Kejetia ASGM community, Talensi District, Upper East Region        | 2011           | d              | Surface water               | Mine pit water                 | 3               | 0.067          | 0.025        | 0.04           | 0.09           | [52]      | Samples collected in June and July 2011 from drinking water sources cited by ASGM community members.                                                               |
|                                                                    |                |                |                             | Rain water                     | 1               | 0.03           | -            | -              | -              |           |                                                                                                                                                                    |
|                                                                    |                |                |                             | Stream                         | 9               | 0.25           | 0.36         | 0.03           | 1.16           |           |                                                                                                                                                                    |
| Obuasi, Ashanti Region                                             | 2009           | d/w            | Surface & tap water         | -                              | 48              | 12413          | 14044.5      | 45             | 53700          | [29]      | Samples collected from Feb - Jun. in the Obuasi mining area.                                                                                                       |
| Obuasi, Ashanti Region                                             | 2008           | -              | Surface water               | Stream                         | 1               | < 0.01         | -            | -              | -              | [51]      | Samples were collected from around Obuasi based on the water demand of the surrounding communities (as a reference to an e-waste worker study).                    |
| Tarkwa, Western Region                                             | 2004           | d              | Surface water               | River/stream                   | 12              | 0.04           | 0.05         | 0.007          | 0.13           | [24]      | Drinking water samples taken from around Tarkwa in March 2004.                                                                                                     |
| Tereribe, Anglogold Ashanti-Iduapriem Mine, Tarkwa, Western Region | 2010           | d              | Surface water               | Streams                        | 2               | < 10           | -            | < 10           | < 10           | [49]      | Samples collected in March 2010 from Etihen and Drobo Streams.                                                                                                     |

Table S14. Total cadmium (Cd) levels in water near Ghanaian small-scale mining sites and reference non-mining sites.

| Study location                                                                                                                    | Year collected | Dry/wet season | Water type    | Water source                                          | Sample size (n) | Mean Cd (µg/L) | SD Cd (µg/L) | Min. Cd (µg/L) | Max. Cd (µg/L) | Reference | Notes                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|---------------|-------------------------------------------------------|-----------------|----------------|--------------|----------------|----------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Abekoase, Gold Fields Ghana Ltd., Tarkwa, Western Region                                                                          | 2010           | d              | Surfacewater  | River                                                 | 2               | -              | -            | < 10           | 270            | [49]      | Samples collected in March 2010 from River Essumang                                                                                                                 |
| Huniso, Gold Fields Ghana Ltd., Tarkwa, Western Region                                                                            | 2010           | d              | Surfacewater  | River                                                 | 1               | < 10           | -            | -              | -              | [49]      | Samples collected in March 2010 from Huni River.                                                                                                                    |
| Reference sites: Non-mining locations                                                                                             |                |                |               |                                                       |                 |                |              |                |                |           |                                                                                                                                                                     |
| Across Ghana                                                                                                                      | 2007           | w              | Groundwater   | Boreholes, wells, and some standpipes & trucked water | 195             | 0.025          | -            | < 0.001        | 1.755          | [55]      | Samples collected from boreholes and wells mainly, but also from some standpipes and trucked water during the 2007 rainy season (Jul/Aug) from Regions across Ghana |
| Ghana, Western Region (Praia), and Elmina (Benya), Cape Coast (Fosu), and Saltpond Beach (Narkwa), Central Region, Gulf of Guinea | -              | w              | Surface water | Estuary & lagoons                                     | 16              | 0.030          | 0.020        | 0              | 0.057          | [22]      | Samples collected from Pra Estuary, Benya Lagoon, Fosu Lagoon, and Narkwa Lagoon during wet and dry seasons.                                                        |
|                                                                                                                                   |                | d              | Surface water | Estuary & lagoons                                     | 16              | 0.029          | 0.010        | 0              | 0.068          |           |                                                                                                                                                                     |
| Accra, Greater Accra Region                                                                                                       | 2008           | -              | Groundwater   | Tap                                                   | 9               | 0.07           | 0.06         | < 0.01         | 0.19           | [51]      | Tap water samples randomly collected in Accra.                                                                                                                      |
| Tarkwa, Western Region                                                                                                            | 2004           | d              | Groundwater   | Standpipe (tap)                                       | 1               | < 0.01         | -            | -              | -              | [24]      | Samples collected from a standpipe (tap) in Accra in March. No samples over detection level of 0.01 µg/L.                                                           |

Table S15. Total lead (Pb) levels in soils near Ghanaian small-scale mining sites and reference non-mining sites.

| Study location                                                                                                            | Year collected | Dry/wet season | Sample size (n) | Mean Pb (ng/g) | SD Pb (ng/g) | Min. Pb (ng/g) | Max. Pb (ng/g) | Reference | Notes                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------|----------------|----------------|-----------------|----------------|--------------|----------------|----------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Obuasi, Ashanti Region                                                                                                    | -              | -              | 36              | 52             | 4            | -              | -              | [57]      | Samples collected at 20cm depth from mined, rehabilitaetd soil within the Anglogold Ashanti concessions in Obuasi.                                                                                                                                                            |
|                                                                                                                           | -              | -              | 36              | 42             | 8            | -              | -              |           | Samples collected at 20cm depth from rehabilitated waste dump soil within the Anglogold Ashanti concessions in Obuasi.                                                                                                                                                        |
|                                                                                                                           | -              | -              | 36              | 48             | 3            | -              | -              |           | Samples collected at 20cm depth from unrehabilitated waste dump soil within the Anglogold Ashanti concessions in Obuasi.                                                                                                                                                      |
|                                                                                                                           | -              | -              | 36              | 48             | 3            | -              | -              |           | Samples collected at 20cm depth from mined, unrehabilitaetd soil within the Anglogold Ashanti concessions in Obuasi.                                                                                                                                                          |
| Abosso Goldfield Ltd.-Daamang, Western Region                                                                             | -              | d              | 36              | 5800           | -            | -              | -              | [45]      | Samples collected at 10cm depth from a variety of soil sites at each mine (Goldfields Ghana Limited - Tarkwa, Abosso Goldfields Limited - Daamang, Anglogold Ashanti - Iduapriem, Bogosu Gold Limited), including topsoil, waste dumps, tailings, and undisturbed vegetation. |
| Bogosu Gold Ltd., Western Region                                                                                          |                | d              | 20              | 4900           | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |
| Anglogold Ashanti-Iduapriem Mine, Western Region                                                                          |                | d              | 24              | 3800           | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |
| Goldfields Ghana Ltd.-Tarkwa, Western Region                                                                              |                | d              | 42              | 5400           | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |
| Reference sites: Non-mining locations                                                                                     |                |                |                 |                |              |                |                |           |                                                                                                                                                                                                                                                                               |
| Obuasi, Ashanti Region                                                                                                    | -              | -              | 36              | 79             | 20           | -              | -              | [57]      | Samples collected at 20cm depth from unmined, native soil within the Anglogold Ashanti concessions in Obuasi.                                                                                                                                                                 |
| Duabone and Nwowam, Brong-Ahafo Region                                                                                    | -              | -              | 6               | 7200           | -            | -              | -              | [45]      | 3 to 15 random samples of paddy soil samples were collected in inland valley or irrigated paddy fields at a 10cm depth.                                                                                                                                                       |
| Ejura, Kobriti, Biemso (at 2 sites), Odumase, and Nobewam, Ashanti Region                                                 |                | -              | 27              | 7800           | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |
| Assin Dansame and Assin Akropong, Central Region                                                                          |                | -              | 9               | 11000          | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |
| Abenase, Oda Nkwanta, and Kpong, Eastern Region                                                                           |                | -              | 36              | 9500           | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |
| Sefwi Asafo, Sefwi Anyinabrim, Mempeasem, Aduku Tanoso, Yirase, Simpa Krutu/Anikorkor, and Kobina Anokrom, Western Region |                | -              | 42              | 6700           | -            | -              | -              |           |                                                                                                                                                                                                                                                                               |

Table S16. Total lead (Pb) levels in edible plants near Ghanaian small-scale mining sites and reference non-mining sites.

| Study location                                                          | Year collected | Dry/wet season | Species (common name/component)  | Sample size (n) | Mean Pb (µg/g) | SD Pb (µg/g) | Min. Pb (µg/g) | Max. Pb (µg/g) | Reference | Notes                                                                                                  |
|-------------------------------------------------------------------------|----------------|----------------|----------------------------------|-----------------|----------------|--------------|----------------|----------------|-----------|--------------------------------------------------------------------------------------------------------|
| Obuasi, Obuasi Municipal District, Ashanti Region                       | 1991           | -              | Citrus sinesis (orange flesh)    | 60              | 1.3            | -            | 0.8            | 1.8            | [58]      | Fruit was harvested from 6 farms, and 10 fruits were harvested from each tree.                         |
|                                                                         |                |                | Citrus sinesis (orange peel)     | 60              | 0.8            | -            | 0.2            | 1.5            |           |                                                                                                        |
|                                                                         |                |                | Persea americana (avocado flesh) | 60              | 1.1            | -            | 0.3            | 1.9            |           |                                                                                                        |
|                                                                         |                |                | Persea americana (avocado peel)  | 60              | 2.2            | -            | 1.9            | 2.5            |           |                                                                                                        |
| Reference sites: Non-mining locations                                   |                |                |                                  |                 |                |              |                |                |           |                                                                                                        |
| Konongo (Konongo-Odumase), Asante Akim Central District, Ashanti Region | 1991           | -              | Citrus sinesis (orange flesh)    | 60              | 1.9            | -            | 0.6            | 3.2            | [58]      | Fruit was harvested from 6 farms, and 10 fruits were harvested from each tree.                         |
|                                                                         |                |                | Citrus sinesis (orange peel)     | 60              | 1.5            | -            | 1              | 1.9            |           |                                                                                                        |
|                                                                         |                |                | Persea americana (avocado flesh) | 60              | 0.7            | -            | 0.3            | 1.1            |           |                                                                                                        |
|                                                                         |                |                | Persea americana (avocado peel)  | 60              | 1.3            | -            | 1              | 1.5            |           |                                                                                                        |
| Kumasi, Kumasi Metropolitan District, Ashanti Region                    | 1991           | -              | Citrus sinesis (orange flesh)    | 60              | 1.3            | -            | 0.4            | 2.2            | [58]      | Fruit was harvested from 6 farms, and 10 fruits were harvested from each tree. Kumasi data is control. |
|                                                                         |                |                | Citrus sinesis (orange peel)     | 60              | 1.2            | -            | 0.8            | 1.6            |           |                                                                                                        |
|                                                                         |                |                | Persea americana (avocado flesh) | 60              | 0.9            | -            | 0.6            | 1.2            |           |                                                                                                        |
|                                                                         |                |                | Persea americana (avocado peel)  | 60              | 1.2            | -            | 0.4            | 2.4            |           |                                                                                                        |

Table S17. Total lead (Pb) levels in sediment near Ghanaian small-scale mining sites and reference non-mining sites.

| Study location                                 | Year collected | Dry/wet season | Sample size (n) | Mean Pb (ng/g) | SD Pb (ng/g) | Min. Pb (ng/g) | Max. Pb (ng/g) | Reference | Notes                                                                                    |
|------------------------------------------------|----------------|----------------|-----------------|----------------|--------------|----------------|----------------|-----------|------------------------------------------------------------------------------------------|
| Mining area, River Pra Basin, Southwestern     | 2002-2003      | d              | 14              | ND             | ND           | ND             | ND             | [47]      | 14 sampling sites along the River Pra (2 downstream--1 past ASGM--and 12 upstream)       |
|                                                |                | w              | 14              | 243            | 635          | 14             | 2441           |           |                                                                                          |
| Non-mining area, River Pra Basin, Southwestern | 2002-2003      | d              | 7               | ND             | ND           | ND             | ND             | [47]      | 7 sites from non-mining areas along the River Pra (5 are from downstream and 2 upstream) |
|                                                |                | w              | 7               | 105            | 86           | 12             | 238            |           |                                                                                          |

ND = Not detectable or below the detection limit.



Table S18. Total lead (Pb) levels in water near Ghanaian small-scale mining sites and reference non-mining sites.

| Study location                                                     | Year collected | Dry/wet season | Water type          | Water source     | Sample size (n) | Mean Pb (µg/L) | SD Pb (µg/L) | Min. Pb (µg/L) | Max. Pb (µg/L) | Reference | Notes                                                                                                                                                |
|--------------------------------------------------------------------|----------------|----------------|---------------------|------------------|-----------------|----------------|--------------|----------------|----------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tarkwa, Western Region                                             | 2004           | d              | Groundwater         | Borehole         | 12              | 0.16           | 0.1          | 0.01           | 0.32           | [24]      | Drinking water samples taken from around Tarkwa in March 2004.                                                                                       |
| Tarkwa, Western Region                                             | 2004           | d              | Groundwater         | Well             | 6               | 7.76           | 17.2         | 0.3            | 42.9           | [24]      | Drinking water samples taken from around Tarkwa in March 2004.                                                                                       |
| Obuasi, Ashanti Region                                             | 2008           | -              | Groundwater         | Tap              | 8               | 0.23           | 0.19         | 0.05           | 0.57           | [50]      | Samples were collected from around Obuasi based on the water demand of the surrounding communities (as a reference to an e-waste worker study).      |
|                                                                    |                |                |                     | Borehole         | 12              | 1.86           | 5.9          | 0.01           | 20.6           |           |                                                                                                                                                      |
|                                                                    |                |                |                     | Spring           | 1               | 0.11           | -            | -              | -              |           |                                                                                                                                                      |
|                                                                    |                |                |                     | Well             | 16              | 0.2            | 0.13         | 0.05           | 0.44           |           |                                                                                                                                                      |
| Tereribe, Anglogold Ashanti-Iduapriem Mine, Tarkwa, Western Region | 2010           | d              | Groundwater         | Boreholes        | 3               | < 10           | -            | < 10           | < 10           | [48]      | Samples collected in March 2010 from boreholes.                                                                                                      |
| Mile 7, Anglogold Ashanti-Iduapriem Mine, Tarkwa, Western Region   | 2010           | d              | Groundwater         | Boreholes        | 2               | < 10           | -            | < 10           | < 10           | [48]      | Samples collected in March 2010 from boreholes.                                                                                                      |
| Abekoase, Gold Fields Ghana Ltd., Tarkwa, Western Region           | 2010           | d              | Groundwater         | Boreholes        | 5               | < 10           | -            | < 10           | < 10           | [48]      | Samples collected in March 2010 from boreholes.                                                                                                      |
| Huniso, Gold Fields Ghana Ltd., Tarkwa, Western Region             | 2010           | d              | Groundwater         | Boreholes        | 2               | < 10           | -            | < 10           | < 10           | [48]      | Samples collected in March 2010 from boreholes.                                                                                                      |
| Dumasi, Wassa West District, Western Region                        | 2004-2005      | d/w            | Groundwater         | Boreholes        | 160             | 6.5            | 1.29         | 5              | 8              | [49]      | Samples were collected from 4 boreholes (40 samples at each borehole) between Aug. 2004 and Jun. 2005. Values here are the means from each borehole. |
| Kejetia ASGM community, Talensi District, Upper East Region        | 2011           | d              | Groundwater         | Borehole         | 2               | 0.335          | 0.106        | 0.26           | 0.41           | [51]      | Samples collected in June and July 2011 from drinking water sources cited by ASGM community members.                                                 |
|                                                                    |                |                |                     | Bottled/sachet   | 2               | 0.145          | 0.0354       | 0.12           | 0.17           |           |                                                                                                                                                      |
| Obuasi, Ashanti Region                                             | 2009           | d/w            | Surface & tap water | -                | 48              | 1580.21        | 2933.434     | 1              | 15200          | [29]      | Samples collected from Feb - Jun. in the Obuasi mining area.                                                                                         |
| Obuasi, Ashanti Region                                             | 2010           | w              | Surface water       | Process effluent | 75              | 200            | 200          | -              | -              | [52]      | Samples collected between Jun. and Sep. 2010 in the morning.                                                                                         |
|                                                                    |                |                |                     | Profess effluent | 75              | 200            | 300          | -              | -              |           | Samples collected between Jun. and Sep. 2010 in the afternoon.                                                                                       |
|                                                                    |                |                |                     | Tailings dam     | 75              | 100            | 100          | -              | -              |           | Samples collected between Jun. and Sep. 2010 in the morning.                                                                                         |
|                                                                    |                |                |                     | Tailings dam     | 75              | 200            | 200          | -              | -              |           | Samples collected between Jun. and Sep. 2010 in the afternoon.                                                                                       |
| Tarkwa, Western Region                                             | 2004           | d              | Surface water       | River/stream     | 12              | 0.85           | 1.06         | 0.02           | 3.71           | [24]      | Drinking water samples taken from around Tarkwa in March 2004.                                                                                       |
| Obuasi, Ashanti Region                                             | 2008           | -              | Surface water       | Stream           | 1               | 0.01           | -            | -              | -              | [50]      | Samples were collected from around Obuasi based on the water demand of the surrounding communities (as a reference to an e-waste worker study).      |
| Tereribe, Anglogold Ashanti-Iduapriem Mine, Tarkwa, Western Region | 2010           | d              | Surface water       | Streams          | 2               | < 10           | -            | < 10           | < 10           | [48]      | Samples collected in March 2010 from Etihen and Drobo Streams.                                                                                       |

ND = Not detectable or below the detection limit.

Table S18. Total lead (Pb) levels in water near Ghanaian small-scale mining sites and reference non-mining sites.

| Study location                                              | Year collected | Dry/wet season | Water type    | Water source                                          | Sample size (n) | Mean Pb (µg/L) | SD Pb (µg/L) | Min. Pb (µg/L) | Max. Pb (µg/L) | Reference | Notes                                                                                                                                                                |
|-------------------------------------------------------------|----------------|----------------|---------------|-------------------------------------------------------|-----------------|----------------|--------------|----------------|----------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Abekoase, Gold Fields Ghana Ltd., Tarkwa, Western Region    | 2010           | d              | Surfacewater  | River                                                 | 2               | < 10           | -            | < 10           | < 10           | [48]      | Samples collected in March 2010 from River Essumang.                                                                                                                 |
| Huniso, Gold Fields Ghana Ltd., Tarkwa, Western Region      | 2010           | d              | Surfacewater  | River                                                 | 1               | < 10           | -            | < 10           | < 10           | [48]      | Samples collected in March 2010 from Huni River.                                                                                                                     |
| Obuasi, Ashanti Region                                      | -              | d              | Surface water | Stream                                                | 8               | ND             | -            | -              | -              | [54]      | Samples from 8 sites at the Pompora Treatment Plant (the old pyrometallurgical pre-treatment plant). Samples were all below detection limit (10 µg/L).               |
|                                                             |                | w              |               |                                                       | 8               | ND             | -            | -              | -              |           |                                                                                                                                                                      |
| Kejetia ASGM community, Talensi District, Upper East Region | 2011           | d              | Surface water | Mine pit water                                        | 3               | 2.65           | 2.44         | 0.54           | 5.33           | [52]      | Samples collected in June and July 2011 from drinking water sources cited by ASGM community members.                                                                 |
|                                                             |                |                |               | Rain water                                            | 1               | 1.51           | -            | -              | -              |           |                                                                                                                                                                      |
|                                                             |                |                |               | Stream                                                | 9               | 13.97          | 29.7         | 1.48           | 92.7           |           |                                                                                                                                                                      |
| Reference sites: Non-mining locations                       |                |                |               |                                                       |                 |                |              |                |                |           |                                                                                                                                                                      |
| Across Ghana                                                | 2007           | w              | Groundwater   | Boreholes, wells, and some standpipes & trucked water | 195             | 1.526          | -            | < 0.006        | 34.94          | [55]      | Samples collected from boreholes and wells mainly, but also from some standpipes and trucked water during the 2007 rainy season (Jul/Aug) from Regions across Ghana. |
| Accra, Greater Accra Region                                 | 2004           | d              | Groundwater   | Tap                                                   | 1               | 0.05           | -            | -              | -              | [24]      | Tap in Accra, as control.                                                                                                                                            |
| Accra, Greater Accra Region                                 | 2008           | -              | Groundwater   | Tap                                                   | 10              | 0.4            | 0.34         | 0.09           | 1.23           | [51]      | Samples were collected randomly from the environment (tap water) in Accra.                                                                                           |

ND = Not detectable or below the detection limit.

Table S19. Guidelines and standards for mercury (Hg) in ecological media. Data are reviewed by the number of sampling sites exceeding guideline values for total, mining (ASGM and/or LSGM), and non-mining sampling sites.

|          |                     | Mercury (Hg)    |                              |                          |            |
|----------|---------------------|-----------------|------------------------------|--------------------------|------------|
|          |                     | Standard        | <i>n</i> sites (%)<br>> std. | <i>n</i> sampling sites* |            |
| Soil     | 0.1 µg/g<br>THg     | US EPA [59, 60] | 26 (81.3)                    | 32                       | Total      |
|          |                     |                 | 22 (88.0)                    | 25                       | Mining     |
|          |                     |                 | 4 (57.1)                     | 7                        | Non-mining |
| Plants   | 0.5 µg/g<br>MeHg    | FAO/WHO [61]    | 4 (28.6)                     | 14                       | Total      |
|          |                     |                 | 4 (28.6)                     | 14                       | Mining     |
|          |                     |                 | 0 (0)                        | 0                        | Non-mining |
| Sediment | 0.18 µg/g<br>THg    | US EPA [62]     | 17 (51.5)                    | 33                       | Total      |
|          |                     |                 | 16 (59.3)                    | 27                       | Mining     |
|          |                     |                 | 1 (16.7)                     | 6                        | Non-mining |
| Water    | 6 µg/L<br>Inorg. Hg | WHO [63]        | 7 (18.9)                     | 37                       | Total      |
|          |                     |                 | 7 (23.3)                     | 30                       | Mining     |
|          |                     |                 | 0 (0)                        | 7                        | Non-mining |
| Fish     | 0.3 µg/g<br>MeHg    | US EPA [64]     | 7 (6.9)                      | 101                      | Total      |
|          |                     |                 | 4 (9.8)                      | 41                       | Mining     |
|          |                     |                 | 3 (5.0)                      | 60                       | Non-mining |
|          | 0.5 µg/g<br>MeHg    | FAO/WHO [61]    | 3 (3.0)                      | 101                      | Total      |
|          |                     |                 | 2 (4.9)                      | 41                       | Mining     |
| Tailings | 0.1 µg/g<br>THg     | US EPA [59, 60] | 1 (1.7)                      | 60                       | Non-mining |
|          |                     |                 | 8 (66.7)                     | 12                       | Total      |
|          |                     |                 | 8 (66.7)                     | 12                       | Mining     |
|          |                     |                 | 0 (0)                        | 0                        | Non-mining |

\*Sampling sites are sites sampled at a given location and time point, that include data on mean metals concentrations.

Table S20. Guidelines and standards for arsenic (As) in ecological media. Data are reviewed by the number of sampling sites exceeding guideline values for total, mining (ASGM and/or LSGM), and non-mining sampling sites.

| Arsenic (As) |          |                         |                              |                          |            |
|--------------|----------|-------------------------|------------------------------|--------------------------|------------|
| Standard     |          |                         | <i>n</i> sites (%)<br>> std. | <i>n</i> sampling sites* |            |
| Soil         | 0.4 µg/g | US EPA [60]             | 16 (94.1)                    | 17                       | Total      |
|              |          |                         | 6 (100)                      | 6                        | Mining     |
|              |          |                         | 10 (90.9)                    | 11                       | Non-mining |
| Plants       | 0.1 µg/g | FAO/WHO [61]            | 10 (100)                     | 10                       | Total      |
|              |          |                         | 10 (100)                     | 10                       | Mining     |
|              |          |                         | 0 (0)                        | 0                        | Non-mining |
| Sediment     | 9.8 µg/g | US EPA [62]             | 1 (14.3)                     | 7                        | Total      |
|              |          |                         | 1 (33.3)                     | 3                        | Mining     |
|              |          |                         | 0 (0)                        | 4                        | Non-mining |
| Water        | 10 µg/L  | WHO, GSB/GWC<br>[63,65] | 18 (52.9)                    | 34                       | Total      |
|              |          |                         | 18 (62.1)                    | 29                       | Mining     |
|              |          |                         | 0 (0)                        | 5                        | Non-mining |

\*Sampling sites are sites sampled at a given location and time point, that include data on mean metals concentrations.

Table S21. Guidelines and standards for cadmium (Cd) in ecological media. Data are reviewed by the number of sampling sites exceeding guideline values for total, mining (ASGM and/or LSGM), and non-mining sampling sites.

| Cadmium (Cd) |           |                         |                              |                          |            |
|--------------|-----------|-------------------------|------------------------------|--------------------------|------------|
| Standard     |           |                         | <i>n</i> sites (%)<br>> std. | <i>n</i> sampling sites* |            |
| Soil         | 78 µg/g   | US EPA [60]             | 0 (0)                        | 11                       | Total      |
|              |           |                         | 0 (0)                        | 4                        | Mining     |
|              |           |                         | 0 (0)                        | 7                        | Non-mining |
| Plants       | 0.1 µg/g  | FAO/WHO [61]            | 6 (100)                      | 6                        | Total      |
|              |           |                         | 6 (100)                      | 6                        | Mining     |
|              |           |                         | 0 (0)                        | 0                        | Non-mining |
| Sediment     | 0.99 µg/g | US EPA [62]             | 0 (0)                        | 2                        | Total      |
|              |           |                         | 0 (0)                        | 0                        | Mining     |
|              |           |                         | 0 (0)                        | 2                        | Non-mining |
| Water        | 3.0 µg/L  | WHO, GSB/GWC<br>[63,65] | 4 (15.4)                     | 26                       | Total      |
|              |           |                         | 4 (19.0)                     | 21                       | Mining     |
|              |           |                         | 0 (0)                        | 5                        | Non-mining |

\*Sampling sites are sites sampled at a given location and time point, that include data on mean metals concentrations.

Table S22. Guidelines and standards for lead (Pb) in ecological media. Data are reviewed by the number of sampling sites exceeding guideline values for total, mining (ASGM and/or LSM), and non-mining sampling sites.

|          |           |                             | Lead (Pb)                    |                          |            |
|----------|-----------|-----------------------------|------------------------------|--------------------------|------------|
| Standard |           |                             | <i>n</i> sites (%)<br>> std. | <i>n</i> sampling sites* |            |
| Soil     | 400 µg/g  | US EPA [60]                 | 0 (0)                        | 8                        | Total      |
|          |           |                             | 0 (0)                        | 8                        | Mining     |
|          |           |                             | 0 (0)                        | 6                        | Non-mining |
| Plants   | 0.1 µg/g  | FAO/WHO [61]                | 12 (100)                     | 12                       | Total      |
|          |           |                             | 4 (100)                      | 4                        | Mining     |
|          |           |                             | 8 (100)                      | 8                        | Non-mining |
| Sediment | 35.8 µg/g | US EPA [62]                 | 0 (0)                        | 4                        | Total      |
|          |           |                             | 0 (0)                        | 2                        | Mining     |
|          |           |                             | 0 (0)                        | 2                        | Non-mining |
| Water    | 10 µg/L   | WHO, GSB/GWC<br>[63,66, 67] | 6 (19.4)                     | 31                       | Total      |
|          |           |                             | 6 (21.4)                     | 28                       | Mining     |
|          |           |                             | 0 (0)                        | 3                        | Non-mining |

\*Sampling sites are sites sampled at a given location and time point, that include data on mean metals concentrations.

## References

1. Bonzongo, J.J.; Donkor, A.K.; Nartey, V.K.; Lacerda, L.D. Mercury pollution in Ghana: A case study of environmental impacts of artisanal gold mining in Sub-Saharan Africa. In *Environmental Geochemistry in Tropical and Subtropical Environments*; Drude de Lacerda, L., Santelli, R.E., Duursma, E.K., Abrão, J.J., Eds.; Springer Berlin Heidelberg: Heidelberg, Berlin, Germany, 2004; pp. 135–156.
2. Adjorlolo-Gasokpoh, A.; Golow, A.A.; Kambo-Dorsa, J. Mercury in the surface soil and cassava, *Manihot esculenta* (flesh, leaves and peel) near goldmines at Bogoso and Prestea, Ghana. *Bull. Environ. Contam. Toxicol.* **2012**, *89*, 1106–1110.
3. Tetteh, S.; Golow, A.A.; Essumang, D.K.; Zugle, R. Levels of mercury, cadmium, and zinc in the topsoil of some selected towns in the Wassa West District of the Western Region of Ghana. *Soil Sediment Contam.* **2010**, *19*, 635–643.
4. Ahiamadjie, H.; Serfor-Armah, Y.; Tandoh, J.B.; Gyampo, O.; Ofosu, F.G.; Dampare, S.B.; Adotey, D.K.; Nyarko, B.J.B. Evaluation of trace elements contents in staple foodstuffs from the gold mining areas in southwestern part of Ghana using neutron activation analysis. *J. Radioanal. Nucl. Chem.* **2011**, *288*, 653–661.
5. Azanu, D. *Sorption of Inorganic Mercury on Soils from Ankobra Basin in the South-Western Part of Ghana*; Kwame Nkrumah University of Science and Technology: Kumasi, Ghana, 2010.
6. Quarshie, E.; Nyarko, B.J.; Serfor-Armah, Y. Studies of levels of some toxic elements in soil and tailings from Bibiani mining area of Ghana. *Res. J. Environ. Earth Sci.* **2011**, *3*, 512–520.
7. Amonoo-Neizer, E.H.; Nyamah, D.; Bakiamoh, S.B. Mercury and arsenic pollution in soil and biological samples around the mining town of Obuasi, Ghana. *Water Air Soil Pollut.* **1996**, *91*, 363–373.
8. Donkor, A.K.; Bonzongo, J.C.; Nartey, V.K.; Adotey, D.K. Mercury in different environmental compartments of the Pra River Basin, Ghana. *Sci. Total Environ.* **2006**, *368*, 164–176.
9. Oppong, S.O.B.; Voegborlo, R.B.; Agorku, S.E.; Adimado, A.A. Total mercury in fish, sediments and soil from the River Pra Basin, southwestern Ghana. *Bull. Environ. Contam. Toxicol.* **2010**, *85*, 324–329.
10. Rajaei, M.; Long, R.N.; Renne, E.P.; Basu, N. Mercury concentrations and spatial distribution in a Ghanaian small-scale gold mining community. *Int. J. Environ. Res. Public Health* **2015**, under review.
11. Samlafo, B.V.; Sarah, L.A.; Quarshie, E.; Serfor-Armah, Y. Arsenic and mercury levels in earthenware clays in Otsew in Gomaa West District of Central Region of Ghana using Instrumental Neutron Activation Analysis. *Res. J. Environ. Earth Sci.* **2011**, *3*, 541–545.
12. Essumang, D.K.; Dodoo, D.K.; Obiri, S.; Yaney, J.Y. Arsenic, cadmium, and mercury in cocoyam (*Xanthosoma sagittifolium*) and watercocoyam (*Colocasia esculenta*) in Tarkwa a mining community. *Bull. Environ. Contam. Toxicol.* **2007**, *79*, 377–379.
13. Babut, M.; Sekyi, R.; Rambaud, A.; Potin-Gautier, M.; Tellier, S.; Bannerman, W.; Beinhoff, C. Improving the environmental management of small-scale gold mining in Ghana: A case study of Dumasi. *J. Clean. Prod.* **2003**, *11*, 215–221.

14. Serfor-Armah, Y.; Nyarko, B.J.B.; Adotey, D.K.; Adomako, D.; Akaho, E.H.K. The impact of small-scale mining activities on the levels of mercury in the environment: The case of Prestea and its environs. *J. Radioanal. Nucl. Chem.* **2004**, *262*, 685–690.
15. Boamponsem, L.K.; Adam, J.I.; Dampare, S.B.; Owusu-Ansah, F.; Addae, G. Heavy metals level in streams of Tarkwa gold mining area of Ghana. *J. Chem. Pharm. Res.* **2010**, *2*, 504–527.
16. Bannerman, W.; Potin-Gautier, M.; Amouroux, D.; Tellier, S.; Rambaud, A.; Babut, M.; Adimado, A.A.; Beinhoff, C. Mercury and arsenic in the gold mining regions of the Ankobra River basin in Ghana. *Journal de Physique IV* **2003**, *107*, 107–110.
17. Akabzaa, T.M.; Yidana, S.M. Evaluation of sources and options for possible clean up of anthropogenic mercury contamination in the Ankobra River Basin in South Western Ghana. *J. Environ. Prot. (Irvine Calif.)* **2011**, *2*, 1295–1302.
18. Nartey, V.K.; Doamekpor, L.K.; Sarpong-Kumankuma, S.; Akabzaa, T.M.; Nyame, F.K.; Kutor, J.; Adotey, D.K. Mercury pollution studies of some rivers draining the Bibiani-Anwiaso-Bekwai mining community of south western Ghana. *Res. J. Environ. Earth Sci.* **2011**, *3*, 375–384.
19. Golow, A.A.; Mingle, L.C. Mercury in river water and sediments in some rivers near Dunkwa-On-Offin, an Alluvial Goldmine, Ghana. *Bull. Environ. Contam. Toxicol.* **2003**, *70*, 379–384.
20. Dwumah-Akoanah, S. Studies on levels of mercury, cadmium and zinc in fish and sediments from River Offin in Ghana; Kwame Nkrumah University of Science and Technology, Kumasi, Ghana, 2008.
21. Nartey, V.; Klake, R.K.; Hayford, E.; Doamekpor, L.K.; Appoh, R. Assessment of mercury pollution in rivers and streams around artisanal gold mining areas of the Birim North District of Ghana. *J. Environ. Prot. (Irvine, Calif.)* **2011**, *2*, 1227–1239.
22. Adokoh, C.K.; Obodai, E.A.; Essumang, D.K.; Serfor-Armah, Y.; Nyarko, B.J.B.; Asabere-Ameyaw, A. Statistical evaluation of environmental contamination, distribution and source assessment of heavy metals (aluminum, arsenic, cadmium, and mercury) in some lagoons and an estuary along the coastal belt of Ghana. *Arch. Environ. Contam. Toxicol.* **2011**, *61*, 389–400.
23. Madkour, H.A.; Obirikorang, K.A.; Amisah, S.; Otchere, F.A.; Adjei-Boateng, D. Relationship between heavy metal concentrations in bottom sediments and the clam, *Galatea Paradoxa* (born 1778) from the Volta Estuary, Ghana. *J. Environ. Prot. (Irvine Calif.)* **2011**, *2*, 720–728.
24. Asante, K.A.; Agusa, T.; Subramanian, A.; Ansa-Asare, O.D.; Biney, C.A.; Tanabe, S.; Ansong, K. Contamination status of arsenic and other trace elements in drinking water and residents from Tarkwa, a historic mining township in Ghana. *Chemosphere* **2007**, *66*, 1513–1522.
25. Obiri, S.; Dodoo, D.K.; Armah, F.A.; Essumang, D.K.; Cobbina, S.J. Evaluation of lead and mercury neurotoxic health risk by resident children in the Obuasi Municipality, Ghana. *Environ. Toxicol. Pharmacol.* **2010**, *29*, 209–212.
26. Cobbina, S.J.; Dagben, J.Z.; Obiri, S.; Tom-Dery, D. Assessment of non-cancerous health risk from exposure to Hg, As and Cd by resident children and adults in Nangodi in the Upper East Region, Ghana. *Water Qual. Expo. Heal.* **2011**, *3*, 225–323.



27. Cobbina, S.J.; Nkuah, D.; Tom-dery, D.; Obiri, S. Non-cancer risk assessment from exposure to mercury (Hg), cadmium (Cd), arsenic (As), copper (Cu) and lead (Pb) in boreholes and surface water in Tinga, in the Bole-Bamboi District, Ghana. *Glob. J. Toxicol. Signal Transduct.* **2013**, *1*, 49–56.
28. Ofosu-Asiedu, L.; Cobbina, S.J.; Obiri, S. Non-cancer human health risk assessment from exposure to cadmium, copper, lead and mercury in surface water and ground water in Konongo-Odumasi Municipality, Ghana. *J. Environ. Chem. Ecotoxicol.* **2013**, *5*, 106–112.
29. Armah, F.A.; Obiri, S.; Yawson, D.O.; Onumah, E.E.; Yengoh, G.T.; Afrifa, E.K.A.; Odoi, J.O. Anthropogenic sources and environmentally relevant concentrations of heavy metals in surface water of a mining district in Ghana: a multivariate statistical approach. *J. Environ. Sci. Health. A. Tox. Hazard. Subst. Environ. Eng.* **2010**, *45*, 1804–1813.
30. Kortatsi, B.K.; Tay, C.K.; Anornu, G.; Hayford, E.; Dartey, G.A. Hydrogeochemical evaluation of groundwater in the lower Offin Basin, Ghana. *Environ. Geol.* **2008**, *53*, 1651–1662.
31. Kwaansa-Ansah, E.E.; Agorku, S.E.; Nriagu, J.O. Levels of total mercury in different fish species and sediments from the Upper Volta Basin at Yeji in Ghana. *Bull. Environ. Contam. Toxicol.* **2011**, *86*, 406–409.
32. Laar, C.; Fianko, J.R.; Akiti, T.T.; Osae, S.; Brimah, A.K. Determination of heavy metals in the Black-Chin Tilapia from the Sakumo Lagoon, Ghana. *Res. J. Environ. Earth Sci.* **2011**, *3*, 8–13.
33. Agorku, E.S.; Voegborlo, R.B.; Adimado, A.A. Total mercury levels in nine species of freshwater fish from two hydroelectric reservoirs and a crater lake in Ghana. *Environ. Monit. Assess.* **2009**, *153*, 383–389.
34. Voegborlo, R.B.; Adimado, A.A.; Ephraim, J.H. Total mercury distribution in different tissues of frigate tuna (*Auxis thazard* thazard) from the Atlantic Coastal Waters of Ghana, Gulf of Guinea. *Environ. Monit. Assess.* **2007**, *132*, 503–508.
35. Voegborlo, R.B.; Baah, D.A.; Kwaansa-Anah, E.; Adimado, A.A.; Ephraim, J.H. Mercury concentrations in fish species from the Gulf of Guinea, Ghana. *Bull. Environ. Contam. Toxicol.* **2004**, *73*, 1057–1064.
36. Voegborlo, R.B.; Matsuyama, A.; Akagi, H.; Adimado, A.A.; Ephraim, J.H. Total mercury and methylmercury accumulation in the muscle tissue of frigate (*Auxis thazard* thazard) and yellow fin (*Thunnus albacares*) tuna from the Gulf of Guinea, Ghana. *Bull. Environ. Contam. Toxicol.* **2006**, *76*, 840–847.
37. Voegborlo, R.B.; Akagi, H. Determination of mercury in fish by cold vapour atomic absorption spectrometry using an automatic mercury analyzer. *Food Chem.* **2007**, *100*, 853–858.
38. Joiris, C.R.; Azokwu, M.I.; Otchere, F.A.; Ali, I.B. Mercury in the bivalve *Anadara* (*Senilia*) *senilis* from Ghana and Nigeria. *Sci. Total Environ.* **1998**, *224*, 181–188.
39. Joiris, C.R.; Holsbeek, L.; Otchere, F.A. Mercury in the Bivalves *Crassostrea tulipa* and *Perna perna* from Ghana. *Mar. Pollut. Bull.* **2000**, *40*, 457–460.
40. Froese, R.; Pauly, D. FishBase [www.fishbase.org](http://www.fishbase.org) (accessed Jul 1, 2014).

41. Boamponsem, L.K.; Adam, J.I.; Dampare, S.B.; Nyarko, B.J.B.; Essumang, D.K. Assessment of atmospheric heavy metal deposition in the Tarkwa gold mining area of Ghana using epiphytic lichens. *Nucl. Instruments Methods Phys. Res. Sect. B Interact with Mater. Atoms.* **2010**, *268*, 1492–1501.
42. Nyarko, B.J.B.; Dampare, S.B.; Serfor-Armah, Y.; Osae, S.; Adotey, D.K.; Adomako, D. Biomonitoring in the forest zone of Ghana: The primary results obtained using neutron activation analyses and lichens. *Int. J. Environ. Pollut.* **2008**, *32*, 467–476.
43. Serfor-Armah, Y.; Nyarko, B.J.B.; Osae, E.K.; Carboo, D.; Seku, F. Elemental analysis of some green and brown seaweeds from the coastal belt of Ghana. *J. Radioanal. Nucl. Chem.* **1999**, *242*, 193–197.
44. Serfor-Armah, Y.; Nyarko, B.J.B.; Osae, E.K.; Carboo, D.; Anim-Sampong, S.; Seku, F. Rhodophyta seaweed species as bioindicators for monitoring toxic element pollutants in the marine ecosystem of Ghana. *Water Air Soil Pollut.* **2001**, *127*, 243–253.
45. Adomako, E.E.; Deacon, C.; Meharg, A.A. Variations in concentrations of arsenic and other potentially toxic elements in mine and paddy soils and irrigation waters from Southern Ghana. *Water Qual. Expo. Heal.* **2010**, *2*, 115–124.
46. Dampare, S.B.; Ameyaw, Y.; Adotey, D.K.; Osae, S.; Nyarko, B.J.B.; Adomako, D. Seasonal trend of potentially toxic trace elements in soils supporting medicinal plants in the Eastern Region of Ghana. *Water Air Soil Pollut.* **2005**, *169*, 185–206.
47. Donkor, A.K.; Bonzongo, J.; Nartey, V.; Adotey, D.K. Heavy metals in sediments of the gold mining impacted Pra River Basin, Ghana, West Africa. *Soil Sediment Contam.* **2005**, *14*, 479–503.
48. Adomako, D.; Nyarko, B.J.B.; Dampare, S.B.; Serfor-Armah, Y.; Osae, S.; Fianko, J.R.; Akaho, E.H.K. Determination of toxic elements in waters and sediments from River Subin in the Ashanti Region of Ghana. *Environ. Monit. Assess.* **2008**, *141*, 165–175.
49. Kusimi, J.M.; Kusimi, B.A. The hydrochemistry of water resources in selected mining communities in Tarkwa. *J. Geochemical Explor.* **2012**, *112*, 252–261.
50. Obiri, S. Determination of heavy metals in water from boreholes in Dumasi in the Wassa West District of western region of Republic of Ghana. *Environ. Monit. Assess.* **2007**, *130*, 455–463.
51. Asante, K.A.; Agusa, T.; Biney, C.A.; Agyekum, W.A.; Bello, M.; Otsuka, M.; Itai, T.; Takahashi, S.; Tanabe, S. Multi-trace element levels and arsenic speciation in urine of e-waste recycling workers from Agbogbloshie, Accra in Ghana. *Sci. Total Environ.* **2012**, *424*, 63–73.
52. Long, R.; Renne, E.; Robins, T.; Wilson, M.; Pelig-ba, K.; Rajaei, M.; Yee, A.; Koomson, E.; Sharp, C.; Lu, J.; Basu, N. Water values in a Ghanaian small-scale gold mining community. *Hum. Organ.* **2013**, *72*, 199–210.
53. Acheampong, M.A.; Paksirajan, K.; Lens, P.N.L. Assessment of the effluent quality from a gold mining industry in Ghana. *Environ. Sci. Pollut. Res. Int.* **2013**, *20*, 3799–3811.
54. Foli, G.; Nude, P.M. Concentration levels of some inorganic contaminants in streams and sediments in areas of pyrometallurgical and hydrometallurgical activities at the Obuasi gold mine, Ghana. *Environ. Earth Sci.* **2011**, *65*, 753–763.

55. Rossiter, H.M.A.; Owusu, P.A.; Awuah, E.; Macdonald, A.M.; Schäfer, A.I. Chemical drinking water quality in Ghana: Water costs and scope for advanced treatment. *Sci. Total Environ.* **2010**, *408*, 2378–2386.
56. Boadu, M.; Osae, E.K.; Golow, A.A.; Nyarko, B.J.B. Determination of arsenic in some water bodies, untreated ore and tailing samples at Konongo in the Ashanti region of Ghana and its surrounding towns and villages by instrumental neutron activation analysis. *J. Radioanal. Nucl. Chem.* **2001**, *249*, 581–585.
57. Dorgbetor, W.H.K. Evaluation of quality of some rehabilitated mined soils within the AngloGold-Ashanti Concession in Ghana. *Int. J. Geosci.* **2012**, *3*, 50–61.
58. Golow, A.A.; Laryea, J.N. Levels of iron, silver, zinc, and lead in oranges and avocados from two gold-rich towns compared with levels in an adjacent gold-deficient town. *Bull. Environ. Contam. Toxicol.* **1994**, *53*, 332–336.
59. Buchman, M.F. *NOAA Screening Quick Reference Tables*; NOAA: Seattle, WA, USA, 2008; pp. 1–34.
60. U.S. Environmental Protection Agency (EPA) Generic Soil Screening Levels 2011, 1–11.
61. Food and Agriculture Organization (FAO); World Health Organization (WHO) *Codex General Standard for Contaminants and Toxins in Food and Feed*; WHO: Geneva, Switzerland, 2013; pp. 1–48.
62. U.S. Environmental Protection Agency (EPA). *Freshwater Sediment Screening Benchmarks*; US EPA: Washington, DC, USA, 2006; pp. 1–6.
63. World Health Organization (WHO) *Guidelines for Drinking-Water Quality: Fourth Edition*; WHO: Geneva, Switzerland, 2011.
64. U.S. Environmental Protection Agency (EPA) *Water Quality Criterion for the Protection of Human Health: Methylmercury*; US EPA: Washington, DC, USA, 2001.
65. Ghana Environmental Protection Agency (EPA) Environmental Quality Standards--Mining Sector 2010.
66. Kusimi, J.M.; Kusimi, B.A. The hydrochemistry of water resources in selected mining communities in Tarkwa. *J. Geochemical Explor.* **2012**, *112*, 252–261.
67. Obiri, S. Determination of heavy metals in water from boreholes in Dumasi in the Wasswa West District of western region of Republic of Ghana. *Environ. Monit. Assess.* **2007**, *130*, 455–463.