Toxic Sites Identification Program (TSIP) in Tanzania

Award: DCI-ENV/2015/371157

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LIST OF ACRONYMS

ADB	African Development Bank
ASGM	Artisanal Small-Scale Gold Mining
EC	European Commission
EPA	Environmental Protection Agency
FEMATA	Federation of Miners Association in Tanzania
ISS	Initial Site Screening
LMIC	Low and Middle-Income Countries
MEM	Ministry of Energy and Minerals
MoH	Ministry of Health
NEMC	National Environment Management Council
OSHA	Occupational Safety and Health Authority
PE	Pure Earth
REMA	Regional Miners Association
TSIP	Toxic Sites Identification Program
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
VPO	Vice President Office
WB	World Bank
XRF	X-Ray Fluorescence

ACKNOWLEDGEMENTS

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INTRODUCTION

Pure Earth (PE) is an international not-for-profit organization dedicated to solving pollution problems in low and middle-income countries. Pure Earth became involved in Tanzania in 2007 via the Toxic Sites Identification Program (TSIP), an effort to identify and screen contaminated sites in low and middle-income countries where public health is at risk. TSIP has been supported by The United Nations Industrial Development Organization (UNIDO), European Commission (EC), Asian Development Bank (ADB), United States Agency for International Development (USAID), World Bank (WB), and Green Cross Switzerland, among others.

The contaminated sites in Tanzania were identified by trained investigators drawn from universities in the country who used the Initial Site Screening (ISS) protocol to identify major elements of a contaminated site, including estimated population at risk, key pollutant information, human exposure pathway data and sampling data.

To date, a total of 187 sites located in Tanzania have been identified using the ISS protocol. Investigators collected soil samples and measured levels of toxicity using an Alpha X-ray Fluorescence (XRF) instrument.

From February of 2016 to January of 2018, TSIP activities in Tanzania were funded by UNIDO Contract SAP Ref: 150416 with co-financing from the World Bank beginning in May of 2017. World Bank funding was awarded based in large part on results demonstrated under UNIDO financing. The World Bank award funds an additional 150 sites over 18 months, nearly doubling the total number of sites assessed in the country. Included in the World Bank award is well was funding to undertake a total restructuring of the TSIP database, discussed in more detail below.

Government Partners

Pure Earth works closely with relevant government agencies for all programs undertaken in the country. At the national level, Pure Earth engages with the Vice President Office – Division of Environment (VPO), the National Environment Management Council, Ministry of Energy and Minerals (MEM), Ministry of Health (MoH), Occupational Safety and Health

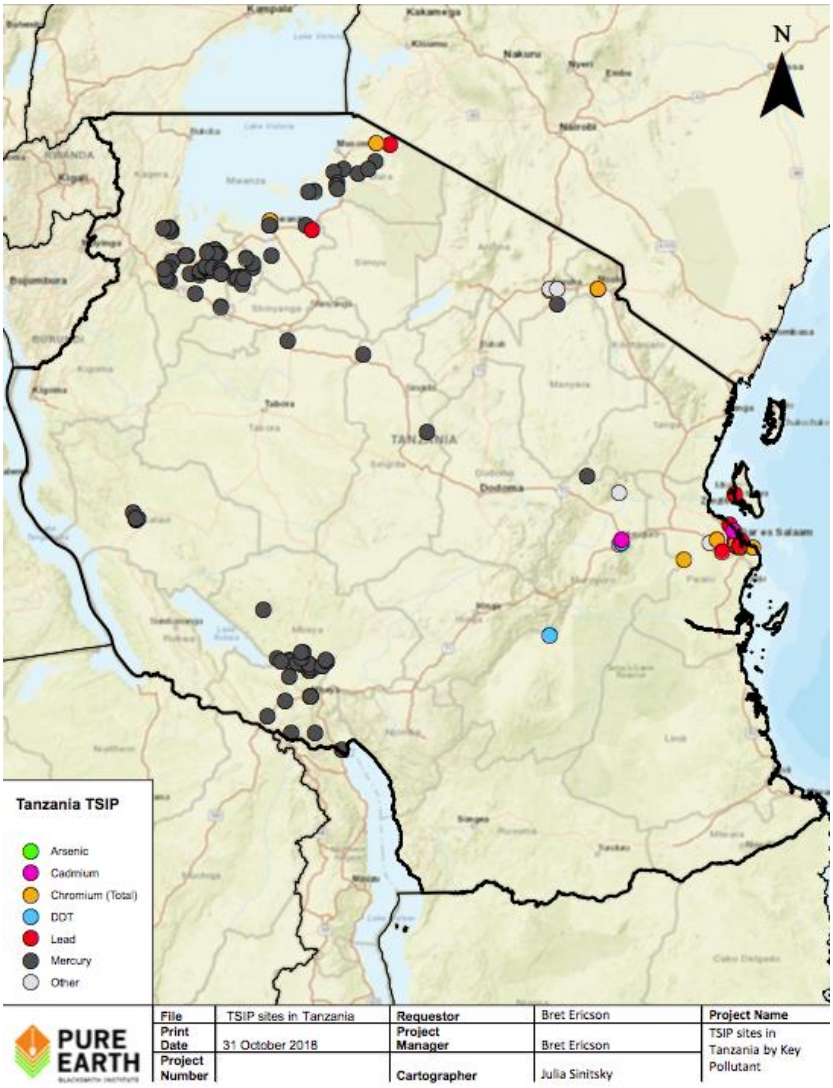
Authority (OSHA). Representatives for these agencies are routinely invited to Pure Earth site visits, events, and trainings.

At the regional level Pure Earth investigators engage local government representatives before conducting any work, not only to seek permission to proceed, but to also inform them of toxic site inventory efforts in their region and to invite them to accompany them on site visits. Recently, investigators met with authorities in the Geita and Mbeya regions as well as with zonal NEMC office representatives in Mwanza and Mbeya.

At the local government authority level, investigators meet with relevant officers in order to seek guidance in identifying sites, and to obtain contact information for ward and village government officers who are instrumental in facilitating trust-building within communities surrounding sites.

TOXIC SITES IDENTIFICATION PROGRAM (TSIP)

Pure Earth's work in Tanzania began in 2007. To date, 187 sites have been assessed in Mbeya, Dar es Salaam, Arusha, Kilimanjaro, Geita, Mwanza regions among. A breakdown by funding periods is found in the tables below. The majority of identified sites are found in areas where mining activities are carried out, namely in the Northern and Western regions of the country (Mbeya, Geita, Shinyanga and Mwanza).



IMPLEMENTATION STRATEGY/COORDINATION WITH GOVERNMENT

In order to effectively work in the country, coordination with government agencies at all stages was essential. Pure Earth's investigators met regularly with government officials to share data and findings. As such, government officials and their respective community constituents gained a better understanding of the scope of toxic pollution and its impact on public health, economic growth, and sustainable development.

Program Implementation Strategies:

- Introduction of the project to national and local government officials

- Recruitment and hiring of researchers with advanced degrees in the environmental field
- Training in rapid site assessments using the ISS protocol
- Coordination with national and local authorities on sites selection and priorities
- Assessment of sites
  - Including site history, estimation of population at risk, creation of site map, and taking of photos
- Collection of samples (water, soil or air)
- Analysis by reputable laboratory when necessary
- Entry of assessment information into existing TSIP database
- Review of data collected for quality and consistency (performed by PE team in New York)

Several sites were identified by contacts at their respective District Councils. Current and former site investigators with regional knowledge and understanding also contributed to the list. The remaining sites were identified following a desk review of relevant literature and reports.

Pure Earth has conducted three TSIP trainings in Tanzania. The trainings consisted of both theoretical and practical components, wherein the theoretical training, conducted on day one, introduced participants to the work of Pure Earth, the health impacts of pollution, and the model of Pollution-Migration-Pathway-People. Participants were also taught how to use a hand-held Alpha Xray Fluorescence (XRF) spectrometer (a precise instrument that permits collection of real-time field data and is key to building in-country capacity to monitor and assess heavy metal contamination). During day two, the practical, field-based component of ISS training, participants visited a site (the Kigogo dumpsite) for hands-on experience in using the ISS protocol. Participants then returned to the classroom to learn how to enter data into the TSIP database. Each participant practiced using the data collected during the morning field visit.

In spring of 2017 an additional training on using a Jerome mercury analyzer (J405) was conducted in Dar Es Salaam. The training was facilitated by a staff member of Pure Earth's NY headquarters staff for members of the current investigative team. The Jerome analyzer is designed for ease of operation and quick, accurate analyses of mercury vapor levels.

SUMMARY OF KEY TSIP TANZANIA RESULTS

To date, a total of 187 sites in Tanzania have been identified using the ISS protocol. Various key pollutants included mercury, lead, arsenic, cadmium, chromium, pesticides, and VOCs. Of these pollutants, mercury was found in 71% of the sites, lead in 12%, chromium in 10%, cadmium in 3%, chromium (Hex) in 1%, DDT in 1%, pesticides in 1%, and other pollutants in 1%.

Table 1: The number of sites as categorized by pollution source assessed by Pure Earth's TSIP investigators

Key Pollutant	Number of Sites Identified
Mercury - elemental	132
Lead	22
Chromium (Total)	18
Cadmium	6
DDT	2
Other	1
Hexachlorobenzene (Benzene Hexachloride)	1
Arsenic	1
2,3,7,8-TCDD (Dioxins)	1
Pesticides (Total)	1
Dieldrin	1
Lindane (Hexachlorocyclohexane all forms)	1
Total	**187**

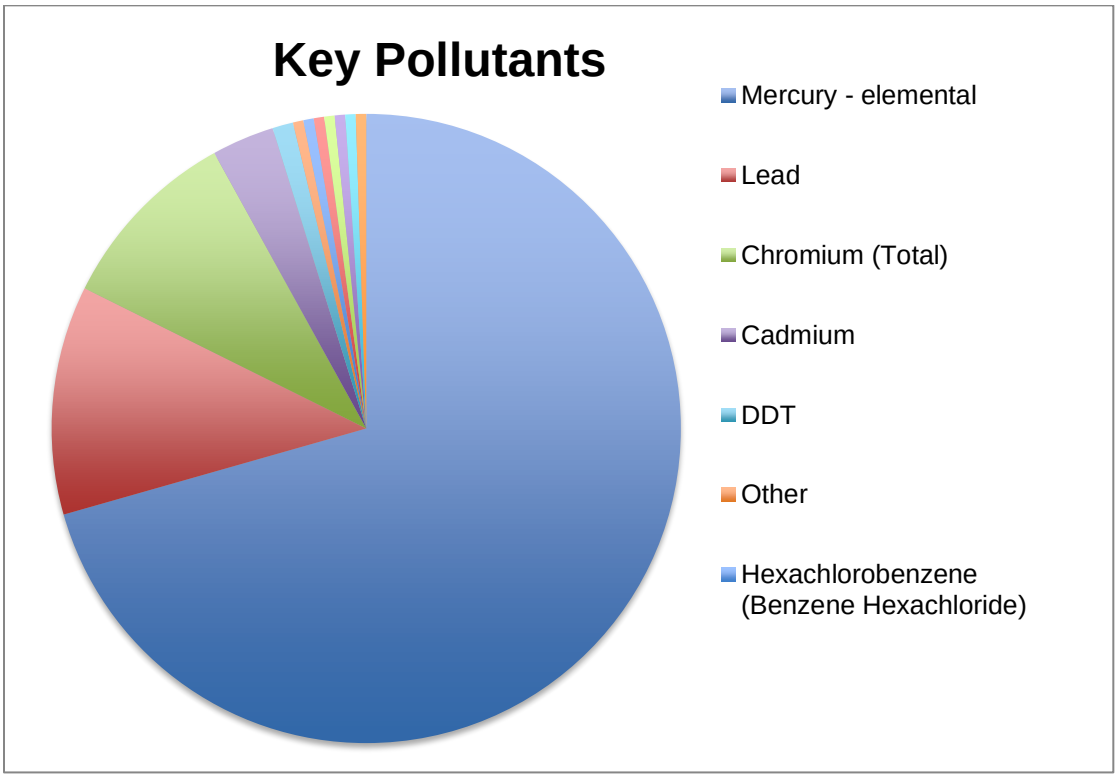
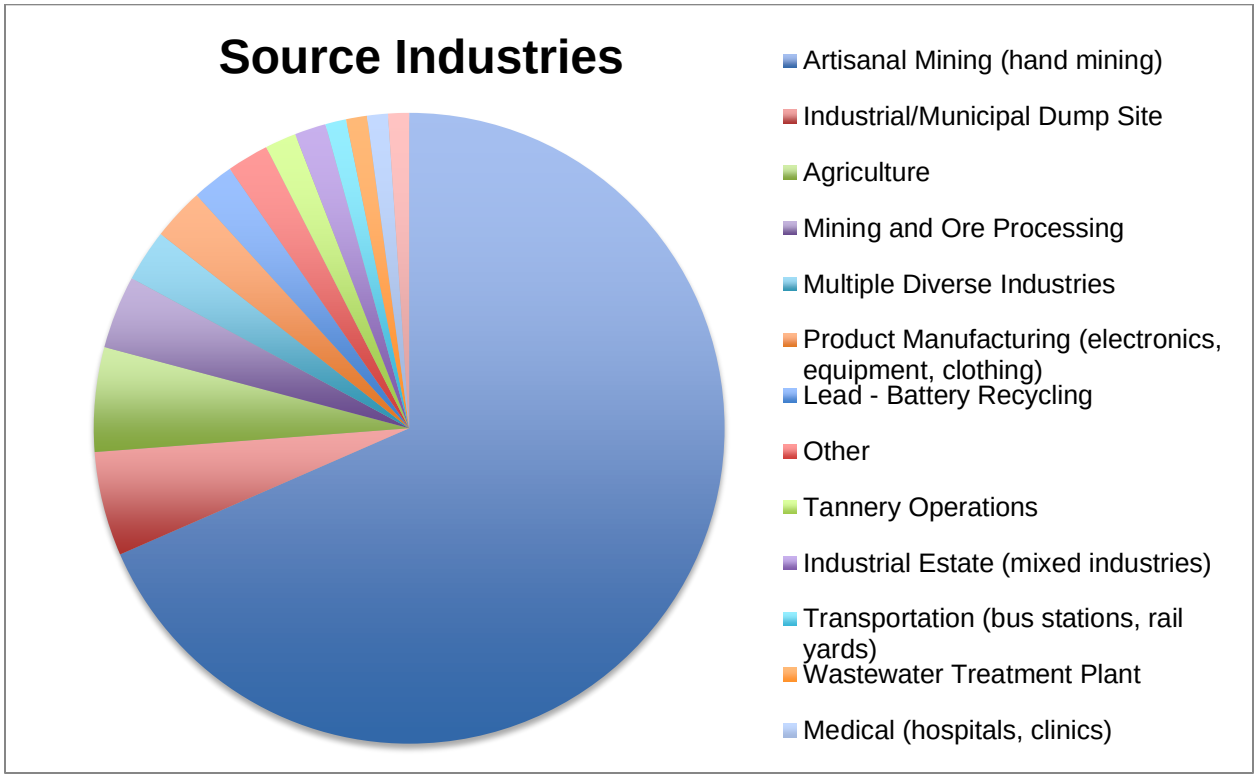


Table 2: Key pollutants identified in Tanzania during TSIP site visits

Site Industry	Number of Sites Identified
Artisanal Mining (hand mining)	128
Industrial/Municipal Dump Site	10
Agriculture	10
Mining and Ore Processing	7
Multiple Diverse Industries	5
Product Manufacturing (electronics, equipment, clothing)	5
Lead - Battery Recycling	4
Other	4
Tannery Operations	3
Industrial Estate (mixed industries)	3
Transportation (bus stations, rail yards)	2
Wastewater Treatment Plant	2
Medical (hospitals, clinics)	2
Dye Industry	2
Total	**187**



Investigators collected soil samples with the guidance of a sampling protocol provided by Pure Earth. Lead concentrations in soil were measured in the field using an XRF. When an XRF was not available, samples were sent to a local laboratory for analysis.

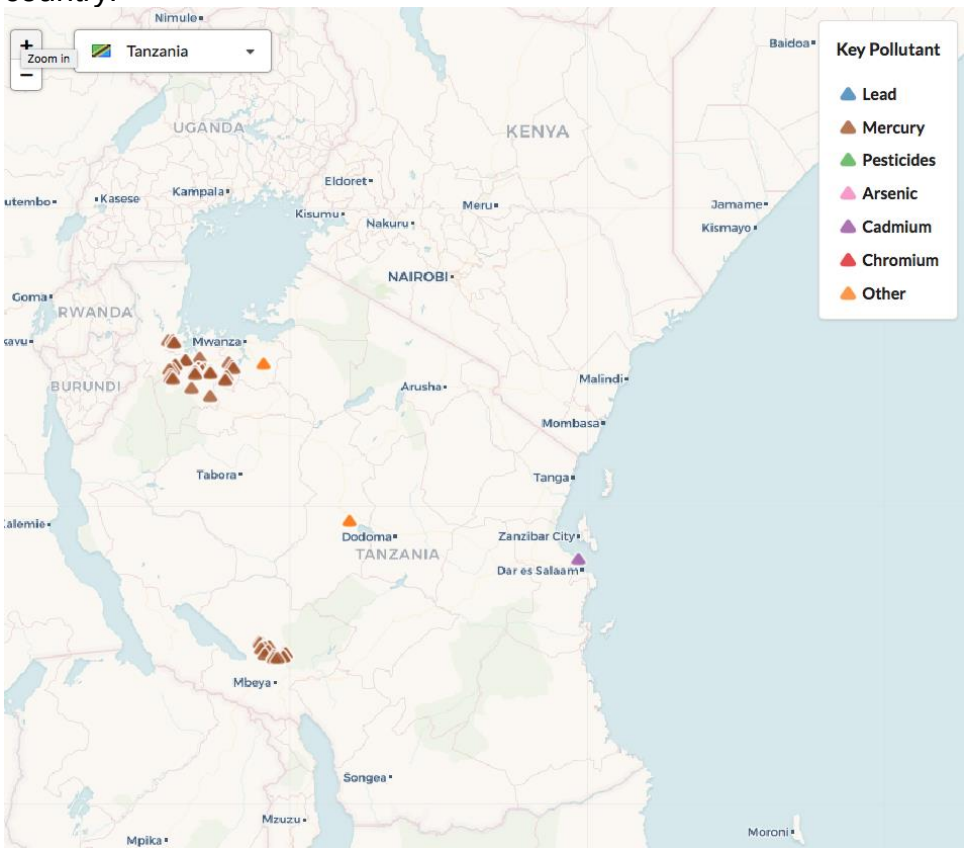
All sites had significant contamination values for toxic substances. Elemental mercury was present in 132 sites, the majority of which were artisanal mining sites, with concentrations ranging from 1 to 375 parts per million (ppm). This translates to great risks to human health.

Lead was recorded at 22 sites, many of which were manufacturing sites, dumpsites, or ULAB recycling facilities. Concentrations ranged from 6 to 2,096 parts per million (ppm).

The test results for chromium, found at 18 sites (including artisanal mines, tanneries, and wastewater treatment sites) ranged from 5 to 25,651 ppm. This is above Blacksmith's recommended standards of 12 ppm.

In partnership with **UNIDO**, of the 187 sites assessed to date, 13 initial site screenings were conducted in 2016 (See Table 3). Mercury (12) and lead (1) were the key pollutants identified at sites. The concentration of lead was 507 ppm, above Pure Earth's recommended level of 400 ppm, which translates to great risks to human health. Elemental mercury in Tanzania ranged in concentration from 0.01 to 650 ppm. These assessments showed that in addition to lead exposures from ULAB recycling operations,

other sources of contamination also pose great risks to human health throughout the country.



TZ UNIDO Sites

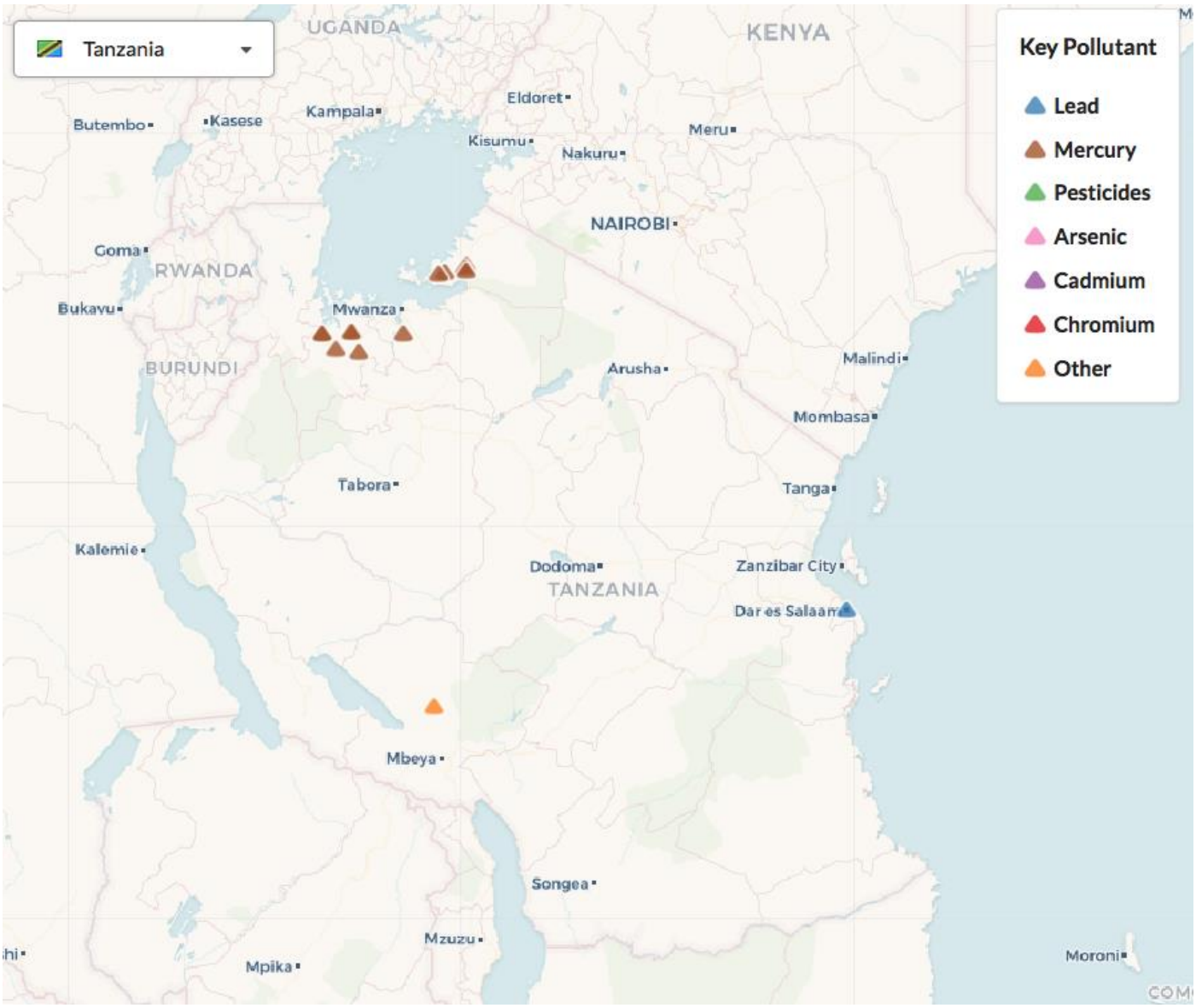
Table 1: Key pollutants identified in Tanzania during TSIP site visits

Key Pollutant	Number of Sites Identified
Mercury - elemental	12
Lead	1
Total	**13**

Table 2: The number of sites as categorized by pollution source assessed by Pure Earth's TSIP investigators

Site Industry	Number of Sites Identified
Artisanal Mining (hand mining)	11
Mining and Ore Processing	1
Multiple Diverse Industries	1
Total	**13**

In partnership with the **World Bank**, of the 186 sites assessed to date, 67 site screenings were conducted in 2017-2018. Mercury was identified at 66 sites, and cadmium at 1 site. The concentrations of mercury ranged from 1 to 585 ug/m3, and concentration for cadmium was 30 ppm. All sources of elemental mercury were artisanal mining sites, and the source of cadmium was agriculture.



TZ World Bank Sites

Table 1: Key pollutants identified in Tanzania during TSIP site visits

Key Pollutant	Number of Sites Identified
Mercury - elemental	66
Cadmium	1
Total	**67**

Table 2: The number of sites as categorized by pollution source assessed by Pure Earth's TSIP investigators

Site Industry	Number of Sites Identified
Artisanal Mining (hand mining)	66
Agriculture	1
Total	**67**

Health Risks Identified and Other Concerns Identified During Sites Assessments

During site visits, many exposure risks were identified by both the investigators and the workers at the sites. Some of the workers in these industries were aware of the health risks involved, while others were unaware of the associations between pollution and health. In many cases, workers experienced symptoms that could potentially be linked to pollution.

Exposure risks identified included:

- Lack of protective equipment – inhalation/ingestion of polluted air and dermal contact were the primary routes of exposure
- Lack of environmental controls – leaching of contaminants into ground and surface water
- Incorrect disposal of waste water during lead recycling – especially dangerous in residential areas
- Lack of expertise by medical professionals in recognizing symptoms of pollution exposure
- Lack of awareness of health hazards posed by chemical pollution

Health symptoms identified included:

- Memory loss, frequent headaches, miscarriages, lack of appetite and poor body coordination
- Hyperactivity - especially in lead contaminated sites
- Chest pains associated with respiratory challenges in pesticides contaminated sites
- Livestock falling ill and/or dying after drinking contaminated water from mining areas

It is noted that the symptoms identified are only a fraction of potential effects. As research continues to identify and confirm pollution linkages, and as further sites are identified (to more accurately measure the pollution burden in a region) it is likely that the list of pollution-related diseases will expand substantially.

Pollutants, Sources, and Health Impacts

Mercury

The risk for mercury exposure is most often associated with occupational exposures from repeated direct contact with the substance. Nearby populations are also at risk. Mercury is commonly used in industrial chemical production as well as in artisanal small-scale gold mining (ASGM) as a means of recovering gold from ore.

Health effects can range from neurological disorders including tremors, ataxia, memory problems and vision disorders, to headaches, mood swings, muscle weakness, trouble sleeping, dizziness, fatigue, difficulty walking, and persistent cough, among others. A higher incidence of kidney and autoimmune dysfunction is also found.

Consuming mercury-contaminated fish while pregnant may also contribute to neurodevelopmental problems in developing fetuses, with symptoms including mental retardation, delayed development, language disorders, seizures and a loss of memory.

Lead

Lead. Global production of lead, driven primarily from the rising global demand for batteries, has more than doubled since the 1970s. Lead is one of the key pollutants for which global burden of disease deaths have been calculated. According to The Lancet Commission on Pollution and Health, approximately 500,000 people a year die globally as a result of exposure to lead. As noted elsewhere in this report however, these numbers are likely underestimated

Among the latest studies is one that found lead exposure may be responsible for nearly 10 times more deaths in the United States than previously thought. Researchers concluded that over 400,000 deaths in the US alone can be linked to lead. Even more surprising was the low concentration of lead that was associated to these mortalities, levels that up until recently were considered safe. The potential for total global mortalities is profound.

In addition, research has shown toxic effects in multiple organ systems from relatively low levels of exposure. Lead has been associated with reductions in children's cognitive function and with disruptive behavior. Some of the overall adverse health impacts from lead include neurological damage, intelligent quotient (IQ) decrement, anemia, muscle and joint pain, loss of memory, decreased concentration, nerve disorders, infertility, increased blood pressure and chronic headaches. At very high doses, lead exposure can

also result in seizures and death.

Chromium

Chromium is a naturally occurring heavy metal found in the earth's crust. It is typically found in two forms: chromium III and chromium VI, which are respectively known as trivalent chromium and hexavalent chromium. Trivalent chromium is the most stable of the forms and occurs naturally. In contrast, hexavalent chromium does not occur naturally, and is often the end product of anthropogenic activities. Of the two forms, hexavalent chromium poses greater health risks due to its higher toxicity and its ability to enter into cells.

Exposure to hexavalent chromium has been associated with damage to the gastrointestinal, respiratory and immunological systems, as well as to reproductive and developmental problems. It has also been linked to some cancers, including lung cancer and stomach cancer.

Studies of both chromium compounds have indicated that chromium accumulation in the human body may have adverse effects on iron metabolism, a critical process for the maintenance of normal bodily functions and an essential component of red blood cells.

Artisanal Small-Scale Gold Mines

To date, 82 Artisanal Small-Scale Gold Mine 82 sites have been identified and screened in Tanzania. These sites were identified and selected based on operations of artisanal small-scale gold miners with assistance from contacts at their District Councils, Regional Miners Association (REMA) and the Federation of Miners Association in Tanzania (FEMATA). The sites were also identified based on desk reviews of reports and research by academics on populations with a history of artisanal gold mining. For example Matundasi is a hotspot for ASGM activities without recovery systems employed, contaminating the Lupa River, a major tributary of Lake Rukwa- Chunya which populations fish for living. The inventory estimates that these sites alone impact 697,110 people.

The environmental legislation (Mining Regulations (Environmental Management and Protection), 1999) dictates that mercury-contaminated mineral concentrates and tailings should be stored in settling ponds with lined structures. However, in some areas amalgamation ponds were found made of wood, not concrete, which allow percolation of polluted wastewater into the ground. In areas where the ponds were made of concrete to prevent seepage and leakage of contaminated wastewater, they had small capacity to hold all waste water generated leading to overflow to the surrounding environment and therefore, contributing to increased pollution of the sites.

The separated amalgam is heated, which vaporizes the mercury, leaving behind the gold. The heating process is either carried out in open spaces with maximum ventilation without recovery as it was observed in Beda, or inside homes as it was observed in Makongolosi, as the gold is valuable and processors wanted security and secrecy. As the

mercury vaporize, the artisans and anyone else in the vicinity, including children, are at risk of inhaling mercury. Inhaling mercury vapors from the amalgam heating process is the most direct pathway of exposure. Unlike mercury in the food chain that must accumulate over time, exposure to the vapors is immediate and can result in direct exposure to dangerous levels of mercury.

The amount of mercury used by the ASGM sector is not known, though rough calculations can be made if the amount of gold produced is known. Local NGO Agenda estimates that approximately 4 tons of gold per year comes from small-scale miners. Using a formula developed by researchers in Peru of 3-5 grams of mercury loss per 1 gram of gold, mercury releases from ASGM could range from between 4-20 tons per year in Tanzania.

Used Lead Acid Battery (ULAB) recycling

Lead-acid batteries are rechargeable batteries made of lead plates in a 'bath' of sulfuric acid within a plastic casing. The batteries can be charged many times, but after numerous cycles of recharging, lead plates eventually deteriorate, causing the battery to lose its ability to hold stored energy. Once the lead-acid battery ceases to be effective, it is unusable and classified as a hazardous waste under the Basel Convention.

In addition to numerous informal operations, two large factories in the Vingunguti industrial are of Dar es Salaam, OK Plast and Gaia Eco Solution release significant amounts of lead into the environment. Other contaminants released in battery recycling activities include, ash, SO2, CO, and arsenic.

Textile industries

Textile industries further contribute to pollution burdens in the country. Dye acetate, lead, and chromium have all been detected around textile operations. On a visit to the Karibu Textile Industry site in Dar es Salaam, a Pure Earth team observed release of untreated effluents leeching into residential areas, exposing the inhabitants to health risks.

Tanneries

Among the principle chemicals used in the tanning process is chromium. Pure Earth teams visited tannery industries located in Moshi that were discharging waste water into nearby ponds whose banks were made by arranging 50kg plastic bags filled with sand one on top of the other. These poorly constructed ponds, which had significant problems with leaking, were not fenced and people and livestock were observed walking freely through the area. Children were found playing near the pond and livestock grazing on polluted grazing land. In addition, maize fields grew adjacent to the ponds, putting the crops at high risk for chromium contamination.

Interviews conducted by Pure Earth with people around the factory revealed that they experienced health problems including the abdominal skin ulcer, decreased ability to

perceive odor (hyposmia), red eye and diarrhea which could be linked to pollutants that are released from the industry.

TSIP DATABASE IMPROVEMENT

Based on work conducted under UNIDO Contract SAP Ref: 150416, Pure Earth was awarded a World Bank grant to not only undertake additional site assessments, but to also embark on a major revision and improvement exercise of the TSIP Database. Pure Earth teams conducted a series of phone interviews and focus groups in order to inform the design of a global survey for database users at every level (investigators, researchers, government officials, NGO partners, media representatives, etc). The survey captured information on data needs across the user range with the aim of increasing rate of use by a wider group of stakeholders.

Incorporating survey results, a new database was created using a new, more responsive and interactive platform. The database was launched in Tanzania in May of 2017 where it was thoroughly beta tested by investigators. The team provided valuable feedback to further improve the usability and functionality of the database. Thanks to the Tanzanian team's efforts the database was released across the globe a few months later in August of the same year.

PILOT PROJECT

ULAB Benchmarking Assessment Tool Training

In 2017, Pure Earth organized a training on implementing a Used Lead-Acid Battery - Benchmarking Assessment Tool (BAT). The training was facilitated by Mr. Brian Wilson of the International Lead Association. The workshop aimed to create awareness around best practices for ULAB recycling, including demonstration of risk mitigation techniques for improving occupational and environmental health and safety. The training was structured in two parts whereby on day one participants were taken through the Benchmark Assessment Tool (BAT) via classroom presentation. Day two was reserved for a hands-on practicum where participants could walk through the BAT process. Hesitation by factory owners to allow participants inside the factory, however, stymied the plans and facilitator Brian Wilson instead presented a film documenting a ULAB factory. The film simulated conditions in the field such that participants were able to conduct a virtual field visit. The factory owner did allow the Pure Earth team and Mr. Wilson to conduct a walk-through of the OKPlast factory the day after the training, opening the doors for future programs with the facility.

CHALLENGES AND RECOMMENDATIONS

Challenges

- Red Tape: Excessive bureaucracy, protocols, rules, formalities
- Lack of Sense of Urgency: Deadlines not respected
- Limited Capacity: Low technical and organizational capacity, governance, leadership, management
- Limited infrastructure: Poor roads cause delays, especially during rainy season; poor internet coverage impacts ability to communicate with field staff and can delay uploading of sites to database
- Safety and Security: Caution must be used in travel to remote regions; investigators sometimes unable to access site

Recommendations

- Prioritize ending the most harmful practices of mercury use on licensed mines, including the use of mercury by children, burning the amalgam in residential areas, and burning the amalgam in the open
- Conduct research to identify and address factors contributing to unsafe practices
- Enforce current regulations that require the use of retorts and protective gear
- Work to supply retorts to miners that are affordable, capable of being replaced, and sensitive to miners' preferences
- Where possible promote Ex-Situ Approaches in restoring the sites polluted by obsolete pesticides (Contamination is either removed from one place and put elsewhere, or destroyed entirely)
- Conduct additional Best Available Technology (BAT) trainings to improve practices in industries
- Promote cleaner production in textile and tannery industries
- Promote the utilization of a geo-textile in remediating sites contaminated by Lead
    - Geo-textile layer is covered by 20cm of compacted clean soil.
    - Advantages: more affordable, less disruption of the community, work is simple enough to be carried out by the community (promoting community buy-in and understanding)
- Work collaboratively to unify work of contaminated sites inventory projects currently being undertaken in the country (Pure Earth TSIP Inventory, inventory of polluted sites with is being done by the Vice President Office)
- Conduct research and facilitate discussions with small-scale miners on the use of mercury alternatives
- Replace individual environmental action plans with a clear checklist of basic environmental practices that all small-scale miners should follow
- Raise awareness on the most harmful uses of mercury, in particular the use of mercury by children and pregnant women, among community members, health officials, and relevant ministries such as the Ministry of Labour and Employment

APPENDIX I - ALL TSIP SITES IN TANZANIA

Site ID	Site Name	Latitude	Longitude	Key Pollutant	Site Industry
TZ-90	Mikocheni, Kinondoni, Dar es Salaam	-6.760857	39.248569	Lead	Multiple Diverse Industries
TZ-257	Vingunguti Dumpsite on Msimbazi River	-6.795535	39.274193	Cadmium	Multiple Diverse Industries
TZ-491	Yuasa Battery Industry Ltd. Dar es Salaam	-6.854498	39.222061	Lead	Lead - Battery Recycling
TZ-492	East Hides Industry, Morogoro	-6.821699	37.673237	Chromium (Total)	Tannery Operations
TZ-493	Wazo Hill Area, Dar es Salaam	-6.682851	39.207458	Chromium (Total)	Product Manufacturing (electronics, equipment, clothing)
TZ-494	Vingunguti Dumpsite, Dar es Salaam	-6.845156	39.220943	Chromium (Total)	Industrial/Municipal Dump Site
TZ-495	M.M. Integrated Steel Mills Ltd.	-6.76173	39.238293	Other	Heavy Industry (casting, rolling, stamping)
TZ-496	TAZARA Locomotive Workshop, Dar es Salaam	-6.847489	39.244194	Lead	Transportation (bus stations, rail yards)
TZ-497	Mzinga Ammunition Factory, Morogoro	-6.832011	37.63504	Lead	Weapons Manufacturing
TZ-498	Metric International Acid Battery Recycling Industry	-6.798049	39.21954	Lead	Lead - Battery Recycling
TZ-722	Vikuge, Soga Ward, Kibaha District	-6.807738	38.866821	Hexachlorobenzene (Benzene Hexachloride)	Agriculture
TZ-1089	Murriet dumpsite, Arusha	-3.5792	36.8003	Mercury - elemental	Industrial/Municipal Dump Site
TZ-1090	Sinon Sewage Sludge, Arusha	-3.3907666	36.69481667	Chromium (Total)	Wastewater Treatment Plant
TZ-1249	Sunflag Textile Industry-Arusha	-3.39865	36.7126	Chromium (Total)	Product Manufacturing (electronics, equipment, clothing)
TZ-1337	Mirongo River, Mwanza	-2.515589	32.9031	Lead	Industrial/Municipal Dump Site
TZ-1340	Ilemela River, Ilemela District, Mwanza	-2.452981	32.901259	Chromium (Total)	Wastewater Treatment Plant
TZ-1346	Simiyu River, Mwanza	-2.502269	33.385065	Mercury - elemental	Agriculture
TZ-1440	Mtoni Dumpsite, Dar es Salaam	-6.8717	39.2828	Arsenic	Industrial/Municipal Dump Site
TZ-1445	North Mara Gold Mining, Mara region	-1.42	34.53	Lead	Mining and Ore Processing
TZ-1447	Twenty First Century Textiles Ltd (TCTL), Morogoro region	-6.820278	37.661667	Chromium (Total)	Product Manufacturing (electronics, equipment, clothing)
TZ-1449	Karibu Textile Mills, Temeke district, Dar-es-Salaam	-6.886796	39.267083	Chromium (Total)	Product Manufacturing (electronics, equipment, clothing)
TZ-1450	Kaloleni Dumpsite, Moshi, Kilimanjaro region	-3.36783	37.34927	Cadmium	Industrial/Municipal Dump Site
TZ-	Tighite River, Tarime District,	-1.387	34.346	Chromium	Mining and Ore Processing

Site ID	Site Name	Latitude	Longitude	Key Pollutant	Site Industry
1475	Mara			(Total)	
TZ-1489	Mzinga Creek, Dar-es-salaam	-6.866667	39.28333	Lead	Industrial Estate (mixed industries)
TZ-1560	Dar-es-salaam Harbour, Dar-es-salaam	-6.817361	39.284995	Lead	Product Manufacturing (electronics, equipment, clothing)
TZ-1561	Mbweni Mangrove Stand, Dar-es-salaam	-6.569259	39.134565	Lead	Industrial/Municipal Dump Site
TZ-1562	Ras Dege Mangrove Ecosystem, Dar-es-salaam	-6.883611	39.45287	Chromium (Total)	Multiple Diverse Industries
TZ-1563	Msasani Bay, Dar-es-salaam	-6.797078	39.299011	Lead	Medical (hospitals, clinics)
TZ-1666	Nyakabale Village, Geita District, Mwanza Region	-2.83875	32.155306	Lead	Mining and Ore Processing
TZ-1668	Mtakuja river, Geita district Paddy Fields, Mwanza region	-2.873345	32.178421	Chromium (Total)	Mining and Ore Processing
TZ-1669	Mount Meru Hospital, Arusha	-3.365666667	36.69455556	2,3,7,8-TCDD (Dioxins)	Medical (hospitals, clinics)
TZ-1868	Lupa Goldfield, Chunya District	-7.731458	32.811275	Mercury - elemental	Mining and Ore Processing
TZ-1869	Lwamgasa Artisanal Gold Mining, Geita District, (Geita) Mwanza Region	-3.117483	32.04245	Mercury - elemental	Artisanal Mining (hand mining)
TZ-1886	Nyarugusu artisanal gold mine, Geita district, Mwanza	-3.11	32.226139	Mercury - elemental	Artisanal Mining (hand mining)
TZ-1887	Mgusu artisanal gold mine, Geita district, (Geita) Mwanza region	-2.86276	32.06187	Mercury - elemental	Artisanal Mining (hand mining)
TZ-1891	Kigogo Dumpsite, Kinondoni district, Dar es Salaam	-6.820839	39.244609	Chromium (Total)	Industrial/Municipal Dump Site
TZ-1892	Moshi Leather Industries Ltd , Moshi district, Kilimanjaro	-3.365025	37.346702	Chromium (Total)	Industrial/Municipal Dump Site
TZ-1895	Lake Trading Co.Ltd (Kibaha Tannery), Coast region	-6.766861	38.962361	Chromium (Total)	Tannery Operations
TZ-1904	Industrial Facilities, Ngerengere river, Morogoro region	-7.05	38.51666667	Chromium (Total)	Industrial Estate (mixed industries)
TZ-1905	Mwanza Gulf, Mwanza Region	-2.507129	32.895093	Mercury - elemental	Artisanal Mining (hand mining)
TZ-1926	Matu River, Mwanza	-2.566667	33.466667	Lead	Industrial Estate (mixed industries)
TZ-2147	Magunga Artisanal Mining, Musoma	-1.8069	34.0984	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2148	Zanzibar Harbour, Zanzibar	-6.164944	39.198789	Lead	Industrial/Municipal Dump Site
TZ-2171	Nyawarioba Artisanal Mining, Kiabakari-Musoma	-1.7482	33.8965	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2172	Saki Artisanal Mining-Kiabakari Musoma	-1.792	33.7678	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2272	Isungang'wanda artisanal mine, Nzega, Tabora	-4.0785	33.1395	Mercury - elemental	Artisanal Mining (hand mining)
TZ-	Ikombanduli Artisanal Mine,	-4.26768	34.1693	Mercury -	Artisanal Mining (hand mining)

Site ID	Site Name	Latitude	Longitude	Key Pollutant	Site Industry
2274	Igunga, Tabora			elemental	
TZ-2506	Maji Moto Artisanal Mine, Serengeti	-1.64612	34.33231	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2507	Kianyundo Artisanal Mine, Musoma	-1.7406	34.2318	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2677	Demco Artisanal Mine, Mbeya	-8.3852	32.993	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2678	Saza Artisanal Mine, Mbeya	-8.904067	33.449936	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2679	Saza II Artisanal Mine, Mbeya	-8.904067	33.449936	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2685	Saza III,Chunya District, Mbeya	-8.904067	33.449936	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2686	Saza IV, Chunya District, Mbeya	-8.904067	33.449936	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2726	Saza V Artisanal Mine, Chunya, Mbeya	-8.557013	33.432747	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2727	Makongolosi I Artisanal Mine, Chunya, Mbeya	-8.904067	33.449936	Lead	Artisanal Mining (hand mining)
TZ-2728	Makongolosi II Artisanal Mine, Chunya, Mbeya	-8.4162	33.1712	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2738	Idiwili artisanal gold mine, Mbozi district, Mbeya region	-8.969183	33.105365	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2739	Iwiji artisanal gold mine, Mbozi district, Mbeya region	-9.166747	32.867496	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2740	Lubanda artisanal gold mine, Ileje district, Mbeya region	-9.403699	33.186655	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2741	Mtula artisanal gold mine, Ileje district, Mbeya region	-9.396095	33.512327	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2742	Mwalisi village artisanal gold mine, Kyela district, Mbeya region	-9.625	33.875	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2744	D-Reef artisanal gold mine, Mpanda district, Rukwa region.	-6.411611	31.042611	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2745	Ibindi artisanal gold mine, Mpanda district, Rukwa region	-6.518	31.081083	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2746	Kapanda artisanal gold mine, Mpanda district, Rukwa region	-6.469167	31.076444	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2747	Mtisi artisanal gold mine, Mpanda district, (Katavi) Rukwa region.	-6.484722	31.112639	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2748	Sikitiko artisanal gold mine, Mpanda district, (Katavi) Rukwa region.	-6.483722	31.080833	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2749	Afro- Leather Industry, Temeke district, Dar es Salaam.	-6.858086111	39.26291944	Chromium (Total)	Tannery Operations
TZ-2750	The Kibangu River Kinondoni District, Dar es Salaam	-6.795569	39.207392	Cadmium	Agriculture
TZ-2771	The Luhanga River, Ilala district, Dar es Salaam region	-6.823673	39.240472	Lead	Agriculture
TZ-2773	Sahaa Garage, Kinondoni district, Dar es Salaam	-6.785602	39.222304	Lead	Transportation (bus stations, rail yards)

Site ID	Site Name	Latitude	Longitude	Key Pollutant	Site Industry
TZ-2776	Misumi garage, Kinondoni district, Dar es Salaam region	-6.810038	39.215842	Lead	Mechanic/Garage (Vehicle Repair)
TZ-2782	Makongolosi V Artisanal Mine, Chunya-Mbeya	-8.4022	33.1625	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2783	Makongolosi VI Artisanal Mine, Chunya-Mbeya	-8.557013	33.432747	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2865	Makongolosi VII, Chunya, Mbeya	-8.557013	33.432747	Mercury - elemental	Artisanal Mining (hand mining)
TZ-2867	Makongolosi IX, Chunya, Mbeya	-8.904067	33.449936	Mercury - elemental	Artisanal Mining (hand mining)
TZ-3487	Gaia Eco Solutions Limited, Ilala district, Dar es Salaam.	-6.854994	39.220076	Lead	Lead - Battery Recycling
TZ-3488	Mabibo Scrap Metals, Kinondoni District, Dar es Salaam	-6.797735	39.225429	Cadmium	Recycling / Recyclers (including salvage yards)
TZ-3490	OK Plast, Ilala district, Dar es Salaam	-6.85265	39.22145	Lead	Lead - Battery Recycling
TZ-3491	Kizinga River, Temeke District, Dar es Salaam	-6.882736	39.268803	Chromium (Total)	Dye Industry
TZ-3492	Kilombero Sugar Company Ltd, Kilombero district, Morogoro	-8.063224	36.6981	DDT	Agriculture
TZ-3493	Mtibwa Sugar Estate Ltd, Mvomero district, Morogoro	-6.140011	37.638665	Pesticides (Total)	Agriculture
TZ-3494	MOFACU Pesticides Stores, Morogoro District, Morogoro	-6.822812	37.673492	DDT	Agriculture
TZ-3495	Kihonda Industrial Area, Morogoro district, Morogoro	-6.781643	37.671076	Cadmium	Multiple Diverse Industries
TZ-3499	NIDA Textile Mills Tanzania Ltd	-6.819707	39.229551	Chromium (Total)	Dye Industry
TZ-3522	Kisarawe Cement Company	-6.93152	39.03325	Lead	Industrial/Municipal Dump Site
TZ-3807	ACU Maize Farm, Meru district, Arusha region	-3.373256	36.882771	Dieldrin	Agriculture
TZ-3808	PPO Tengeru, Meru district, Arusha region	-3.384823	36.797716	Lindane (Hexachlorocyclohexane all forms)	Agriculture
TZ-3830	Nzuguni -Dodoma	-5.308	35.0309	Mercury - elemental	Artisanal Mining (hand mining)
TZ-3837	STAMICO artisanal gold mine, Kahama district, Shinyanga region	-3.198931	32.502788	Mercury - elemental	Artisanal Mining (hand mining)
TZ-3838	Nyakagwe artisanal gold mine, Kahama District	-3.21041	32.42795	Mercury - elemental	Artisanal Mining (hand mining)
TZ-3839	Nyang_homango artisanal gold mine, Kahama District	-3.22088	32.41602	Mercury - elemental	Artisanal Mining (hand mining)
TZ-4040	Nyankumbu artisanal gold mine, (Geita) Mwanza region	-2.90253	32.22237	Mercury - elemental	Artisanal Mining (hand mining)
TZ-4041	Samina artisanal gold mine, (Geita) Mwanza region	-2.898334	32.15282	Mercury - elemental	Artisanal Mining (hand mining)
TZ-4042	Buziba artisanal gold mine Geita district, Mwanza region	-3.12722	32.18425	Mercury - elemental	Artisanal Mining (hand mining)

Site ID	Site Name	Latitude	Longitude	Key Pollutant	Site Industry
TZ-4043	Magema artisanal gold mining Geita district, (Geita) Mwanza region	-2.88709	32.19531	Mercury - elemental	Artisanal Mining (hand mining)
TZ-4044	Kakola artisanal gold mine Kahama district, Shinyanga Region	-3.23392	32.45811	Mercury - elemental	Artisanal Mining (hand mining)
TZ-4047	Mabubi River, (Geita) Mwanza region	-2.836955	32.154519	Mercury - elemental	Artisanal Mining (hand mining)
TZ-4048	Isingile River, Mwanza Region	-3.11301	32.03863	Mercury - elemental	Artisanal Mining (hand mining)
TZ-4049	Beda artisanal gold mine, Mwanza region	-3.17021	31.81606	Mercury - elemental	Artisanal Mining (hand mining)
TZ-4050	Busolwa artisanal gold mine, Mwanza region	-3.15	32.22422	Mercury - elemental	Artisanal Mining (hand mining)
TZ-4124	Mining sites-Autraid & Lupa Mapunga	-8.46765	33.33616	Mercury - elemental	Mining and Ore Processing
TZ-4125	Mining sites-Kipoki	-8.42892	33.16319	Mercury - elemental	Artisanal Mining (hand mining)
TZ-4126	Mining sites-Kalungu	-8.42343	33.05346	Mercury - elemental	Artisanal Mining (hand mining)
TZ-4128	Mining sites-Ifwenkenya	-8.64124	33.16442	Mercury - elemental	Artisanal Mining (hand mining)
TZ-4300	Autraid Mining site	-8.46765	33.33601	Mercury - elemental	Artisanal Mining (hand mining)
TZ-4403	Seita artisanal gold mine	-5.91493	37.19991	Mercury - elemental	Artisanal Mining (hand mining)
TZ-4980	Temeke Wailes Vegetable Farm,Temeke District, Dar es Salaam Region.	-6.85453	39.26608	Lead	Agriculture
TZ-5007	Chingurubira Artisanal Mining, Bunda District, Mara	-2.0471	33.5059	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5008	Namhula Artisanal Mine, Bunda District, Tanzania	-2.0546	33.4241	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5009	Kamkenga Artisanal Mine, Bunda District, Tanzania	-1.9328	33.8088	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5010	Kabasa Artisanal Mine, Bunda District, Tanzania	-1.9686	33.8017	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5011	Songambele Artisanal Mine, Bunda District, Tanzania	-2.0115	33.8124	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5028	Nyamtondo Artisanal Gold Mine, Geita District,Geita region	-3.13005	31.96267	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5029	Sobola Artisanal Gold Mine,Geita District,Geita Region	-3.1323	31.95034	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5030	Nyamahuna Plant Gold Mine, Geita District, Geita region	-3.14168	31.95701	Mercury - elemental	Mining and Ore Processing
TZ-5031	Ikandilo Artisanal Gold Mine, Geita District, Geita Region	-3.14928	32.22423	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5032	Nyaruyeye Artisanal Gold Mine,Geita District,geita Region	-3.15283	32.26231	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5033	Wigo Artisanal Gold Mine,Geita District,Geita	-3.18142	32.27898	Mercury - elemental	Artisanal Mining (hand mining)

Site ID	Site Name	Latitude	Longitude	Key Pollutant	Site Industry
	Region				
TZ-5034	Magenge Artisanal Gold mine, Geita District,Geita region	-3.14992	31.94631	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5037	Makurugusi Artisanal Gold Mine	-2.91857	31.744386	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5038	Mpomvu Juu Artisanal Gold Mine	-2.919824	32.919824	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5039	Ikumbayaga Artisanal Mine	-2.90911	32.18937	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5040	Mpomvu Chini Artisanal Gold Mine	-2.90981	32.162964	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5041	Musasa Artisanal Gold Mine	-2.922428	31.757071	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5057	Godima Artisanal Gold Mining-Chunya District	-8.50761	33.49907	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5058	Shoga Artisanal Small Scale Gold Mining-Chunya District	-8.43016	33.6654	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5059	Sangambi Artisanal Small Scale Gold Mining-Chunya District	-8.48913	33.60957	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5060	Matundasi Artisanal Small Scale Gold Mining -Chunya District	-8.45495	33.27113	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5098	Chunya Mjini Artisanal Gold Mining-Chunya District	-8.5158	33.44403	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5370	Chunya-Maweto Artisanal Gold Mining, Chunya District	-8.46292	33.43145	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5371	Sangambi-Igundu Artisanal Small Gold Mining, Chunya District	-8.48956	33.60751	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5372	Shoga 2 Artisanal Small Scale Gold Mining, Chunya District	-8.42972	33.66491	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5373	Matundasi-Itumbi Artisanal Small Gold Mining, Chunya District	-8.37917	33.32751	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5374	Godima-Mapogoro Artisanal Small Scale Gold Mining, Chunya District	-8.41264	33.65014	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5375	TegetaVegetable Gardens, Kinondoni district, Dar es Salaam	-6.65938	39.19039	Cadmium	Agriculture
TZ-6279	Rusungwa Artisanal Gold Mine, Geita District, Geita Region	-2.92504	31.75669	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6284	Nyakafuru Artisanal Gold Minie, Bukombe District, Shinyanga Region	-3.60898	32.23146	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6285	Nyijundu Artisanal Gold Mine, Geita District, Geita Region	-3.08111	32.66845	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6904	Magengeni Artisanal Gold Mine, Geita District, Geita Region, Tanzania	-3.18218	31.95189	Mercury - elemental	Artisanal Mining (hand mining)

Site ID	Site Name	Latitude	Longitude	Key Pollutant	Site Industry
TZ-6905	Busolwangili Artisanal Gold Mine, Kahama District, Shinyanga Region	-3.30031	32.52013	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6913	Iseni Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-3.07102	32.04247	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6950	Nyamalimbe Artisanal Gold Mine, Geita Region, Tanzania	-3.15085	31.94819	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6951	Nyamtondo Artisanal Gold Mine, Geita Region, Tanzania	-3.13035	31.96508	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6952	Bingwa Artisanal Gold Mine, Geita District, Geita Region	-3.11868	32.07174	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6954	Sobora Artisanal Gold Mine, Geita Region, Tanzania	-3.13262	31.94865	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6986	Lambo la Mzungu Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-3.07601	32.02439	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6987	Imalanguzu Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-3.07679	32.02354	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6988	Makarashani Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-3.06955	32.02412	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6989	Nyakagwe Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-3.1286	32.25415	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6990	Ikandilo A Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-3.08955	32.13464	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6991	Stamico Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-3.08202	32.12271	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6992	Mtaa wa Afya Artisanal and Small Scale Gold Mining, Geita District, Geita Region	-3.01293	31.57151	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6993	Inyara Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-2.58109	31.56749	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6994	Ibozyamagigo Artisanal and Small Scale Gold Mining, Geita District, Geita Region	-3.01142	31.57275	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6995	Maweni Artisanala and Small Scale Gold Mining, Chato District, Geita Region.	-2.59569	31.5514	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6996	Iparamasa Artisanal and Small Scale Gold Mining,Chato District, Geita Region.	-3.09265	31.53378	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6997	Beda Artisanal and Small Scale Gold Mining, Chato District, Geita Region.	-3.10198	31.49166	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6998	Imwelo Artisanal and Small Scale Gold mining, Chato District, Geita Region	-2.53983	31.53704	Mercury - elemental	Artisanal Mining (hand mining)

Site ID	Site Name	Latitude	Longitude	Key Pollutant	Site Industry
TZ-6999	Mwambu Artisanal and Small Scale Gold Mining, Chato District, Geita Region.	-2.54836	31.52325	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7000	Musasa Centre Artisanal and Small Scale Gold Mining, Chato District, Geita Region.	-2.5544	31.45321	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7001	Katente Artisanal and Small Scale Gold Mining, Bukombe District, Geita Region.	-3.26454	31.53646	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7002	Kerezia Artisanal and Small Scale Gold Mining, Bukombe District, Geita Region.	-3.25676	31.49602	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7003	Ng'anzo Artisanal and Small Scale gold Mining, Bukombe District, Geita Region.	-3.21647	31.48613	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7004	Matabe Artisanal and Small Scale Gold Mining, Chato District, Geita Region.	-3.09764	31.4597	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7028	Ifugandi Artisanal Gold Mine, Geita District, Geita Region	-3.02367	32.66142	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7030	Ililika Artisanal Gold Mine, Geita District, Geita Region	-3.11731	32.24265	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7031	Katente Nambamoja Artisanal Gold Mine, Bukombe District, Shinyanga Region	-3.44096	31.89095	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7032	Mawemeru Artisanal Gold Mine, Geita District, Geita Region	-3.10928	32.22904	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7033	Ziwani Artisanal Gold Mine, Geita District, Geita Region	-3.11508	32.24389	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7034	Nyangarata Artisanal Gold Mine, Kahama District, Shinyanga Region	-3.30447	32.52353	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7035	Nyaruyeye Artisanal Gold Mine, Geita District, Geita Region	-3.16999	32.24161	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7037	Shibaranga Artisanal Gold Mine, Kahama District, Shinyanga Region	-2.95452	32.57602	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7038	Nambamoja Fine Holdings Artisanal Gold Mine, Geita District, Geita Region	-2.88248	32.04153	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7040	Rushimba Artisanal Gold Mine, Geita District, Geita Region	-3.2255	32.53727	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7041	Rusungwa Artisanal Gold Mine, Geita District, Geita Region	-2.92751	31.77837	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7080	Mbugani Artisanal Gold Mine, Chato District, Geita Region	-2.92468	31.75672	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7161	Izumbi Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.29749	33.35288	Mercury - elemental	Artisanal Mining (hand mining)

Site ID	Site Name	Latitude	Longitude	Key Pollutant	Site Industry
TZ-7168	Sinjiriri A Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.31994	33.26704	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7169	Isoko Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.29857	33.32894	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7170	Legezamwendo Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.27781	33.25887	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7176	Mawelo Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.3298	33.22167	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7179	Makatang'ombe Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.23137	33.21248	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7200	Soweto Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.34875	33.20692	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7209	Nanyuki Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.2095	33.1587	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7210	Matondo Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.23871	33.17305	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7223	Chokaa Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.30744	33.26049	Mercury - elemental	Artisanal Mining (hand mining)

UNIDO FUNDED SITES

Site ID	Site Name	Latitude	Longitude	Key Pollutant	Site Industry
TZ-4980	Temeke Wailes Vegetable Farm,Temeke District, Dar es Salaam Region.	-6.85453	39.26608	Lead	Multiple Diverse Industries
TZ-5007	Chingurubira Artisanal Mining, Bunda District, Mara	-2.0471	33.5059	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5008	Namhula Artisanal Mine, Bunda District, Tanzania	-2.0546	33.4241	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5009	Kamkenga Artisanal Mine, Bunda District, Tanzania	-1.9328	33.8088	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5010	Kabasa Artisanal Mine, Bunda District, Tanzania	-1.9686	33.8017	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5011	Songambele Artisanal Mine, Bunda District, Tanzania	-2.0115	33.8124	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5030	Nyamahuna Plant Gold Mine, Geita District, Geita region	-3.14168	31.95701	Mercury - elemental	Mining and Ore Processing
TZ-5033	Wigo Artisanal Gold Mine,Geita District,Geita Region	-3.18142	32.27898	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5037	Makurugusi Artisanal Gold Mine	-2.91857	31.744386	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5038	Mpomvu Juu Artisanal Gold Mine	-2.919824	32.919824	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5039	Ikumbayaga Artisanal Mine	-2.90911	32.18937	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5040	Mpomvu Chini Artisanal Gold Mine	-2.90981	32.162964	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5041	Musasa Artisanal Gold Mine	-2.922428	31.757071	Mercury - elemental	Artisanal Mining (hand mining)

WORLD BANK FUNDED SITES

Site ID	Site Name	Latitude	Longitude	Key Pollutant	Site Industry
TZ-5028	Nyamtondo Artisanal Gold Mine, Geita District,Geita region	-3.13005	31.96267	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5029	Sobola Artisanal Gold Mine,Geita District,Geita Region	-3.1323	31.95034	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5031	Ikandilo Artisanal Gold Mine, Geita District, Geita Region	-3.14928	32.22423	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5032	Nyaruyeye Artisanal Gold Mine,Geita District,geita Region	-3.15283	32.26231	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5034	Magenge Artisanal Gold mine, Geita District,Geita region	-3.14992	31.94631	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5057	Godima Artisanal Gold Mining-Chunya District	-8.50761	33.49907	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5058	Shoga Artisanal Small Scale Gold Mining-Chunya District	-8.43016	33.6654	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5059	Sangambi Artisanal Small Scale Gold Mining-Chunya District	-8.48913	33.60957	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5060	Matundasi Artisanal Small Scale Gold Mining -Chunya District	-8.45495	33.27113	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5098	Chunya Mjini Artisanal Gold Mining-Chunya District	-8.5158	33.44403	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5370	Chunya-Maweto Artisanal Gold Mining, Chunya District	-8.46292	33.43145	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5371	Sangambi-Igundu Artisanal Small Gold Mining, Chunya District	-8.48956	33.60751	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5372	Shoga 2 Artisanal Small Scale Gold Mining, Chunya District	-8.42972	33.66491	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5373	Matundasi-Itumbi Artisanal Small Gold Mining, Chunya District	-8.37917	33.32751	Mercury - elemental	Artisanal Mining (hand mining)

TZ-5374	Godima-Mapogoro Artisanal Small Scale Gold Mining, Chunya District	-8.41264	33.65014	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6279	Rusungwa Artisanal Gold Mine, Geita District, Geita Region	-2.92504	31.75669	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6284	Nyakafuru Artisanal Gold Minie, Bukombe District, Shinyanga Region	-3.60898	32.23146	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6285	Nyijundu Artisanal Gold Mine, Geita District, Geita Region	-3.08111	32.66845	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6904	Magengeni Artisanal Gold Mine, Geita District, Geita Region, Tanzania	-3.18218	31.95189	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6905	Busolwangili Artisanal Gold Mine, Kahama District, Shinyanga Region	-3.30031	32.52013	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6913	Iseni Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-3.07102	32.04247	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6950	Nyamalimbe Artisanal Gold Mine, Geita Region, Tanzania	-3.15085	31.94819	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6951	Nyamtondo Artisanal Gold Mine, Geita Region, Tanzania	-3.13035	31.96508	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6952	Bingwa Artisanal Gold Mine, Geita District, Geita Region	-3.11868	32.07174	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6954	Sobora Artisanal Gold Mine, Geita Region, Tanzania	-3.13262	31.94865	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6986	Lambo la Mzungu Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-3.07601	32.02439	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6987	Imalanguzu Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-3.07679	32.02354	Mercury - elemental	Artisanal Mining (hand mining)

TZ-6988	Makarashani Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-3.06955	32.02412	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6989	Nyakagwe Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-3.1286	32.25415	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6990	Ikandilo A Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-3.08955	32.13464	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6991	Stamico Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-3.08202	32.12271	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6992	Mtaa wa Afya Artisanal and Small Scale Gold Mining, Geita District, Geita Region	-3.01293	31.57151	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6993	Inyara Artisanal and Small Scale Gold Mining, Geita District, Geita Region.	-2.58109	31.56749	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6994	Ibozyamagigo Artisanal and Small Scale Gold Mining, Geita District, Geita Region	-3.01142	31.57275	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6995	Maweni Artisanala and Small Scale Gold Mining, Chato District, Geita Region.	-2.59569	31.5514	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6996	Iparamasa Artisanal and Small Scale Gold Mining,Chato District, Geita Region.	-3.09265	31.53378	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6997	Beda Artisanal and Small Scale Gold Mining, Chato District, Geita Region.	-3.10198	31.49166	Mercury - elemental	Artisanal Mining (hand mining)
TZ-6998	Imwelo Artisanal and Small Scale Gold mining, Chato District, Geita Region	-2.53983	31.53704	Mercury - elemental	Artisanal Mining (hand mining)

TZ-6999	Mwambu Artisanal and Small Scale Gold Mining, Chato District, Geita Region.	-2.54836	31.52325	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7000	Musasa Centre Artisanal and Small Scale Gold Mining, Chato District, Geita Region.	-2.5544	31.45321	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7001	Katente Artisanal and Small Scale Gold Mining, Bukombe District, Geita Region.	-3.26454	31.53646	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7002	Kerezia Artisanal and Small Scale Gold Mining, Bukombe District, Geita Region.	-3.25676	31.49602	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7003	Ng'anzo Artisanal and Small Scale gold Mining, Bukombe District, Geita Region.	-3.21647	31.48613	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7004	Matabe Artisanal and Small Scale Gold Mining, Chato District, Geita Region.	-3.09764	31.4597	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7028	Ifugandi Artisanal Gold Mine, Geita District, Geita Region	-3.02367	32.66142	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7030	Ililika Artisanal Gold Mine, Geita District, Geita Region	-3.11731	32.24265	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7031	Katente Nambamoja Artisanal Gold Mine, Bukombe District, Shinyanga Region	-3.44096	31.89095	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7032	Mawemeru Artisanal Gold Mine, Geita District, Geita Region	-3.10928	32.22904	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7033	Ziwani Artisanal Gold Mine, Geita District, Geita Region	-3.11508	32.24389	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7034	Nyangarata Artisanal Gold Mine, Kahama District, Shinyanga Region	-3.30447	32.52353	Mercury - elemental	Artisanal Mining (hand mining)

TZ-7035	Nyaruyeye Artisanal Gold Mine, Geita District, Geita Region	-3.16999	32.24161	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7037	Shibaranga Artisanal Gold Mine, Kahama District, Shinyanga Region	-2.95452	32.57602	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7038	Nambamoja Fine Holdings Artisanal Gold Mine, Geita District, Geita Region	-2.88248	32.04153	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7040	Rushimba Artisanal Gold Mine, Geita District, Geita Region	-3.2255	32.53727	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7041	Rusungwa Artisanal Gold Mine, Geita District, Geita Region	-2.92751	31.77837	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7080	Mbugani Artisanal Gold Mine, Chato District, Geita Region	-2.92468	31.75672	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7161	Izumbi Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.29749	33.35288	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7168	Sinjiriri A Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.31994	33.26704	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7169	Isoko Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.29857	33.32894	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7170	Legezamwendo Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.27781	33.25887	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7176	Mawelo Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.3298	33.22167	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7179	Makatang'ombe Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.23137	33.21248	Mercury - elemental	Artisanal Mining (hand mining)

TZ-7200	Soweto Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.34875	33.20692	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7209	Nanyuki Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.2095	33.1587	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7210	Matondo Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.23871	33.17305	Mercury - elemental	Artisanal Mining (hand mining)
TZ-7223	Chokaa Artisanal and Small Scale Gold Mining, Chunya District, Mbeya Region	-8.30744	33.26049	Mercury - elemental	Artisanal Mining (hand mining)
TZ-5375	TegetaVegetable Gardens, Kinondoni district, Dar es Salaam	-6.65938	39.19039	Cadmium	Agriculture