BACKGROUND

Pure Earth has conducted Rapid Marketplace Screening (RMS) with support from GiveWell in 12 countries including Bangladesh.

Pure Earth developed and followed a sampling protocol based on a Desk Review Report (DRR) which summarized published literature on known lead exposure sources to inform initial sampling and analysis of products, commodities, and substances that may contain lead.

The trained investigators of Pure Earth conducted the formative research (FR) with the information presented in the DRR, entered the markets, and determined what lead-containing products to sample.

OBJECTIVE

• To identify sources of lead exposure and prioritize countries for future interventions.

• This formative research is to guide a larger, more formal and comprehensive sampling and testing of selected ‘lead-positive’ products.

METHODOLOGY

• Train the investigators on project goals, procedures, data entry process in SurveyCTO, and operating XRF instrument.
• Identify Markets
• During the market visit: Collect samples, fill out market-level questions, vendor-level questions, and product questions
• Level the samples with a Unique ID
• Level the sample photo and photo ID
• Analyze the samples via XRF
• Send selected samples for laboratory testing
• Upload the data using SurveyCTO

XRF TESTING ON SAMPLES

The samples were tested with a Thermo Fisher NITON hand-held portable X-ray Fluorescence Heavy Metal Analyzer (Olympus Vanta Model). Samples were purchased and tested off-site.

XRF ANALYSIS

SAMPLES WITH HIGH LEVEL OF LEAD (Pb)

Dhaka City, Phase 01, Samples:
• Spices - 13 samples
• Pottery - 6 samples
• Ceramics - 3 samples
• Medicines - 14 samples
• Cosmetics - 46 samples
• Toys - 7 samples
• Paints - 11 items
• Other foods - 21 samples
• Other non-food items - 22 samples
• Other non-food items (pigment) - 11 samples
• Cookware from recycled aluminum - 9 samples

Lab Test Result:
• Vegetables, Fresh Turmeric 17922 PPm
• Vegetables, Cauliflower 3998 PPm

List of Market

Dhaka City
1. Mirpur Co-operative Market
2. Mirpur Shah Ali Market
3. Mohammadpur Town Hall Market
4. Mirpur Capital Tower Market
5. Mohakhali Kacha Bazar
6. Mohakhali Bazar
7. Mohakhali Shaitola Bazar
8. Chowk Bazaar

Khulna Division
1. Boro Bazar
2. Prantik Market
3. New Market

Rajshahi Division
1. Shaheb Bazar
2. New Market

Barishal Division
1. Shagordi Market
2. New Market

RMS RESULT PHASE 01 AT DHAKA CITY

- AMULETS
  - Amulet: 256000 PPm
- PIGMENTS
  - Deep Yellow Pigment: 135000 PPm
- ALUMINUM COOKWARE
  - Small: 2504 PPm
  - Pan: 1738 PPm
  - Pan: 1081 PPm
  - Plate: 932 PPm
  - Saucepan: 403 PPm
- OTHER NON-FOOD ITEMS
  - Orange color Mug: 9387 PPm
  - Sweetener container: 3506 PPm
  - Plastic box: 1931 PPm
- CERAMICS
  - Tea Mug: 3718 PPm
- TOYS
  - Duck: 722 PPm
  - Ring: 277 PPm
**XRF ANALYSIS**

SAMPLES WITH HIGH LEVEL OF LEAD (Pb)

Khulna, Rajshahi, Barishal, Phase 02,
Samples:
- Aluminium cookwares: 47
- Toys: 31
- Spices: 49
- Paints: 30
- Rice: 13
- Cosmetics: 34

In the first phase, a total of 163 samples of 11 types of items were screened; lead is found in 40 samples of 9 types of items’ category.

In the second phase, a total of 204 samples were screened; lead is found in 56 samples.

**REFERENCES LEVELS**

- Decorative Paint - 90 ppm (UNEP, Bangladesh)
- Toys - 90 or 100 ppm for paint or coatings (US Consumer Product Safety Commission)
- Rice & cereals - less than 0.1 mg/kg) as defined by WHO/FAO
- Major Starch - 0.1-0.5 ppm (US FDA; WHO/FAO)
- Raw & processed turmeric - 2.5 ppm (mg/kg)/(BSTI)
- Spices other than turmeric - 2mg/kg (QCVN 8-2:2011/BYT)
- Cosmetics & Vermilion (Sindoor) - 10 ppm for lipstick; 20 ppm for other types (FDA)
- Metal foodware: 100ppm
- Ceramic foodware: 100ppm
- Plastic foodware: 100ppm
- Herbal/traditional medicines: 10ppm (WHO)

**RMS RESULT PHASE 02 AT KHULNA, RAJSHAHI, BARISHAL DIVISIONS**

**ALUMINUM COOKWARE & FOOD WARES, CERAMIC FOOD WARES**

<table>
<thead>
<tr>
<th>Location</th>
<th>Pb Level</th>
</tr>
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<tbody>
<tr>
<td>Khulna</td>
<td>533 ppm</td>
</tr>
<tr>
<td>Rajshahi</td>
<td>2116 ppm</td>
</tr>
<tr>
<td>Barishal</td>
<td>5109 ppm</td>
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</tbody>
</table>

**TOYS**

<table>
<thead>
<tr>
<th>Location</th>
<th>Pb Level</th>
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<tbody>
<tr>
<td>Khulna</td>
<td>600 ppm</td>
</tr>
<tr>
<td>Rajshahi</td>
<td>1814 ppm</td>
</tr>
<tr>
<td>Barishal</td>
<td>750 ppm</td>
</tr>
</tbody>
</table>

**LOCAL PANK: YELLOW PIGMENTS**

<table>
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<th>Location</th>
<th>Pb Level</th>
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<tbody>
<tr>
<td>Khulna</td>
<td>51390 ppm</td>
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<tr>
<td>Rajshahi</td>
<td>2890 ppm</td>
</tr>
<tr>
<td>Barishal</td>
<td>12530 ppm</td>
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**COMMENTS**

- Need to explore the exposure route of lead contamination through qualitative investigation
- Need to prioritize the lead exposure issue to conduct a national-level analysis of potential lead sources
- Many consumer and food products do not have reference values/standards for using lead in the products. Need to standardize the use of lead
- Strict monitoring and enforcement of the law and regulations are required to prevent using lead arbitrarily
- Public awareness raising and capacity building of the relevant authority on lead issue is crucial to prevent the sources of lead exposure

**SOLVE POLLUTION. SAVE LIVES. PROTECT THE PLANET.**

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