ANNUAL REPORT 2016

PURE EARTH
BLACKSMITH INSTITUTE

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Letter from the Chair of the Board

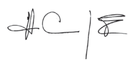
In 2016, Pure Earth remained true to the mission of identifying and cleaning up toxic hot spots. Before each cleanup project becomes a reality, Pure Earth staffers log hundreds of hours building relationships in the affected communities, empowering local champions, gaining trust, forging partnerships and getting government buy in. On this basis, community education can be accomplished.

In the dozens of projects our teams have executed, I never get used to the fact that so many people around the world are unaware of the dangers associated with constant exposure to toxic heavy metals and other pollutants. In the U.S. we are inundated daily with anxiety-provoking news stories about exposures to pollutants that are relatively low risk in comparison to the threats we see in the developing world. The people Pure Earth helps are awash in mercury, molten lead, hexavalent chromium and other toxicants, as they work hard every day doing informal, subsistence industrial work to support their families.

Leveraging small investments into larger grants is something Pure Earth does very well, and as a former banker, this is one of the reasons for my passionate support of our work. Small investments from private donors are used to implement pilot projects. These projects typically cost between $10,000 and $100,000, and provide proof of concept and lead to larger investments from multilateral funders and foundations. A successful cleanup project also mobilizes regional and national governments to commit additional resources to expand the work. This strategic approach enables initial investments of just thousands of dollars to leverage millions, allowing donor dollars to save and better lives with greatly enhanced affect.

Beyond the financial leverage, these projects leverage human capacity and potential. A community no longer under the daily assault from dangerous toxins immediately experiences health gains for all, but particularly pregnant women, babies in utero, infants and young children. Children born without in utero exposure will have higher IQs and better overall health and productivity. I am especially inspired when I think about the benefits a cleaned up community will enjoy for generations into the future. I invite you to join us in this unique effort.

Sincerely,



H. Conrad Meyer III
Pure Earth Chair

Cover Photo: Zambia—Kabwe man on black mountain with smelter in background, by Larry C. Price

Letter from the President

The most important role we play at Pure Earth is that of a catalyst. We seek out community leaders and government representatives concerned about pollution, partner and marshal the resources to start the process of cleaning up toxic sites. Our staff create and deliver education materials, conduct soil, water, and air sampling to determine the concentration of toxins and assesses the health of the population exposed. In the best cases, this results in a cleanup project, where we work along side locals building capacity so they can continue after we leave.

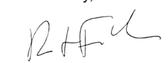
We see the long-term benefits of our efforts, rippling out over people's lives for years to come. For example, one of our first projects in Haina, Dominican Republic continues to have a positive impact on the community's health. A highly toxic residential area built on top of abandoned lead smelters was causing brain damage in many local children. We raised private funds to start the cleanup. This served as a financial catalyst attracting more funding. Hopelessness and resignation transformed into enthusiasm and energy. We got the job done, and a decade later blood lead levels are normal, down to 5 µg/dL from 23 µg/dL. All the babies born in this community since we finished our project in 2010 are no longer victims of the ravages of lead poisoning. The return on investment goes on for generations.

Today, in addition to the 110 projects we have completed improving the lives of over 4.5 million people, Pure Earth is serving as a catalyst for change on the global research and policy front. By convening The Lancet Commission on Pollution and Health, we brought together a global brain trust of over 50 leaders in environmental health, policy, research and economics, and produced a landmark report that will be published in the fall of 2017. Commission researchers collected the latest data available on the totality of pollution, its affect on public health, its economic impact, as well as the practical solutions for solving the pollution crisis. The goal of the report is to increase commitment to fight pollution and to trigger increased investments from the international community.

In all our efforts, I witness concerned community leaders, government officials, donors, parents, young people turn from feeling overwhelmed and helpless into hopeful, active campaigners, who change the toxic status.

Thank you for being part of the solution.

Sincerely,



Richard Fuller
President

CAMPAIGN FOR 10 MILLION LIVES

Pollution kills 9 million people each year—more than the population of New York City. It also permanently damages the brains and bodies of millions more, especially children. Pollution knows no borders, the mercury used by gold miners in Peru and Indonesia is poisoning the tuna in our homes and restaurants. The air pollution in Asia travels across continents, affecting us all.

In late 2016, Pure Earth made a bold commitment to raise $10 million to implement proven pollution solutions and directly improve the health and lives of 10 million endangered women, men and children.

Imagine… $1 helps 1 life.

Join our community to raise $10 million. Together, we can:

- impact the health of at least 10 million people, including 3.2 million children
- cleanup 35 of the world's most toxic sites and improve livelihoods
- launch Health and Pollution Action Plans with at least 4 national governments
- increase research in understudied areas such as the impact of mercury and lead on human health which will guide our programs and policy makers
- leverage $38 million in public funding for wide-scale replication

We thank Pure Earth's Board and Campaign Committee for taking the lead, and making $836,000 in gifts and pledges in 2016, and providing excellent guidance and input.

We are also proud to report that $510,000 was raised in new Campaign gifts, including two leadership gifts:

- Alcoa Foundation supporting the identification of toxic hot spots in Brazil and developing a resource manual for the government
- Armenia Fund USA funding the cleanup of one of the most contaminated lead sites in the world, and the first of its kind in Armenia

Akhtala Monastery, Armenia

"We find Pure Earth is simply the best way for us to help families in far-off places help their children grow up healthy. Not only does Pure Earth clean up toxic places where children live and play, but it retrains their parents in safe methods to perform their livelihoods such as gold mining, lead-acid battery smelting, and electronic waste recycling. Our money cleans up lead from homes and educates mothers on how to keep mercury out of their food. Please join us, and help Pure Earth save thousands of lives this year."

—Charlotte Triefus & Sheldon Kasowitz, Campaign Co-chairs

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Photo: India, by Larry C. Price

THE BASICS

Pollution Kills

Pollution is one of the leading causes of death and disease in the world, killing 9 million people a year according to the Institute for Health Metrics Evaluation and the World Health Organization. Pollution accounts for 1 out of 6 deaths globally—three times more than AIDS, tuberculosis, and malaria combined. Exposure to toxic substances causes debilitating illness and brain damage that can last a lifetime.

Pollution Disproportionately Affects the Poor

Of the 9 million deaths from pollution every year, 92% of the deaths occur in low- and middle-income countries. Young children and pregnant women experience the most harm from toxic pollution. They do not contribute to the problem and often have no control over the solutions.

Too Little is Being Done

Toxic pollution in the soil, water, and air receives very little funding or attention relative to its impact as a leading global killer. The scope of the problem is only beginning to be fully understood. The worst cases occur in low-income countries where there are often no available funds, or government institutions able to come up with comprehensive solutions. Toxic chemical contamination in soil and water is often not visible like air pollution, and requires special equipment to detect. The causes of deaths and illnesses in communities exposed to toxic contamination are often mysterious to the people affected.

Zambia
Child on Black Mountain in Kabwe, one of the most lead-contaminated sites in the world.
Photo: Larry C. Price

Low-income countries have to tackle many urgent priorities and are only able to devote 1 to 2% of their national annual budget, or less, to environment and health. This can result in annual expenditures of perhaps a few hundred thousand dollars, which often has to cover the full range of activities.

COMPARE THIS TO…

The Netherlands had expenditures of **930 million dollars** on air pollution alone in 2012.

The United Kingdom spent **22.5 billion dollars** on environment protection in 2010, according to the OEC.

The US EPA has a budget of around **8 billion dollars** annually and a staff of more than 15,000 people.

Pure Earth Saves Lives

Toxic pollution can often be addressed with simple, cost-effective interventions. Pure Earth works in poor communities suffering from toxic poisoning and performs environmental remediations, also called cleanups. We measure the contamination, assess the health impact, and design a remediation plan to address the most severe threats to human health. We hire and work alongside local community members training them in cleanup techniques so they can continue after we leave. We educate people in safer work strategies, and teach them methods that avoid future contamination.

We Are Data Driven and Achieve Measurable Results

Over the past decade, we have trained hundreds of environmental investigators in 50 countries to measure toxic chemicals in soil, water, and air. Using soil measurement tools to detect heavy metals or chemical wastes, water and air sampling kits, we measure and assess the level of contamination and study the exposure pathways. We take biological samples, like blood lead levels, to measure the health impacts toxic pollution is having in a community. Once we perform the cleanup, we repeat the environmental and health measurements at intervals to document the results of the intervention.

Health Education Leads to Behavior Change

In many communities, we encounter parents who risk their health doing dangerous jobs in order to feed their families. Faced with extreme poverty, such jobs seem like the only solution. When Pure Earth conducts health assessments for children in the affected communities, parents can see high levels of lead or mercury in the children's blood. Parents are then able to connect these test results with developmental delays and health issues they see in their community. Then, parents change their behavior. As our Technical Advisor Joe Hayes says, “No matter where you go in the world, no one wants to see their kids getting poisoned.”

HUMAN IMPACT

Morelos, Mexico

As part of our Barro Aprobado project to get traditional potters to stop using leaded glaze, we collaborated with the National Institute of Public Health of Mexico testing umbilical cord blood of newborns. When one baby measured 38 µg/dL our team went to the family's house to do an investigation and found the source was the traditional clay pots the mother cooked in while pregnant. The lead crossed the placenta into the baby and this infant was not healthy. The family immediately switched to safe, lead-free cookware. We returned 5 months later and found a chubby, happy, alert baby meeting developmental milestones.

Sovetskoe, Kyrgyzstan

Villagers were suspicious when we first came and told the community that there were high lead levels in the sand they were using as a building material. But once they attended our education programs and then received the blood test results showing high lead levels in their children, they stopped using the sand and requested assistance to remove the toxic materials they were storing in their yards and sheds.

Rural Mongolia

When it comes to small scale artisanal gold mining, both safety and efficiency matter, if miners are to adopt new methods. In artisanal gold mining communities in Mongolia, Pure Earth has led comprehensive educational trainings on mercury free mining and community health & safety. Pure Earth received multiple requests from artisanal gold miners in other provinces wishing to be trained.

Left: **Mongolia:** Families learning safe techniques that can extract up to 50% more gold.

Top right: **Kyrgyzstan:** Regional Director Dr. Petr Sharov warming hands with a young girl during the school health training.

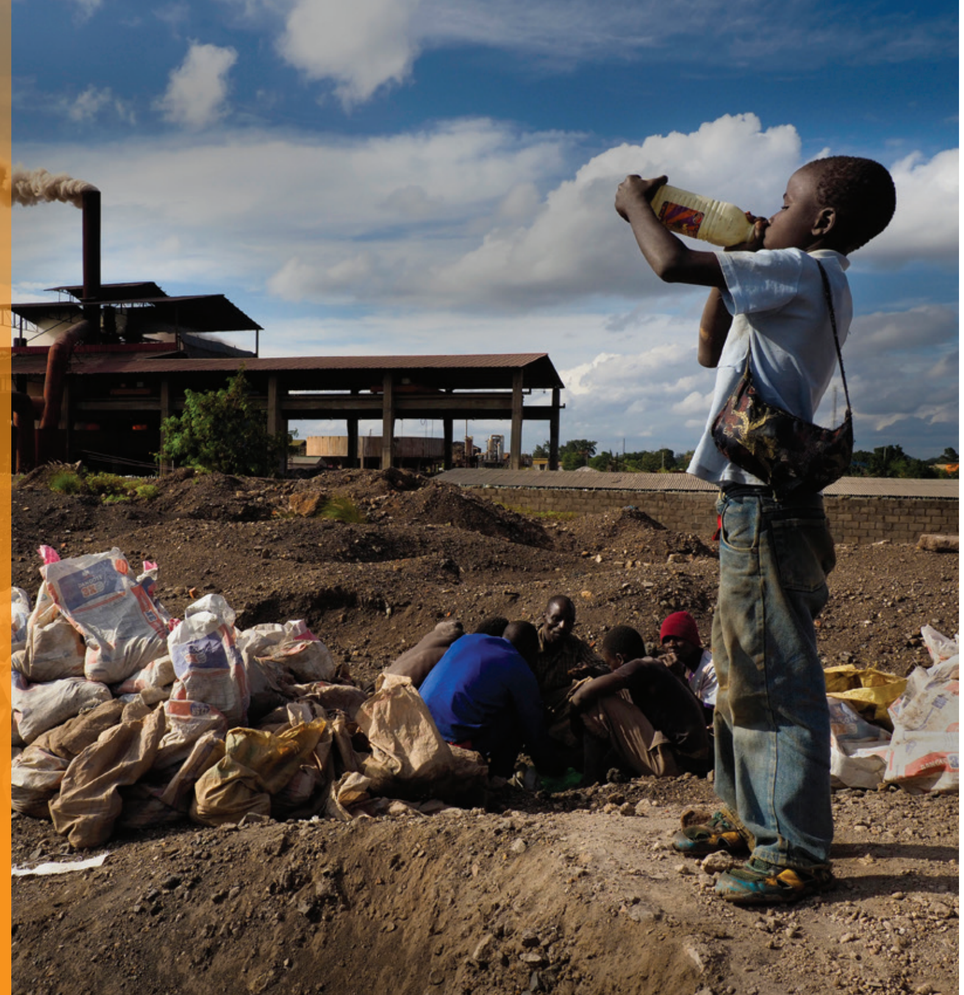
Bottom right: **Mexico:** A baby boy was born with dangerously high lead levels because his mother unknowingly cooked with lead-glazed pottery. This post-Pure Earth intervention blood test provided good news for the boy and his mother—a sixfold reduction in lead levels, and a boy now growing up happy and healthy.

Zambia
Dr. Jack Caravanos, PhD Pure Earth Research Director, measuring toxins.

Photo: Larry C. Price

LEVERAGE: OUR MODEL IN ACTION

The projects highlighted are not only successful examples of financial leverage, but also represent how we use an initial “entry” project with a country, to guide it to success, which then evolves into future projects. Our goal is to work with multiple levels of government and build capacity so that they create their own pollution control strategies, priorities and programs.



Zambia

This page: **A young boy drinks water he collected from a rain puddle on the immense Black Mountain made entirely of lead mining waste from decades of smelting.**

Photo: Larry C. Price

Following page: **Boys are reclining in clean dirt, free of toxic lead, for the first time in their lives.**

Kabwe, Zambia

Lead Remediation

In Kabwe, Zambia, after a century of lead and copper mining, many children have dangerously high levels of lead in their blood. In 2014, a team of Pure Earth investigators found over 25% of the 196 children tested had blood lead levels over 65 µg/dL. The CDC recommends immediate medical intervention for any blood lead level over 5 µg/dL.

With the help of private donations and a budget of $150,000, we deployed a project team, partnered with the Kabwe City Council, trained a team on our rapid assessment protocol, and measured and documented thousands of sites with XRFs in less than a week, identifying the toxic hotspots with the highest amounts of lead in the soil. The team then designed a low-cost pilot intervention, trained local staff, and got to work.

Since finding the high blood lead levels in 2014, Pure Earth notified the World Bank and insisted on action. As we were implementing our cleanup, and documenting that blood lead levels were falling, in 2016 The World Bank approved a $65 million loan to the government of Zambia with direction that soil remediation and health improvements are a priority.

Pure Earth's cleanup resulted in lead-free homes in the community for the first time in almost 100 years. In 2016, we completed the remediation of contaminated yards and homes for 80 families. Now these few lucky children in a city of 200,000 can play without the daily risk of being poisoned by lead in their own homes and backyards. We are continuing to clean up homes with private donations until the $65 million loan is released then we will monitor progress closely.

Leveraged an initial investment of $100,000 into $65 million from the World Bank.

Funding also provided by Terre des Hommes.

Dong Mai, Vietnam

Leverage and Expansion to More Projects

Pure Earth started working in Dong Mai in 2015, and we are seeing continued momentum propel progress through 2016 and into 2017. The main livelihood for villagers in Dong Mai was the informal recycling of used lead-acid batteries into ingots for resale to China. For years, almost every family in the village recycled used car batteries informally, without any environmental controls or protection, often in backyards and kitchens. As a result, the village was contaminated with lead and the 3,000 villagers were suffering from severe lead poisoning.

The government constructed an industrial smelter just south of the village, but because lead is immobile in the environment, lead levels in yards and homes, and children's blood, throughout Dong Mai remained dangerously high.

We began the remediation with a small amount of private funding that allowed us to clean 30 homes and yards. We trained and hired villagers to perform the remediation, working alongside them throughout the process.

This resulted in villagers taking it upon themselves to clean and decontaminate an additional 250 homes and yards and to secure additional funding to clean 67 more homes.

After the remediation activities were complete, Pure Earth conducted environmental sampling in all of the remediated yards and found lead levels at or below 50 ppm in all yards (8x below the U.S. EPA standard for residential soil). In addition to environmental sampling, blood-lead levels were collected and analyzed from a total of 263 children before and after the project. Blood-lead levels in children age 0-5 decreased by an average of 72%, from a geometric mean of 39 µg/dL to 11 µg/dL.

This project an example of how Pure Earth serves as a catalyst, initiating collaboration between various levels of government, community, and industry. The Vietnamese government has requested Pure Earth's assistance in expanding remediation programs in industrial craft villages across the country.

$95,000 was leveraged to secure an additional $330,000 in resources and funding from village residents, district government and private industry.

Vietnam

Previous page: **Potential next village to remediate; Woman works in her village commune breaking down electrical transformers and other e-scrap.**

This page: **Waste from aluminum smelters piled in a recycling village.**

India
Woman
burning coal
Photo: Larry C. Price

KEY ACCOMPLISHMENTS IN 2016

Projects

At the close of 2016, Pure Earth has completed 110 projects in 27 countries around the world. It is estimated that this has improved the health and lives of at least 4.5 million people, including a million children. Pure Earth managed 15 projects in 2016, ranging from site cleanups to pilot remediation and community health education. In 2016, we expanded partnerships and began work in Cameroon, Colombia, Brazil, Bangladesh and Madagascar for the first time.

Toxic Sites Identification Program (TSIP)

Pure Earth made significant progress in TSIP efforts expanding to include 15 countries with active hotspot identification and assessment programs and 6 TSIP investigator training sessions and environmental assessments in Azerbaijan, Bangladesh, India, Kyrgyzstan, Mexico, Cameroon, Nepal, Ukraine, Senegal, Brazil, Tajikistan, and Colombia.

Global Alliance on Health and Pollution (GAHP)

GAHP membership grew to 50 members in 2016 with dozens of observers. The Fourth Annual GAHP meeting was held in 2016 and was attended by representatives from numerous countries. GAHP led the effort in the creation of The Lancet Commission on Pollution + Health.

In 2016, GAHP launched the Health and Pollution Action Planning (HPAP) process. This is an innovative effort that engages a cross-section of relevant government agencies.

The UN Environment Assembly will be held in Nairobi, Kenya in December 2017 under the overarching theme, “Toward A Pollution Free Planet.”

PROJECTS overall

Indonesia
Worker dangerously exposed to lead at smelter in Tangerang.
Photo: Larry C. Price

2016 PROJECT HIGHLIGHTS

Metro Manila, Philippines
Patna, India
Tegal, Indonesia
Akhtala, Armenia
West Bank, Israel
Sovetskoe, Kyrgyzstan
Sao Paulo, Brazil
Malambo, Colombia
Morelos, Mexico
Puno and Madre de Dios, Peru
Agbogbloshie, Ghana

SOUTH AND SOUTHEAST ASIA

Philippines—Marilao, Meycauayan, and Obando River Fisheries project

Over the past four years, hundreds of HSBC employees have worked with Pure Earth to improve the health of more than 300,000 people in Metro Manila and train 370 small-scale fish farmers in best practices for reducing contamination in their fishponds.

The HSBC-Pure Earth water project was designed as a response to the heavily polluted Marilao, Meycauayan, and Obando River System (MMORS) in Metro Manila. The pollutants in these rivers—lead, mercury, chromium, sewage, and solid waste—not only flow into Manila Bay, but also accumulate in the fishponds along the river. The fishponds in the MMORS region are the largest suppliers of milkfish and tilapia in the country. This means that not only are fish farmers and communities along the rivers affected by the polluted river water, but also the people living and working in Metro Manila.

This successful project was completed in 2017 with accomplishments including an analysis of the pollution issues in the MMO River System, development and implementation of low-cost techniques for reducing heavy metals and toxins in the fish, and dissemination of the learnings with stakeholders at the local and national government level.

Patna, India

One of Pure Earth's priority areas is tackling lead poisoning in poor communities. A major source of lead contamination globally is the informal recycling of used lead acid batteries (ULAB) which involves individuals acting as recyclers. These practices, with no environmental controls or protection, result in widespread lead contamination, pose significant health risk to communities, and cause permanent brain damage in children who are exposed as well as cardiovascular and many other diseases in adults.

In 2016, Pure Earth conducted a series of environmental and health assessments in Patna, located in Bihar State, with staggering results, measuring lead levels in soil at over 200 locations, with 36% registering the highest lead levels we have ever recorded. One dirt pathway used daily by children measured at 60,000 parts per million (ppm) in soil. The US EPA safety standard is 400 ppm.

Throughout 2016 and into 2017, the Pure Earth team used this data to design an intervention plan targeting four neighborhoods with the highest levels of lead exposure posing the gravest health threat to children.

Project activities will include:

- Conducting community environmental and health assessments
- Community education programs regarding lead risk
- Investigating relocating informal recyclers to formal, safe recycling facilities
- Remediation of contaminated soil in residential areas
- Technical assistance to help recyclers reduce lead emissions and occupational health risks

Top: **Patna, India:** Worker whose hands are covered in extremely dangerous lead dust. Bottom: **Philippines:** Volunteers planting grasses to restore the Obando River.

Clockwise, from top left: **Indonesia:** Pesarean village center today—lead smelting waste dump; **Metro Jakarta:** Pure Earth team measuring playground equipment for lead paint; **Akhtala, Armenia:** Families and schoolchildren regularly visit this important religious and historic site

Pesarean Village, Indonesia

Pure Earth continued to work with the government of Indonesia on several projects.

Key accomplishments of 2016 are:

- Created an Urban Redevelopment Plan for a lead-contaminated waste dump in Pesarean Village. This can be used as a model for brownfield redevelopment planning.
- Led a government training series on assessing lead smelters for environmental and safety compliance
- Assessed contamination levels and the impact on the local population through the Toxic Sites Identification Program (TSIP).
- Conducted field investigations into the supply and demand of used lead acid battery recycling
- Assessed exposures to lead from paint and soil in residential areas and schools, and began planning a phase for remediating lead-contaminated schools
- Supported education and environmental health campaigns in Gunung Mas Regency
- Researched alternative technologies to eliminate mercury use in artisanal and small scale gold mining
- Performed a detailed assessment of mercury contamination and population at risk at cinnabar mining sites in Sukabumi Regency.

EASTERN EUROPE AND CENTRAL ASIA

Akhtala, Armenia

In 2016, Pure Earth continued its environmental assessment and project planning work in Armenia, identifying the site of an ancient monastery in Akhtala as one of the world's most toxic lead sites.

This 12th century Armenian monastery was built on top of an even older copper mine with dangerous lead levels measuring at 47,000 parts per million, 117 times higher than the EPA's standard of 400 parts per million. This monastery is a popular historic site and is regularly visited by school children on class trips.

Blood lead testing of children who live in Akhtala showed that more than 84% had extremely high levels of lead in their blood, and therefore are likely suffering serious health consequences.

Thanks to the support from Armenia Fund USA, funds have been donated so Pure Earth can cleanup the toxic soil surrounding the monastery in 2017, and end a centuries-long cycle of childhood lead poisoning.

Not only will this project improve lives in Akhtala, it will serve as a model for future cleanups in Armenia. Pure Earth has identified a number of additional sites we hope to tackle in the future.

Sovetskoe, Kyrgyzstan

Sovetsko is a small town in South Kyrgyzstan with a population of 1,300. The village was heavily contaminated with lead and other toxic metals from a former Soviet open-pit lead and zinc mining and an ore processing factory. The mine closed in the 1970's, but the contaminated tailings remained next to the village—2.8 million cubic meters of tailings sit on the eastern edge of town. The tailing piles include a red sand that villagers found very useful as a building material, not knowing it was highly-contaminated with lead. The toxic sand was used in village schoolyards and other playground areas. The sand was also used in a wall plastering mixture in and outside of homes.

The Pure Earth regional team conducted community education with adults on the exposure and danger of lead and presented the findings from soil tests. But it was not until the residents saw the results of the blood tests of their children, showing elevated lead levels, that they believed the threat and started asking the team to remove sand piles in their yards.

The Pure Earth team created a curriculum and a booklet depicting local animals as the teachers and protectors of children, teaching them how to protect themselves from lead. In animal costume, our team went from class to class, playing games and teaching the children how to stay healthy.

The program was implemented in partnership with Pure Earth, the local government in Sovetskoe and UNIDO, funded by the European Commission.

West Bank, Israel

Solving the Palestinian-Israeli Electronic Waste Crisis Through Partnership and Leverage

A highly toxic informal e-waste recycling industry has emerged over the past decade in the West Bank and East Jerusalem. Cross-border pollution is taking place, contaminating land and food supplies, air, and aquifers, with the toxicants poisoning both local Palestinians and Israelis. Through a complex informal cross-border value chain of Palestinian and Israeli actors, the majority of Israel's e-waste is transported to the West Bank. There, hundreds of Palestinian businesses dismantle e-waste in order to extract valuable metals. Plastic cables are burned to gain access to the copper.

The long-term damage is becoming apparent as each year's rains carry a decade's worth of contaminants downstream into Israel, and downwards into one of the region's largest and most important aquifers, affecting the lives of thousands of people.

Pure Earth has partnered with Ben Gurion University and a team of internationals, Palestinian and Israeli researchers studying the informal electronic waste sector in the Middle East.

In 2016, we executed a pilot cleanup of three sites in which contaminated surface ash and soils were removed.

Due to the success of this pilot, the Swedish government agency SIDA allocated an additional $2.5 million grant to scale up a multi-faceted effort.

Top: **West Bank:** Burning of e-waste in open field; Bottom: **Kyrgyzstan:** Little girl standing near a pile of toxic tailings

"Before any country can begin to take action against toxic pollution, leaders must understand the scale, severity, and sources of the problem. They also need to know how pollution is affecting their citizens, and where it is occurring. Unfortunately, that data is scarce, especially in low- and middle-income countries, where pollution is the largest cause of death."

—Richard Fuller, President of Pure Earth

Top: **Brazil:** The Pure Earth team; Bottom: **Malambo, Colombia:** Technical Advisor Joe Hayes and Country Coordinator Alfonso Rodriquez lead the investigation.

LATIN AMERICA

Brazil

Pure Earth expanded its work in Brazil to identify and assess toxic hotspots posing health threats to children and families, this was made possible by grants from Alcoa Foundation and Pacific Market International. The effort is part of Pure Earth's global Toxic Sites Identification Program (TSIP), which has screened more than 3000 toxic sites worldwide in over 50 countries.
The project will advance Brazil's efforts to address its pollution problems. Over 102,000 deaths a year are due to pollution (according to the IHME Global Burden of Disease database 2013). Children are the most vulnerable–toxic pollution causes physical and neurological developmental delays that can last a lifetime.

The information collected by Pure Earth for TSIP in the selected states in Brazil will be shared with the country's state and federal governments, giving them the ability to plan and prioritize the cleanup of the worst sites with the biggest health risks in order to save lives and prevent future damage. It also supports the design of a guidance document for toxic site identification that can be used in every state across Brazil.

Colombia

In 2016, Pure Earth started working with the government of Colombia for the first time as part of a new project funded by USAID to reduce the threats of toxic chemical pollution on human health in low- and middle-income countries.

Working with the Ministry of Environment and Sustainable Development in Colombia, Pure Earth agreed to prioritize work in five geographic areas–Nariño, Valle, Atlántico, Bolívar and Cundinamarca, which includes the country's capital, Bogotá. The focus will be on legacy or orphan sites contaminated with obsolete pesticides, PCBs and toxic heavy metals such as lead, cadmium, arsenic, and mercury.

We are pleased to be working with the Colombian government as they develop a strategy for environmental liabilities (pasivos ambientales) management following their identification of more than 1,500 contaminated sites in 2015.

We are performing detailed assessments on the most potentially contaminated sites and intervention and clean up efforts are being considered in collaboration with the Colombian national, state and municipal governments.

Rural Mexico

Lead-glazed Pottery

Despite of the removal of lead from gasoline in 1997, many studies document high Blood Lead Levels in the Mexican population. This is a particular concern for small children.

These high levels are directly related to the use of traditional lead-glazed pottery among the population. The lead on the pottery leaches into food and beverages, poisoning its unsuspecting users.

It is estimated that between 10,000 and 50,000 artisanal workshops exist in Mexico, producing traditional pottery. For centuries, they have used lead oxide for glazing. Even though affordable lead-free glazes exist, with similar physical and aesthetic features, less than 1% of traditional potters use these glazes exclusively.

Pure Earth's solution consists of four strategies:

- Driving demand for lead free glazed pottery
- Converting artisans to lead-free glaze
- Encouraging a standardized lead screening process
- Providing support to the Federal Commission for Protection against Sanitary Risks (COFEPRIS) to enforce the law banning the sale of leaded glazes

Accomplishments in 2016 included:

- In collaboration with the National Institute of Public Health (INSP), Pure Earth published a scientific paper on Blood Lead Levels in Morelos. This is the first study in Mexico about the average Blood Lead Levels of newborns in one state. It was found that 14.7% of the newborns in Morelos have Blood Lead Levels above 5 µg/dL "(reference level at which the US CDC recommends public health actions be initiated) and the average is of 22.2% in rural areas.
- Pure Earth cooperated with the Federal Government to demonstrate the importance of consolidated efforts when advocating for the removal of lead from pottery. Thanks to this and to the government involvement trough COFEPRIS, 8 states received a budget to promote the use of lead free glazes.
- Participated in the traditional cookers meeting in Morelos and created an educational video.
- Tested 23 artisans in Tlayacapan for high Blood Lead Levels. This not only gave Pure Earth information on their Blood Lead Levels, but also helped us to demonstrate the importance of being lead-free.
- Received funding from HSBC and Promotora Social Mexico. This money will enable Pure Earth to expand its efforts in Mexico City, Morelos and Puebla. This was possible with the pro bono support of Creel and Guillermo Guidiño.

Puno and Madre de Dios, Peru

Artisanal Small-scale Gold Mining (ASGM)

In 2016, Peru lifted the state of emergency in Madre de Dios, which was declared because of severe mercury contamination due to informal, artisanal and small-scale gold mining. Pure Earth directly addresses this crisis by teaching miners mercury-free alternatives.

Clockwise, from top left: **Peru:** Gold grains yielded from mercury-free Benguet panning method; **Peru:** Panning for gold; **Mexico:** We are supporting the production of traditional pottery with lead-free glaze.

"Creating such a friendly, healthy environment and introducing the wire grinding machine will not only positively affect our health, but will also create job opportunities for our members. The wires, instead of coming out burnt, will now be new, fetching us a good market price."

—Abdullai Abdul-Rahman, Chairman of GASDA

Left: **Ghana:** Images from the worker safety training days in Agbogbloshie.

Pure Earth is working in Peru on a project funded by the U.S. Department of State to assist the government in assessing artisanal gold mining sites, as well as in planning remediation efforts which includes an innovative re-forestation pilot project and strategies for alternative livelihoods. Partners include CREEH and the Ministry of Environment (MINAM: Ministerio de Medio Ambiente) of Peru. As part of this project, Pure Earth is teaching miners mercury-free alternatives.

Trainings were conducted by Pure Earth during 2016 in various mining communities across Peru. This included Laberinto located in the dense rainforest of Madre de Dios, and Ollachea in the mountains of Puno. As part of our work model, some of the trained miners will go on to teach others, helping to transform even more mining communities. Funding for training additional communities in Madre de Dios was also provided by Brilliant Earth.

AFRICA

Agbogbloshie, Ghana

Electronic Waste Recycling Center

In 2016, a five-year effort to improve the health and environmental conditions for workers engaged in e-waste burning at the informal scrap yard in Ghana's capital began to pay off.

Pure Earth opened the Agbogbloshie Scrap Metal Recycling Center in January 2014 as a pilot project funded by the United Nations Industrial Development Organization (UNIDO) and the Global Alliance on Health and Pollution, with local partners Green Advocacy Ghana and the Greater Accra Scrap Dealers Association (GASDA). Mechanical wire-strippers offered workers an alternative to the extremely toxic burning of cables. In 2016, we added a new machine to process finer cables—a granulator and separator. This resulted in an increase of materials being processed in a clean and environmentally safe manner.

In 2016, Pure Earth and partners conducted a two-day worker training on the dangers of e-waste burning, demonstration of the new equipment and distributing basic worker protection items like gloves and masks.

In 2016, we projected that the facility would process approximately 5,000 pounds of cables in 12 months from July 2016 to June 2017. Even with conservative estimates, the facility greatly exceeded expectations. From October 2016 to March 2017, the facility processed nearly 13,000 pounds of cables through stripping and shredding. The site will likely turn a profit of $2,000 in the 2016 to 2017 reporting year.

This has not only improved the environment and health of local community members but also generated additional income for the recyclers. Subsequent funding provided by the Addax and Oryx Foundation.

Bangladesh
South Asia Regional Coordinator Promila Sharma helping a TSIP trainee map contaminated sites.
Photo: Larry C. Price

THE TOXIC SITES IDENTIFICATION PROGRAM (TSIP)

Measure and Visualize the Problem to Craft Solutions

It is hard to come up with the right solution when you do not fully understand the problem. The United States has the Superfund program to track, evaluate, and prioritize the US legacy of toxic contamination. Many developing countries have small, underfunded environmental programs and little to no technical expertise. Pure Earth has been evaluating and mapping polluted places around the world to provide that aid and knowledge since 2007. We have compiled the largest global contaminated sites database through our Toxic Sites Identification Program or TSIP.

Pure Earth's Toxic Sites Identification Program (TSIP) works to identify and screen contaminated sites in low- and middle-income countries that pose a potential threat to human health. This is an important step in understanding the scope of toxic pollution globally, but is not meant to be a comprehensive inventory of sites around the world.

Currently there are more than 3,200 sites in the Global Inventory Database, affecting an estimated 83 million people. However, this database is still a work in progress. Pure Earth estimates that the real number of people at risk from exposure to contaminated sites is closer to 200 million people, and that is a conservative estimate. Of the 3,200 sites in the TSIP database, more than 2,300 have been visited in person by Pure Earth staff.

Over the past nine years, a team of more than 250 trained investigators in nearly 50 countries has been working to collect health and pollution data while working in collaboration with both local and national partners. TSIP is a valuable tool for people working in a range of areas. Researchers can use the aggregate data to better understand the burden of disease posed by pollution in LMICs. Donors and country governments could use countrywide information to design lending programs. Finally, implementers could use site specific data as a resource for designing effective interventions.

TSIP HIGHLIGHTS IN 2016

- **TSIP efforts expanded to include at least 15 countries with active hotspot identification and assessment programs and 5 TSIP investigator training sessions**
- **TSIP work began in Azerbaijan, Bangladesh, Brazil, Cameroon, Colombia, India, Kyrgyzstan, Mexico, Nepal, Senegal, Tajikistan, Ukraine**
- **Number of sites screened expanded to at least 150 additional sites per year (450 total), and these sites are integrated into the existing TSIP database**
- **As a result of the TSIP trainings and investigations, design and contracting work began in Kabwe, Zambia and Sovetskoe, Krgyzstan. Planning for remediation projects began in Bihar, India, and in Sumgait, Azerbaijan**

Bangladesh

The assessment of contaminated sites in Bangladesh has proceeded more quickly than in any other country. In 2016, Pure Earth and its partner, the University of Dhaka, completed assessments at 101 polluted sites that cumulatively jeopardize the health of 360,000 people. Nearly all sites are informal Used Lead Acid Battery (ULAB) processors. These include informal battery breaking and smelting operations as well as battery manufacture and repair workshops. These sites are regularly located in residential areas and result in severe exposures to surrounding residents. Under the current effort, work has expanded to other regions (Chittagong, Khulna and Rajshahi) while also continuing to make the inventory more robust in Dhaka. The speed with which the assessment team was able to identify contaminated sites in Bangladesh is deeply troubling and indicates that ULAB processing in Bangladesh is an urgent and under-reported problem.

Mongolia

An investigator training was held in Ulaanbaatar, Mongolia on 13-14 October with 18 participants, 6 of whom were investigators and 12 of whom were government staff. To date 4 sites have been visited and assessed. None of these have been fully entered into the database. Site assessments were paused due to winter season and will resume in April 2017. Target areas will include leather tanneries and ASGM sites. The former regularly uses hexavalent chromium while the latter is associated with mercury contamination.

Senegal

An investigator training was held on 29-30 November in Dakar, Senegal. Four investigators and 7 government staff were in attendance. The focus of investigations was obsolete pesticide storages, and legacy ULAB processing sites.

Cameroon

In Cameroon, the Pure Earth team held a series of workshops to train local environment and health experts in FAO's (Food and Agriculture Organization of the U.N.) on rapid environmental assessment technique—a method to determine the source and level of contamination, how the pollutant spreads, and the impact on the population.

Following the workshops, the team led the newly trained class of pollution investigators out into the field to begin the measurement and assessment work.

"With the data we collect, the local government will have a better idea of how many polluted sites they need to address, and which sites need immediate attention. We will return in August to complete detailed assessments of priority sites, and then launch cleanup efforts in the fall on the two sites at the top of the list," says Russell Dowling, Pure Earth Program Officer for Africa.

Clockwise, from top left: **Senegal:** TSIP trainees with certificate of completion; **Mongolia:** Country coordinator Erdene Naidansuren guiding trainees in the field; **Bangladesh:** Two men participating in a TSIP training; **Cameroon:** Soil sample being taken.

India
Tannery in Calcutta
Photo: Larry C. Price

GLOBAL ALLIANCE ON HEALTH AND POLLUTION (GAHP)

Founded in 2012, The Global Alliance on Health and Pollution was formed in response to the growing crises posed by toxic pollution. Pure Earth serves as the Secretariat of GAHP. GAHP was established to provide low-and middle-income countries with the tools to tackle toxic pollution and alleviate its impacts on human health. The Alliance has been tasked with coordinating resources to identify and clean up toxic hot spots in order to improve the health of affected populations.

Indonesia
Citarum River
Photo: Larry C. Price

The Lancet Commission on Pollution and Health

In 2015–2016, Pure Earth and GAHP embarked on a mission to create the *Commission Report on Pollution and Health*, with the Icahn School of Medicine at Mt. Sinai and *The Lancet*. The Commission comprises many of the world's most influential leaders, researchers and practitioners in the fields of pollution management, environmental health, and sustainable development. The Global Commission on Pollution and Health will reveal pollution's severe and under-reported contribution to the Global Burden of Disease. It will uncover the economic costs of pollution to low- and middle-income countries, and compare the costs of inaction to the costs of available solutions. It will inform key decision makers around the world about the burden that pollution places on health and economic development, and about available pollution control strategies and solutions. The Commission will bring pollution squarely into the international development agenda.

Multiple meetings were held to gain support for the Commission report—35 briefings with various multilateral agencies, UN agencies, Ministries of Environment, Health, and Development in 9 European Union Countries, and 5 Asian countries. The report will be published in a special edition of *The Lancet* in fall of 2017.

Health and Pollution Action Planning: Creating Road Maps to End Pollution

Launched by GAHP in 2016, the Health and Pollution Action Planning (HPAP) process assists governments to prioritize pollution challenges based on health impacts and to design and advance appropriate solutions. The program is innovative because it engages a cross-section of relevant government agencies (Environment, Health, Development, Industry, Transport, Mines, and Finance) the World Bank, UNEP, UNDP, as well as potential donors.

During the HPAP workshop, country-specific data on the health and economic impacts of pollution from the Commission research is presented as well as a methodology to enable countries to prioritize pollution within their own development policies, determine the most cost effective investments and prioritize focused interventions.

Led by Pure Earth staff, Thailand and Madagascar initiated the HPAP process in 2016 and early 2017. Ten additional countries have submitted requests to begin the process in 2017.

UNEA3: The United Nations Environment Assembly

The UN Environment Assembly will be held in Nairobi, Kenya in December 2017 under the overarching theme of "Toward A Pollution Free Planet."

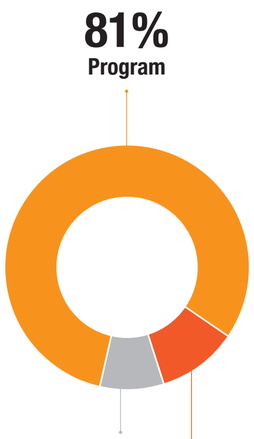
GAHP and its members were instrumental in pushing the UNEA3 theme to be focused on pollution.

FINANCIAL HIGHLIGHTS

Consolidated Statement of Financial Position ◆ Years Ended December 31, 2016 and 2015

	2016 Consolidated	2015 Consolidated
CURRENT ASSETS		
Cash and cash equivalents	$ 174,765	$ 109,547
Grants receivable	6,417,116	3,847,484
Pledges receivable, net	453,208	353,088
Prepaid expenses and other current assets	530,253	183,570
Total current assets	$7,575,342	$4,493,689
Property and equipment, net	678,371	771,327
Security deposit	25,000	25,000
Total assets	$ 8,278,713	$ 5,290,016
LIABILITIES AND NET ASSETS		
CURRENT LIABILITIES		
Accounts payable	947,909	642,603
Accrued expenses	105,379	95,229
Line of credit	100,000	50,000
Long-term debt, current portion	157,869	149,798
Total current liabilities	$1,311,157	$ 937,630
LONG TERM DEBT	384,414	541,563
Total liabilities	$1,695,571	$1,479,193
NET ASSETS		
Unrestricted net assets	327,817	363,506
Temporarily restricted net assets	6,255,325	3,447,317
Total net assets	6,583,142	3,810,823
Total liabilities and net assets	$ 8,278,713	$ 5,290,016

Breakdown of Expenses



CHARITY NAVIGATOR ★★★★ Four Star Charity

FINANCIAL HIGHLIGHTS

Consolidated Statement of Activities ◆ Years Ended December 31, 2016 and 2015

	December 31, 2016 Pure Earth Consolidated			December 31, 2015 Pure Earth Consolidated		
SUPPORT AND REVENUE	**Unrestricted**	**Temp Rest**	**Total**	**Unrestricted**	**Temp Rest**	**Total**
Grants	$ —	$ 6,867,525	$ 6,867,525	$ —	$ 1,532,697	$ 1,532,697
Contributions	210,906	—	210,906	496,215	—	496,215
Fundraising income	724,769	—	724,769	464,090	—	464,090
In-kind contributions	82,502	—	82,502	196,226	—	196,226
Net assets released from restrictions	4,036,214	(4,046,2140	—	3,353,202	(3,353,202)	—
Total support and revenue	**$5,054,391**	**$2,831,311**	**$ 7,885,702**	**$4,543,033**	**($1,820,505)**	**$ 2,722,528**
FUNCTIONAL EXPENSES						
Program	4,079,600	—	4,079,600	3,746,590	—	3,746,590
Administration	527,783	—	527,783	467,378	—	467,378
Fundraising	416,526	—	416,526	257,474	—	257,474
Total functional expenses	**$5,023,909**	**$ —**	**$ 5,023,909**	**$4,471,442**	**$ —**	**$ 4,471,442**
Excess (Deficiency) of support and revenue over functional expenses	30,482	2,831,311	2,861,793	71,591	(1,820,505)	(1,748,914)
Interest expense	(46,016)	—	(46,016)	(45,261)	—	(45,261)
Realized (loss) gain on investments	(931)	—	(931)	498	—	498
Foreign currency translation adjustment	(19,224)	(23,303)	(45,527)	(111,637)	—	(111,637)
Change in net assets	**($ 35,689)**	**$2,808,008**	**($2,772,319)**	**($ 84,809)**	**($1,820,505)**	**($1,905,314)**
NET ASSETS, Beginning	**363,506**	**3,447,317**	**3,810,823**	**448,315**	**5,267,822**	**5,716,137**
NET ASSETS, End	**$ 327,817**	**$ 6,255,325**	**$ 6,583,142**	**$ 363,506**	**$ 3,447,317**	**$ 3,810,823**

FINANCIAL HIGHLIGHTS

Consolidated Statement of Cash Flows ◆ Years Ended December 31, 2016 and 2015

	2016	2015
OPERATING ACTIVITIES		
Change in net assets	$ 2,772,319	($1,905,314)
Adjustments to reconcile change in net assets to net cash provided by (used in) operating activities:		
Depreciation	96,384	102,706
In-kind contribution of investments	(61,973)	(50,877)
Realized loss (gain) on investments	931	(499)
Changes in:		
Grants receivable	(2,569,632)	1,256,403
Pledges receivable	(100,120)	(178,844)
Prepaid expenses and other current assets	(346,683)	124,864
Accounts payable	305,306	135,149
Accrued expense	10,150	3,201
Net cash provided by (used in) operating activities	**$ 106,682**	**($ 513,211)**
INVESTING ACTIVITIES		
Proceeds from sale of investments	61,042	51,376
Fixed asset purchases	(3,428)	(390,116)
Net cash (used in) provided by investing activities	**$ 57,614**	**($ 338,740)**
FINANCING ACTIVITIES		
Proceeds from line of credit	125,000	50,000
Repayments on line of credit	(75,000)	—
Proceeds from long-term debt	—	315,957
Repayments of long-term debt	(149,078)	(108,639)
Net cash provided by financing activities	**$ (99,078)**	**$ 257,318**
NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS	**$ 65,218**	**($ 594,633)**
CASH AND CASH EQUIVALENTS, Beginning	**$ 109,547**	**$ 704,180**
CASH AND CASH EQUIVALETS, Ending	**$ 174,765**	**$ 109,547**
SUPPLEMENTAL INFORMATION		
Interest paid	**$ 46,016**	**$ 45,261**

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Bangladesh
Polluted stream from nearby tannery.
Photo: Larry C. Price

Zambia
Clean-up effort in Kabwe.
Photo: Larry C. Price

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Conrad & Sarah Meyer
Rob and Amy Morton
Sam Milstein
Helen Misk
Dean Misser
Diana and Charles Mkhitarian
lopamudra Mohanty
Jay Moncada
Joe Moran
Madeleine and Yeprem Nazarian
Lonhang Nguyen
Jan-Harm Nieland
Rohan Nirody and Soniya Sapre
David Norgard
Stephen O'Rourke
Steve O'Shea
Gary Ostroff
Lizbeth Palacios
Alex Papachristou and Anne Detjen
Harlin Parker
Balasubramanian Periyasamy
Kathleen Perrotte and Marla Pasaquale
Thomas Polton
Toby Pomeroy
Eric Potter
Lauretta Prevost
Robert Principe
Michael Radziemski
Michael Reali
Ron and Elizabeth Reede
Lesley Reosnthal
Julia Reznicek
Ira Riklis
Liana and Carla Rinaldi
Charles Rinaldi
Ken Rivlin
Ellen Robinson
Cecilia Rodhe Pinzke
Andrea Rosen
Laurie Rothenberg
Paul Roux
Vit Rysavy
Patricia Salkowski
Nancy Sammon
Alex & Talar Sarafian
Mary Ann Saraydarian
Jennifer Scappettone
Ralph Scopo
Kathy Seabrook
Craig Seaver
Alan Sebulsky
Chelsea Senft
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Victor Shrenzel
Hugh Siegel
Lauren Siegel
Gaston Silva
Arunan Sivalingam
Suzanne Skipper
Dino Stathis
Lisa Stepanian
John Stepper
Alison Stone
Harvey Stone
Stewart Strauss
Peter Sullivan
Johanna Svederud
Ted Tamura
Connie Tate
Benay and Steven Taub
Oliver Tetlow
Kevin Thompson
Charlotte Triefus and Lloyd Zuckerberg
Greg Valure
Chris Vilchek
Janet Vinyard
Robert Wagner
Kentaro Watanabe
Adrian Webber
Marc Weiss-Meyer
Christopher Wells
Susan Wilmink and Thomas Schneck
Robert Wolf
Scosha Woolridge
Elan Ziff
Samantha and Scott Zinober
Leandro Zucchi
Barbara Zuckerberg

Corporations & Foundations

Addax & Oryx
Alcoa Foundation
Allan Briteway Electrical Contractors Inc.
Allen & Overy
Americon
Archetype Consultants
Assured Environments
Bank of America Merrill Lynch
The Bernard and Anne Spitzer Charitable Trust
Brilliant Earth
Building Maintenance Services, LLC
Capital Group
Century Elevator Maintenance Corp.
CitiBank
Classic Recycling
Colovos Family Charitable Foundation
Credit Suisse
Dana Bronfman

2016 Pure Earth Pure Gold Benefit Bash

Pure Earth honored **Timothy Wilkins** of ***Freshfields Bruckhaus Deringer*** and **Nathalie Gysi** of ***Green Cross Switzerland*** at its annual spring benefit held at Gotham Hall, which raised over $350,000, featuring its first responsibly sourced gold jewelry auction.

The Durst Organization
ERM Foundation
Ess & Vee Acoustical/
SBA Plumbing
ExxonMobil
Fidelity Charitable Gift Fund
Freshfields Bruckhaus Deringer
Gemini Foundation
Girl Scouts 4th Grade
Upper Nyack Goldman Sachs
Goldman Sachs Gives
Green Cross Switzerland (GCS)
Gulabi Gulbenkian Foundation
Hawthorn PNC Family Wealth
HSBC
Indus Capital Partners LLC
J.T. Magen & Company Inc.
James E. Fitzgerald, Inc.
JDP Mechanical Inc.
John Gallin & Son
Madison Service Corporation
Mizuho
National Philanthropic Trust
Nomura Holding America Inc.
Pacific Market International, LLC
Paper Enterprises/
Architectural Flooring Care
Pfizer
PMSV Holdings LLC
R&R Scaffolding
Richline
The Rockefeller Foundation
Roux Associates
Royal Waste Services, Inc.
Shikiar Family Foundation
Siemens Industry
Silicon Valley
Community Foundation
SMBC Nikko Securities
America, Inc.
Stop Pest
Terre des Homes
Trust for Mutual Understanding
Tufenkian Foundation, Inc.
United Elevator Consultants Inc.
Vornado Office Management

In–Kind

1-100/Graham Tabor Studio
Aesa Jewelry
Andy Golub
Anndra Neen
Bario Neal
Gordon Binkhorst
Dana Bronfman
Sophie Buhai
Chandally
CREEL
Fenway Golf Club
Judy Geib
Hanna Sandin
Joe Hayes
Hoover & Strong
JefHoo
Don Jones
Judi Powers Jewelry
John Keith
Melissa Joy Manning
Merzatta
Mociun
Nialaya
Pamela Love
PR Series
Roux Associates
Samma Jewelers
Stephen Dweck
Taber Studios
Bryn Thoms
Ursa Major
WWake

Government and Multilateral Organizations

Asian Development Bank (ADB)
Danish Ministry of Foreign Affairs
DANIDA
European Commission (EC)
FORBIO
German Federal Ministry of the
Environment, Building and
Nuclear Safety (BMUB)
The Global Environment Facility
(GEF)
Ministry of Energy and
Environment of Sweden
NIEHS—IN KIND via Mt. Sinai
Swedish International
Development Agency (SIDA)
UN Agency for Industrial
Development Organization
(UNIDO)
UN Development Program (UNDP)
UN Food and Agriculture
Organization (FAO)
US Agency for International
Development (USAID)
US Department of State
(US DoS)
University College London (UCL)
University of Zhejiang

Back cover photo: India—Children standing on a coal mine, by Larry C. Price

Indonesia
Child miners on
Sulawesi Island.
Photo: Larry C. Price

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