LEAD IN SOLVENT-BASED PAINTS IN TANZANIA

June 2024

IPEN
for a toxics-free future

African Violet
AGENDA
For Environment and Responsible Development

NATIONAL REPORT: LEAD IN SOLVENT-BASED PAINTS IN TANZANIA

June 2024

Authors:

Swai D,[1] Mng'anya S,[1] Guarino J,[2] and Brosché S, PhD[2]

[1] AGENDA for Environment and Responsible Development (AGENDA)

[2] International Pollutants Elimination Network (IPEN)

Established in 1998, **IPEN** currently comprised of over 600 Participating Organizations in over 125 countries, primarily developing and transition countries. IPEN brings together leading environmental and public health groups around the world to establish and implement safe chemicals policies and practices that protect human health and the environment. IPEN's mission is a toxics-free future for all.
www.ipen.org

AGENDA is a member based non-governmental, non-profit sharing NGO based in Tanzania. It was established in 1994 and officially registered in July 1997. It has been serving as the Hub for IPEN Anglophone Africa NGOs since 2004. In addition to this one, AGENDA has carried out similar studies in 2009, 2015 and 2017. Also, AGENDA maintains listservs for IPEN Anglophone Africa and the East Africa Strategic Approach to International Chemicals Management (SAICM).

AGENDA for Environment and Responsible Development (**AGENDA**)
Sinza B, Plot No 545, Mashujaa Street, Sinza Palestina
Postal Address:
P.O. Box 77266
Dar es Salaam, Tanzania
Email: agenda.environment1997@gmail.com
Website: http://www.agendatz.org

Cite this publication as: Swai D, Mng'anya S, Guarino J, and Brosché S (2024). *Lead in Solvent-Based Paints in Tanzania: Compliance Monitoring*, AGENDA and IPEN.

ACKNOWLEDGMENTS

We take this opportunity to thank all those who were instrumental in compiling and shaping this paint study, particularly Jeiel Guarino of the International Pollutants Elimination Network (IPEN) for his close support during the entire study period.

This report was undertaken as part of IPEN's Global Lead Paint Elimination Campaign and funded by the New York Community Trust (NYCT) and the Swedish Government. It was conducted in Tanzania by a Non-Governmental Organization (NGO) named AGENDA for Environment and Responsible Development (AGENDA) in partnership with IPEN.

While this study was undertaken with funding assistance from the New York Community Trust (NYCT) and the Swedish Government, responsibility for the content lies entirely with IPEN and AGENDA. NYCT and the Swedish Government do not necessarily share the expressed views and interpretations.

CONTENTS

PREFACE

Lead paints continue to be widely produced, sold, and used in developing countries despite the fact that most highly industrial countries banned lead paints for household use more than 40 years ago. IPEN and Participating Organizations are part of the global movement to eliminate lead paint by 2020 to protect children's health.

In 2007 and 2008, NGOs in the IPEN network collected and analyzed decorative (home use) paints on the market in 11 developing countries, and in countries with economies in transition. The results were startling. In every one of these countries, many of the paints contained exceedingly high lead levels. In response, IPEN launched its Global Lead Paint Elimination Campaign, which seeks to eliminate lead in paint and raise widespread awareness among business entrepreneurs and consumers about the adverse human health impacts of lead paint, particularly on the health of children. Since then, IPEN-affiliated NGOs and others have sampled and analyzed paints on the market in more than 50 low- and middle-income countries.

This report presents new data on the total lead content of solvent-based paints for decorative and industrial uses available on the market in Tanzania. It also presents background information on why the use of lead paint is a source of serious concern, especially to children's health; a review of national policy frameworks that are in place banning the manufacture, import, export, sale, and use of lead paint, and provides a strong justification to strengthen compliance monitoring and enforcement of lead paint regulatory controls in Tanzania. Finally, it proposes action steps by different stakeholders to protect children and others from lead paint.

This study was conducted by *AGENDA for Environment and Responsible Development* (AGENDA) in partnership with IPEN.

IPEN is an international NGO network of health and environmental organizations from all regions of the world of which AGENDA is a member. IPEN is a leading global organization working to establish and implement safe chemicals policies and practices to protect human health and the environment. Its mission is a toxics-free future for all. IPEN helps build the capacity of its member organizations to implement on-the-ground activities, learn from each other's work, and work at the international level to set priorities and achieve new policies.

AGENDA is an NGO officially registered in Tanzania in July 1997. Its vision is "to attain equitable socio-economic development to all members of the public without causing adverse effects to human and environment," and its mission is "to promote a culture of responsibility to the environment amongst the general public through awareness, advocacy, capacity building and stakeholders' involvement in Tanzania and beyond."

AGENDA's work towards achieving its vision is based on the following strategic areas—sound management of chemicals, waste and hazardous waste management, sustainable natural resource management, climate change impacts mitigation and adaptation, applied research, training and advisory services and institutional capacity strengthening.

In fulfilling its mission, AGENDA renders advice, technical support, and capacity building services to Government Ministries, Departments and Agencies, Local Government Authorities, NGOs, Communities, and Development Partners. In achieving its mission, AGENDA utilizes various methods and approaches including awareness raising, advocacy, capacity building, and high stakeholder's engagement in Tanzania and beyond. In particular, AGENDA carries out studies and research, training, project development and management, information dissemination, and organizes workshops and meetings.

In the last 26 years since its establishment, AGENDA has successfully conducted a number of studies and evaluations services throughout Tanzania. Some of these are: elimination of lead in decorative paints in Tanzania; research on mercury level in air in artisanal small-scale mining areas such as Geita region and Chunya district in Mbeya region, in schools and in healthcare facilities in Tanzania; capacity building to the artisanal and small-scale miners communities towards reducing exposure to mercury; contribution in the preparation of the draft National Action Plan for the artisanal and small gold miners (NAP); preparation of The Second Guidelines for Provision of Oral Health Services in Tanzania; and identification of highly hazardous pesticides (HHPs) formulations registered for use in Tanzania with recommendations on the strategies to phase them out.

EXECUTIVE SUMMARY

Lead is a toxic metal that causes adverse effects on both human health and the environment. While lead exposure is also harmful to adults, lead exposure harms children at much lower levels, and the health effects are generally irreversible and can have a lifelong impact.

The younger the child, the more harmful lead can be, and children with nutritional deficiencies absorb ingested lead at an increased rate. The human fetus is the most vulnerable, and a pregnant woman can transfer lead that has accumulated in her body to her developing child. Lead is also transferred through breast milk when lead is present in a nursing mother.

Evidence of reduced intelligence caused by childhood exposure to lead has led the World Health Organization (WHO) to list "lead-caused mental retardation" as a recognized disease. WHO also lists it as one of the top ten diseases whose health burden among children is due to modifiable environmental factors.

Lead paint is a major source of childhood lead exposure. The term lead paint is used in this report to describe any paint to which one or more lead compounds have been intentionally added. The cut-off concentration for lead paint used in the report is 90 parts per million (ppm, total lead dry weight of paint), the strictest legal limit enacted in the world today. All lead concentrations in the report are total lead levels, unless otherwise specified.

Most highly industrial countries adopted laws or regulations to control the lead content of decorative paints—the paints used on the interiors and exteriors of homes, schools, and other child-occupied facilities—beginning in the 1970s and 1980s. In 2017, the Tanzania Bureau of Standards (TBS) adopted several East African Community (EAC) standards which set a lead content limit of 100 ppm (soluble lead) for solvent-based decorative paints for exterior and interior use, emulsion paints, and auto-refinish paints among others. In 2019, the EAC revised the lead content limit to 90 ppm (total lead), which TBS adopted in the same year. TBS has also set a 90 ppm total lead limit for lead in varnishes for interior use, primers for steel, and bituminous paint among others, and continue to do so for other paints (existing and new in market).

In June 2023, AGENDA purchased a total of 34 cans of solvent-based paints—23 decorative paints, five industrial paints, four anticorrosive paints, and two spray paints—from various stores around Dar es Salaam City, Tanzania. The paints represented 11 different brands produced by 11 manufacturers—six local manufacturers and five foreign manufacturers from China, Kenya, Thailand and UAE.

All paints were analyzed by an accredited laboratory in the United States of America for their total lead content, based on dry weight of the paint. The laboratory participates in the Environmental Lead Proficiency Analytical Testing (ELPAT) program operated by the American Industrial Hygiene Association (AIHA), assuring the reliability of the analytical results.

RESULTS

Eleven out of 34 analyzed solvent-based paints (32%) were lead paints, i.e., they contained lead concentrations above 90 parts per million (ppm, total lead dry weight). This is also the regulatory limit for lead in paint set by the East Africa Community (EAC). The limit is also used in Kenya, Ethiopia, Cameroon, Morocco, Saudi Arabia, Jordan, China, India, the Philippines, Colombia, and the United States of America. Moreover, four paints (12%) contained extremely high lead concentrations, above 10,000 ppm. The highest lead concentration detected was 140,000 ppm in a yellow DAVOS Aerosol Paint imported from China.

On the other hand, 23 out of 34 solvent-based paints (68%) did not contain intentionally added lead,[1] suggesting that the technology to produce paint without lead ingredients exists in Tanzania as it does in other countries.

---

1 There were 23 paints with lead concentrations reported as "less than 600 ppm," "less than 500 ppm," "less than 200 ppm," and "less than 100 ppm." In this report, we say that these 23 paints did not contain "intentionally added lead." Intentionally adding lead compounds to paint either as pigment or drier will yield concentrations of lead that are higher than 200 ppm. According to Module A-3 (Paint Basics) of UNEP's Toolkit for Establishing Laws to Eliminate Lead Paint, "Lead-based pigments may contribute around 1,500 ppm to over 100,000 ppm" concentrations of lead in paint, while "lead-based driers may contribute around 1,200 ppm to 6,000 ppm" concentrations of lead in paint. (https://wedocs.unep.org/bitstream/handle/20.500.11822/37030/PAINT.pdf?sequence=3&isAllowed=y, p.14-15)

Seven out of 11 analyzed brands (64%) sold at least one lead paint, i.e., a paint with lead concentration above 90 ppm. Also, four out of 11 analyzed brands (36%) sold at least one lead paint with extremely high lead concentrations above 10,000 ppm.

This study shows that yellow and clear paints most frequently contained extremely high lead concentrations above 10,000 ppm. Of 10 yellow paints, three (30%) contained lead levels above 10,000 ppm; and of three clear or colorless paints, one (33%) contained lead levels above 10,000 ppm.

In general, paint can labels did not carry meaningful information about lead content or the hazards of lead paint. Only one out of 34 paints (3%) provided information about lead on its label, i.e., a "NO LEAD" symbol or pictogram. Lab results confirmed it did not contain intentionally added lead.

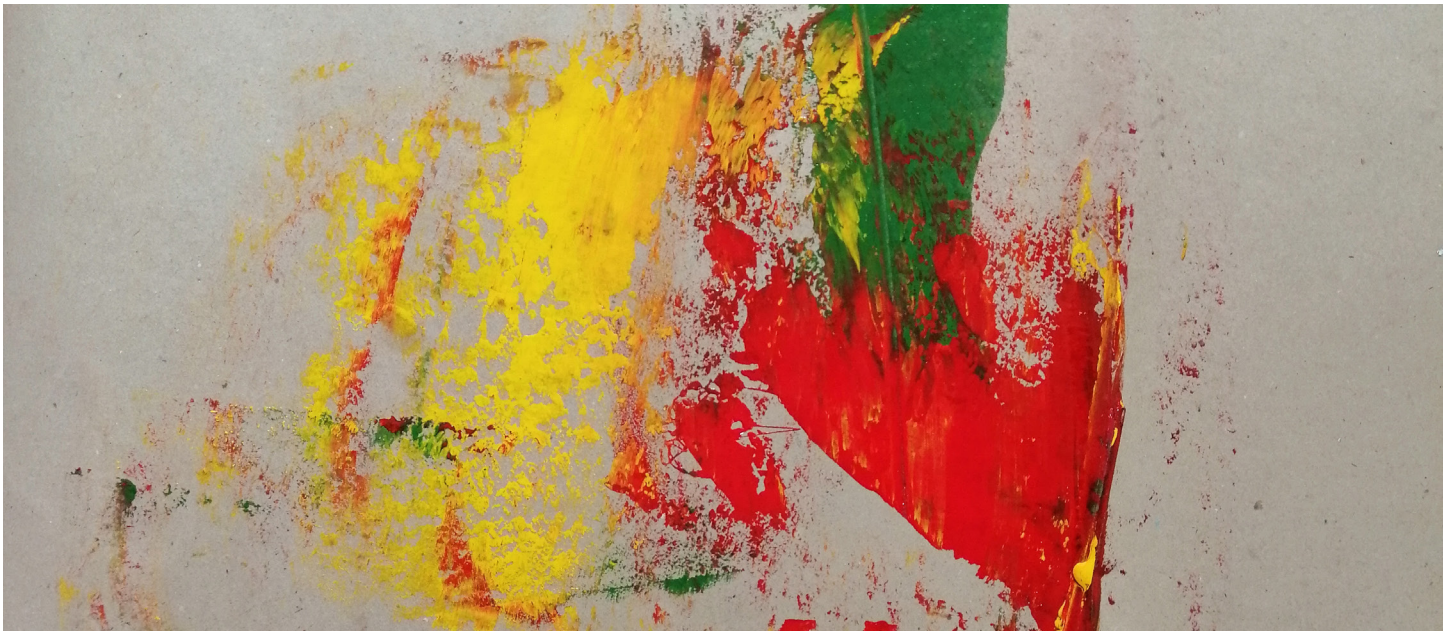
Most paints carried little information about any ingredients on can labels. Most paints were merely labeled as "solvents, pigments and resin," with no further details on the type of solvents and pigments (organic or inorganic) provided on paint can labels. Warning symbols on most of the paint cans indicated the flammability of the paints, but no precautionary warnings on the effects of lead dust to children and pregnant women were provided.

Manufacturing dates were included on the labels of 25 out of 34 paints (74%) included in this study. The batch numbers of 27 of the 34 paints (79%) were provided on the labels.

The results of the three studies conducted by AGENDA and IPEN in 2015, 2017, and 2023 indicated an increase in the percentage of compliant solvent-based paints with lead concentrations below 90 ppm. The percentage of similar paints exceeding 90 ppm and 10,000 ppm, on the other hand, had considerably decreased. For example, the study conducted in 2015 prior to the issuance of the lead paint regulation showed that 64 percent of 56 analyzed paints had lead content above 90 ppm. In contrast, only 30 percent of 34 analyzed paints in 2023 exceeded the 90 ppm limit six years after the regulatory limit was adopted in 2017. The percentage of paints with lead levels above 10,000 ppm also decreased: from 23 percent in 2015 to nine percent in 2023.

CONCLUSIONS

This study demonstrates that solvent-based paints with high concentrations of lead are still sold in the market in Tanzania despite the adoption of standards that set regulatory limits on lead in paint in 2017. However, the fact that 23 out of 34 paints (68%) did not contain intentionally added lead indicates that the technology to produce paints without added lead exists in Tanzania. The study results provide a strong justification to strengthen compliance monitoring and enforcement mechanisms to ensure adherence to the national ban on the manufacture, import, export, distribution, sale, and use of paints in Tanzania.



RECOMMENDATIONS

In the interest of upholding the national ban on lead-containing paints, thereby protecting the health of children and other vulnerable populations, AGENDA and IPEN propose the following recommendations:

FOR GOVERNMENT AND GOVERNMENT AGENCIES

The Tanzania Bureau of Standards (TBS), with collaboration from other relevant government agencies, should implement stricter enforcement of several East African Community (EAC) lead paint standards that have been adopted by Tanzania in 2017 and conduct continuous monitoring schemes to ensure that paint manufacturers, distributors of imported and locally manufactured paints, and local vendors comply with the law. They should require paint companies to display sufficient information indicating the level of lead and other toxic materials on paint can labels and provide relevant warnings on possible lead paint exposure hazards. They should integrate lead toxicity awareness and poisoning prevention programs about potential health hazards of lead in paint targeting the public and specific vulnerable groups such as painters, parents (women and men) of children, and school children. They should institutionalize the mandatory procurement and use of lead-safe paints in all construction projects and activities for government infrastructure. The government can also initiate monitoring for children's toys to ensure those sold in the market are not coated with lead paint.

FOR THE PAINT INDUSTRY

Due to weak enforcement of the lead paint standards by regulatory bodies, paint companies that still produce lead-containing paints should expeditiously stop the use of leaded paint ingredients in paint formulations in support of government efforts towards eliminating lead paint in the country. Paint companies that have shifted to non-lead paint manufacturing procedures should get their products certified through independent, third-party verification procedures to increase the customer's ability to choose paints with no added lead. Apparently, no guidance to inform the customer on this.

FOR INDIVIDUAL, HOUSEHOLD, AND INSTITUTIONAL CONSUMERS

All paint consumers, including painters and workers in the construction industry, need to demand paints with no added lead from paint manufacturers and retailers, as well as full disclosure of a paint product's content. Household and institutional consumers should ask for, consciously buy, and apply only paints with no added lead in places frequently used by children such as homes, schools, health facilities, day care centers, parks, and playgrounds.

FOR ORGANIZATIONS AND PROFESSIONAL GROUPS

Public health groups, consumer organizations and other concerned entities should support the elimination of lead paint, and conduct activities to inform the public and protect children from lead exposure through lead paint, lead in dust and soil, and other sources of lead.

FOR ALL STAKEHOLDERS

Stakeholders from the government, business and industry, health care sector, academia, and the civil society should actively support policies and programs that will contribute to the reduction of children's, women's, and workers' exposures to lead from lead-containing paint, as well as from lead-contaminated dust and soil towards a lead-safe future for all.

LEAD PAINT TERMINOLOGY

As used in this booklet:

- "Paint" includes varnishes, lacquers, stains, enamels, glazes, primers, or coatings used for any purpose. Paint is typically a mixture of resins, pigments, fillers, solvents, and other additives.
- "Lead paint" is paint to which one or more lead compounds have been added.
- "Lead pigments" are lead compounds used to give a paint product its color.
- "Lead anti-corrosive agents" are lead compounds used to protect a metal surface from rusting or other forms of corrosion.
- "Lead driers" are lead compounds used to make paint dry more quickly and evenly.
- "Decorative paint" refers to paints or coating materials that are produced for use on inside or outside walls, and surfaces of homes, schools, commercial buildings, and similar structures. Decorative paints are frequently used on doors, gates, and windows, and to repaint household furniture such as cribs, playpens, tables, and chairs.
- "Solvent-based, enamel decorative paint" or "enamel decorative paint" refers to oil-based paints.
- "ppm" means parts per million total lead content by weight in a dried paint sample. All lead concentrations in the report are total lead levels, unless otherwise specified.

1. BACKGROUND

1.1 HEALTH AND ECONOMIC IMPACTS OF LEAD EXPOSURE

Children are exposed to lead from paint when lead-containing paint on walls, windows, doors or other painted surfaces begins to chip or deteriorate, since this causes lead (from paint) to be released to dust and soil. When a surface previously painted with lead paint is sanded or scraped in preparation for repainting, very large amounts of lead-contaminated dust is produced, which, when spread, can constitute a severe health hazard.[1]

Children playing indoors or outdoors get house dust or soil on their hands, and then ingest it through normal hand-to-mouth behavior. If the dust or the soil is contaminated with lead, the children will ingest lead. Hand-to-mouth behavior is especially prevalent in children aged six years and under, the age group most easily harmed by exposure to lead. A typical one-to six-year-old child ingests between 100 and 400 milligrams of house dust and soil each day.[2]

In some cases, children pick up paint chips and put them directly into their mouths. This can be especially harmful because the lead content of paint chips is typically much higher than what is found in dust and soils. When toys, household furniture, or other articles are painted with lead paint, children may directly ingest the lead-contaminated, dried paint when chewing on them. Nonetheless, the most common way that children ingest lead is through lead-contaminated dust and soil that gets onto their hands.[3]

While lead exposure is also harmful to adults, lead exposure harms children at much lower levels. In addition, children absorb up to five times as much of ingested lead than adults. Children with nutritional deficiencies absorb ingested lead at an even increased rates.[2]

The younger the child, the more harmful lead can be, and the health effects are generally irreversible and can have a lifelong impact. The human fetus is the most vulnerable and a pregnant woman can transfer lead that has accumulated in her body to her developing child.[4] Lead is also transferred through breast milk when lead is present in a nursing mother.[5]

Once lead enters a child's body through ingestion, inhalation or across the placenta, it has the potential to damage several biological systems and pathways. The primary target is the central nervous system and the brain, but lead can also affect the blood system, the kidneys, and the skeleton.[6] Lead is also categorized as an endocrine-disrupting chemical (EDC).[7]

It is generally agreed that one key element in lead toxicity is its capacity to replace calcium in neurotransmitter systems, proteins and bone structure, altering function and structure and thereby leading to severe health impacts. Lead is also known to affect and damage cell structure.[8]

According to the World Health Organization (WHO): "Lead has no essential role in the human body, and lead poisoning accounts for about 0.6 percent of the global burden of disease."[2] Evidence of reduced intelligence caused by childhood exposure to lead has led WHO to list "lead-caused mental retardation" as a recognized disease. WHO also lists it as one of the top ten diseases whose health burden among children is due to modifiable environmental factors.[9]

In recent years, medical researchers have been documenting significant health impacts in children from lower and lower levels of lead exposure.[2, 6] According to the factsheet on Lead Poisoning and Health from WHO: "There is no known level of lead exposure that is considered safe."[10]

When a young child is exposed to lead, the harm to her or his nervous system makes it more likely that the child will have difficulties in school and engage in impulsive and violent behavior.[11] Lead exposure in young children is also linked to increased rates of hyperactivity, inattentiveness, failure to graduate from high school, conduct disorder, juvenile delinquency, drug use, and incarceration.[2] Lead exposure impacts on children continue throughout life and have a long-term impact on a child's work performance, and—on average—are related to decreased economic success.

A study investigating the economic impact of childhood lead exposure on national economies in all low- and middle-income countries estimated a total cumulative cost burden of $977 billion international dollars[2] per year.[12] The study considered the neurodevelopmental effects on lead-exposed children, as measured by reduced Intellectual Quotient (IQ) points, and it correlated lead exposure-related reductions in children's IQ scores to reductions in lifetime economic productivity, as expressed in lifelong earning power. The study identified many different sources of lead exposure in children, with lead paint as one major source. Broken down by region, the economic burden of childhood lead exposure as estimated by this study was:

- Africa: $134.7 billion of economic loss, or 4.03 percent of Gross Domestic Product (GDP);
- Latin America and the Caribbean: $142.3 billion of economic loss, or 2.04 percent of GDP; and
- Asia: $699.9 billion of economic loss, or 1.88 percent of GDP.

Country estimates used in this study can be accessed at a publicly available website, http://www.med.nyu.edu/pediatrics/research/environmentalpediatrics/leadexposure, and shows that economic loss in Tanzania is estimated at $4.14 billion, or 6.06 percent of the country's Gross Domestic Product (GDP).

---

2 An International dollar is a currency unit used by economists and international organizations to compare the values of different currencies. It adjusts the value of the U.S. dollar to reflect currency exchange rates, purchasing power parity (PPP), and average commodity prices within each country. According to the World Bank, "An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States." The international dollar values in this report were calculated from a World Bank table that lists GDP per capita by country based on purchasing power parity and expressed in international dollars.

1.2 THE USE OF LEAD IN PAINT

Paints contain high levels of lead when the paint manufacturer intentionally adds one or more leaded compounds to the paint for some purpose. A paint product may also contain some amount of lead when paint ingredients contaminated with lead are used, or when there is cross-contamination from other product lines in the same factory. Leaded paint ingredients are most commonly intentionally used in solvent-based paint due to their chemical properties, and solvent-based paints have been found to have high lead content in many countries.[13-15]

The leaded compounds most commonly added to paints are pigments. Pigments are used to give the paint its color, make the paint opaque (so it covers well), and protect the paint and the underlying surface from degradation caused by exposure to sunlight. Lead-based pigments are sometimes used alone, and sometimes used in combination with other pigments.

Leaded compounds may also be added to enamel paints for use as driers (sometimes called drying agents or drying catalysts). Leaded compounds are also sometimes added to paints used on metal surfaces to inhibit rust or corrosion. The most common of these is lead tetroxide, sometimes called red lead or minium.

Non-leaded pigments, driers, and anti-corrosive agents have been widely available for decades and are used by manufacturers producing the highest quality paints. When a paint manufacturer does not intentionally add lead compounds in the formulation of its paints and takes care to avoid the use of paint ingredients that are contaminated with lead, the lead content of the paint will be very low—less than 90 parts per million (ppm) total lead by dry weight, and frequently down to 10 ppm or less.

Most highly industrial countries adopted laws or regulations to control the lead content of decorative paints beginning in the 1970s and 1980s. Many also imposed controls on the lead content of paints used on toys and for other applications likely to contribute to lead exposure in children. These regulatory actions were taken based on scientific and medical findings that lead paint is a major source of lead exposure in children, and that lead exposure in children causes serious harm, especially to children aged six years and under.

The use of lead in production of decorative paint is prohibited in the European Union through regulations related to safety of consumer products and specific prohibitions for most leaded raw materials. In the U.S., Canada, Australia and other countries with regulations restricting the use of leaded ingredients in decorative paint, standards specifying a maximum lead limit are in place. The current standard for decorative household paints in e.g., the U.S., China, India, South Korea, Saudi Arabia, Morocco, Ethiopia, Kenya, Georgia, Ukraine and Colombia is a total maximum lead content of 90 ppm, and adherence to this ensures that a manufacturer can sell its paint anywhere in the world. This standard is also recommended in the *Model Law and Guidance for Regulating Lead Paint*,[3] which was developed by the Global Alliance to Eliminate Lead Paint (GAELP) and published by the UN Environment Programme. Some other countries such as Brazil, South Africa, and Sri Lanka have established standards of 600 ppm total lead.

1.3 PAINT MARKET AND REGULATORY FRAMEWORK IN TANZANIA

According to a 2017 study carried out by Frost & Sullivan, the total market size of decorative paints and coatings in Kenya and Tanzania was 66.2-million litres in 2015, and this was expected to reach 91.5-million litres by 2020. Crown Paints and Basco Paints, both from Kenya, and Insignia from Tanzania dominate the market, while Sadolin Paints (now Plascon Paints) and Goldstar Paints, both from Tanzania, were trying to expand their shares.[4]

The source noted further that water-based paints were expected to account for 64.7% of the market, and solvent-based paints for the remaining 35.3% by 2020.

---

3 https://www.unenvironment.org/resources/publication/model-law-and-guidance-regulating-lead-paint

4 https://www.bizcommunity.com/Article/414/493/160772.html

Other paint companies in Tanzania that AGENDA identified during the study include Kiboko Paints Tanzania Ltd, Berger Paints Tanzania Ltd, Crown Pants (T) Ltd, Viva All Viva Co. Ltd, Jakiba Enterprises Ltd, Kopru International Company Ltd, Billion Paint, Silkcoat Paint Company Ltd, and Masia Paint Tanzania Ltd. Some of these companies produce emulsion paints only.[5]

Information on the size of each company were not available at the time this report was written, hence categorization of large, medium- and small-sized paint companies cannot be established in the country.

In Tanzania, some paints are manufactured locally while others are imported from abroad mainly from Kenya, UAE, China and India. The locally manufacturing companies are: Berger Paints Tanzania Ltd, Billion Paint, Crown Pants (T) Ltd, Goldstar Paints Tanzania Ltd, Insignia Limited, Jakiba Enterprises Ltd, Kiboko Paints Tanzania Ltd, Kopru International Company Ltd, Masia Paint Tanzania Ltd, Plascon Kansai Paints Tanzania Ltd, Silkcoat Paint Company Ltd, and Viva All Viva Co. Ltd.

The products from these companies must be certified by the Tanzania Bureau of Standards (TBS), and its quality monitored regularly to comply with the recently approved standard requirements.

In Tanzania, control of lead paint is in the mandate of TBS, which is a government entity established by the law under the Standard Act 2009 Cap 130.[6]

TBS is the custodian and an overseer of the observance of standards in Tanzania. It has the mandate of formulating and enforcing standards in the country. Under the Industrial and Consumer Chemicals (Management and Control) Act No. 3 of 2003, conditions for restriction, banning, and elimination of a chemical have been stipulated in Section 30 subsection 1 part (a) to (e), which states that: "Upon application for the registration of a chemical or where after registration, a chemical is:

a. Proved to be dangerous to human life or environment;
b. Proved to be highly toxic, highly hazardous, persistent or biologically accumulative;
c. Proved to cause poisoning effect to human and animals of which no effective antidote is available;
d. Severely restricted by National, International Convention or Treaty; and
e. Subject to action according to International Convention or Treaty after ratified in the United Republic.

Also, the Government Chemist Laboratory Authority (GCLA) (under the same Act) has been given powers to restrict, severely restrict, ban or phase out the use and handling of chemicals specified under the Eighth schedule of the Act. Lead paint is currently not listed under the Eighth schedule and is therefore not restricted. Setting a legal limit for lead in paint could trigger such a restriction. The administration and function of the Industrial and Consumer Chemicals Act No 3 of 2003 is under the GCLA. It is also the national focal point for the Strategic Approach to International Chemicals Management (SAICM). The National Environment Management Council (NEMC) is the national enforcer of the Environmental Management Act of 2004. It oversees the undertaking of the Environmental Impact Assessment (EIA) and Environmental Audit (EA) in the country, through which they can control the use of lead in paints during consultation and approval processes. The Occupational Safety and Health Authority (OSHA) administers the Occupational Safety and Health Act of 2003. Its main obligation is to ensure safety and health of workers in industries and other workplaces. Exposure of workers to lead compounds used in paint production could be one of the issues of concern.

5 https://www.tbs.go.tz/uploads/publications/en-1710401722-BUYERS%20GUIDE%20Final%2006-06-2023.pdf

6 https://www.tbs.go.tz/uploads/publications/en-1627548034-en-1589278779-Standards_Act_2009.pdf

2. MATERIALS AND METHODS

From May to June 2023, 34 cans of solvent-based paints—23 decorative paints, five industrial paints, four anticorrosive paints, and two spray paints—were purchased by AGENDA from various stores around Dar es Salaam City, Tanzania. The paints represented 11 different brands produced by 11 manufacturers—six local manufacturers and five foreign manufacturers from China, Kenya, Thailand and UAE.

In most cases, one white paint and one or more bright-colored paint such as red, orange or yellow were selected. Additionally, five industrial paints, four anticorrosive paints, and two spray paints were also included in this study. The availability of these paints in retail establishments suggested that they were intended to be used within home and other environments such as schools, healthcare facilities, etc.

During the paint sample preparation, information such as color, brand, manufacturer, country where manufactured, product codes, production dates and other details as provided on the label of the paint can were recorded. Generic paint colors were recorded, e.g., "yellow" instead of "sunflower." For all colored paints, the protocol called for obtaining "bright" or "strong" red and yellow paints when available.

Paint sampling preparation kits containing individually numbered, untreated wood pieces, single-use paint brushes and stirring utensils made from untreated wood sticks were assembled and shipped to AGENDA by the staff of the IPEN partner Non-Governmental Organization (NGO), Arnika, in The Czech Republic.

Each can of paint was thoroughly stirred and was subsequently applied onto individually numbered duplicates of untreated, labeled wood pieces using different unused, single-use paint brushes by a researcher of AGENDA. The paints tested for lead content are shown in **Figure 1** below.

Each stirring utensil and paintbrush was used only for the same paint and extra caution was taken to avoid cross contamination. All samples were then allowed to dry at room temperature for six days. After drying, the painted wood pieces were placed in individually labeled, resealable plastic bags and shipped for analysis of lead content to SGS Forensic Laboratories in the United States of America. The laboratory participates in the Environmental Lead Proficiency Analytical Testing (ELPAT) Program operated by the American Industrial Hygiene Association. In the laboratory selection process, IPEN further assessed the reliability of the laboratory results by conducting an independent quality assurance testing. This was made by sending paint samples with a known lead content to the laboratory, and evaluating the results received.

Figure 1 Paints tested by AGENDA for lead content.

The laboratory's lower limit of detection for the lead concentration in the paint samples is dependent on the amount of paint in the samples. Generally, the lowest detection limit for the method used is 60 ppm, but if only a small amount of paint is available, the detection limit increases. Therefore, the detection limit was higher (up to 600 ppm) for some of the samples.

The paint samples were analyzed using method EPA3050B/7000B, i.e., through acid digestion of the samples, followed by Flame Atomic Absorption Spectrometry, as recognized by the WHO as appropriate for the purpose.[16]

3. RESULTS

3.1 SUMMARY OF RESULTS

This study shows that:

- Eleven out of 34 analyzed solvent-based paints (32%) were lead paints, i.e., they contained lead concentrations above 90 parts per million (ppm), dry weight. In addition, four paints (12%) contained extremely high lead concentrations above 10,000 ppm.
- Seven out of 11 analyzed brands (64%) sold at least one lead paint, i.e., a paint with lead concentration above 90 ppm. Also, four out of 11 analyzed brands (36%) sold at least one lead paint with extremely high lead concentrations above 10,000 ppm.
- Nine out of 23 bright-colored paints (39%) were lead paints, i.e., they contained lead concentrations above 90 parts per million (ppm), dry weight.
- The highest lead concentration detected was 140,000 ppm in a yellow DAVOS Aerosol (Spray) Paint imported from China and sold for home use.
- Only one out of 34 paints (3%) provided information about lead on their labels and all paints carried no information about ingredients. Most warning symbols on the paint cans indicated the flammability of the paints, but no precautionary warnings on the effects of lead dust to children and pregnant women were provided.

3.2 LEAD CONTENT ANALYSIS

Eleven out of 34 analyzed solvent-based paints (32%) were lead paints, i.e., contained a lead concentration above 90 ppm – four of these contained extremely high lead concentrations above 10,000 ppm (12%).

A yellow DAVOS Aerosol (Spray) Paint manufactured in China by DAVOS Peoples Product contained the highest concentration of lead at 140,000 ppm, while the lowest concentration of lead less than 90 ppm was detected in two decorative paints from the following brands: Robbialac (yellow) and Master Paints (white). Complete details of analyzed paints are provided in Annex 1, Table 4.

The eight solvent-based paints with the highest amounts of lead are summarized in Table 1.

Table 1 Top Eight Solvent-Based Paints with the Highest Lead Content.

RANK	SAMPLE NO.	TYPE OF PAINT	MANUFACTURER	COLOR	LEAD CONTENT (ppm)
1	TZA-430	DAVOS (Aerosol Paint)	DAVOS Peoples Product (China)	Yellow	140,000
2	TZA-429	DUCO (2K Acrylic Paints)	Crown Paints Tanzania Ltd (Tanzania)	Yellow	120,000
3	TZA-418	Kiboko (Hi Gloss Enamel)	Kiboko Paints Ltd (Tanzania)	Yellow	36,000
4	TZA-434	Wellcoat (Maxigloss Enamel Clementon-395)	Wellcoat Paints (UAE)	Clear	15,000
5	TZA-427	Master Paints (Synthetic Enamel Gloss 1)	National Paints Factories Co. Ltd (UAE)	Green	9,000
6	TZA-421	Robbialac (Shield Undercoat)	Berger Paints International Ltd (Tanzania)	Red	7,700
7	TZA-404	Plascon (2K Acrylic Refinish)	Kansai Plascon Paint (T) Ltd (Tanzania)	Red	1,700
8	TZA-405	Plascon (2K Acrylic Primer Beige)	Kansai Plascon Paint (T) Ltd (Tanzania)	Yellow	1,200

In addition, 21 out of 34 analyzed paints (62%) had lead concentrations reported as "less than 600 ppm," "less than 500 ppm," "less than 200 ppm," and "less than 100 ppm." In this report, we say that these 21 paints did not contain "intentionally added lead."

Intentionally adding lead compounds to paint either as pigment or drier will yield concentrations of lead that are higher than 200 ppm. According to Module A-3 (Paint Basics) of UNEP's *Toolkit for Establishing Laws to Eliminate Lead Paint*, "Lead-based pigments may contribute around 1,500 ppm to over 100,000 ppm" concentrations of lead in paint, while "lead-based driers may contribute around 1,200 ppm to 6,000 ppm" concentrations of lead in paint.[7]

3.3 PAINT BRAND ANALYSIS

Four out of 11 analyzed brands (36%) sold at least one paint with extremely high lead concentration above 10,000 ppm.

Among 23 decorative paints, a yellow Kiboko Hi Gloss Enamel Paint contained the highest concentration of lead at 36,000 ppm. On the other hand, at least one paint from each of the following brands did not contain intentionally added lead, including Coral (white and yellow); Goldstar (green, red, white, and yellow); Kiboko (red and white); Master Paints (red, white, and yellow); Plascon (white and yellow); Robbialac (white and yellow); and Wellcoat (clear). This indicates that the technology to produce paints without added lead exists in Tanzania.

Among five industrial paints, a yellow DUCO 2K Acrylic Paint contained the highest concentration of lead at 120,000 ppm. On the other hand, at least one paint from two brands—DUCO (red) and Goldstar (black)—did not contain intentionally added lead.

For imported spray paints, a yellow DAVOS Aerosol (Spray) Paint manufactured in China by DAVOS Peoples Product contained the highest concentration of lead at 140,000 ppm, while a red Bosny Spray Paint manufactured in Thailand by R.J. London Chemicals Ind. did not contain intentionally added lead.

None of the four anticorrosive paints from Coral (Tanzania), Goldstar (Tanzania), and Basco Paints (Kenya) had intentionally added lead.

3.4 PAINT COLOR ANALYSIS

Nine out of 23 bright-colored paints (39%) such as yellow, orange, red and green contained lead concentrations above 90 ppm, with three paints containing extremely high lead concentrations above 10,000 ppm (13%).

This study included 10 yellow paints, 10 red paints, six white paints, three clear varnishes, two green paints, and one each of orange, blue, and black paints. Yellow paints contained the highest lead concentrations.

Among bright-colored paints, three out of 10 yellow paints (30%) contained lead concentrations above 10,000 ppm. One enamel clear varnish also contained lead above 10,000 ppm.

3.5 LABELING

In general, most paint can labels did not carry meaningful information about lead content or the hazards of lead paint.

Only one out of 34 paints (3%) provided information about lead its label, i.e., "NO LEAD" symbol or pictogram. Lab results confirmed it did not contain intentionally added lead.

All other paints carried little information about any ingredients on can labels. Most paints were merely labeled as "solvents, pigments and resin," with no further details on the type of solvents and pigments (organic or inorganic) provided on paint can labels. Warning symbols on most of the paint cans indicated the flammability of the paints and its environmental friendliness among others, but no precautionary warnings on the effects of lead dust to children and pregnant women were provided. Three paints contained labels of TBS quality mark, one paint showed a label of its QMS and EMS ISO certifications, and one paint showed ISO 14001:2004 and ISO 9001:2008 conformity labels.

---

7 https://wedocs.unep.org/bitstream/handle/20.500.11822/37030/PAINT.pdf?sequence=3&isAllowed=y, p.14-15

Manufacturing dates were included on the labels of 25 out of 34 paints (74%) included in this study. The batch numbers of 27 of the 34 paints (79%) were provided on the labels.

3.6 COMPARISON WITH RESULTS FROM EARLIER STUDIES

The results of the three studies conducted by AGENDA and IPEN in 2015, 2017, and 2023 indicated an increase in the percentage of compliant solvent-based paints with lead concentrations below 90 ppm. The percentage of similar paints exceeding 90 ppm and 10,000 ppm, on the other hand, had considerably decreased. For example, the study conducted in 2015 prior to the issuance of the lead paint regulation showed that 64 percent of 56 analyzed paints had lead content above 90 ppm. In contrast, only 30 percent of 34 analyzed paints in 2023 exceeded the 90 ppm limit six years after the regulatory limit was adopted in 2017. The percentage of paints with lead levels above 10,000 ppm also decreased: from 23 percent of 56 paints in 2015 to nine percent of 34 paints in 2023.

Seventeen decorative paints analyzed in previous studies were also analyzed in this study. Among these, four decorative paints remained non-compliant with the legal limit and still contains intentionally added lead in 2023. These include two Kiboko paints (yellow and blue), one Master paint (green), and one Robbialac paint (red).

On the other hand, four paints analyzed in 2015 and 2017 remained without intentionally added lead in 2023. These include two Coral paints (yellow and white), one Goldstar paint (white), and one Master paint (white).

Moreover, nine paints have been reformulated and were now compliant with the 90 ppm limit. These paints—which includes three Goldstar paints (yellow, green, and red), two Kiboko paints (red and white), two Robbialac paints (yellow and white), and two Master paints (yellow and red)—still contained lead in previous studies.

Table 2 Comparison of Lead Concentrations in Some Solvent-Based Paints.

SAMPLE NO.	BRAND NAME	COLOR	2023 LEAD CONTENT (ppm)	2017 LEAD CONTENT (ppm)	2015 LEAD CONTENT (ppm)	REMARKS
TZA-418	Kiboko (Hi Gloss Enamel)	yellow	36,000	61,000	61,000	Still contains "intentionally added lead" (most likely lead pigment) just like in 2017 and 2015
TZA-427	Master Paints (Synthetic Enamel Gloss 1)	green	9,000	84,000	84,000	Still contains "intentionally added lead" (most likely lead pigment) just like in 2017
TZA-421	Robbialac (Shield Enamel Undercoat)	red	7,700	28,000	28,000	Still contains "intentionally added lead" (most likely lead pigment) just like in 2017 and 2015
TZA-419	Kiboko (Hi Gloss Enamel)	blue	300	1,600	1,600	Lead content decreased, but still contains lead (most likely from trace amounts of lead contaminants)
TZA-406	Coral (High Gloss Enamel)	white	< 200	< 70	< 70	Remains no "intentionally added lead" just like in 2017 and 2015
TZA-408	Coral (High Gloss Enamel)	yellow	< 200	< 70	< 70	Remains no "intentionally added lead" just like in 2017 and 2015
TZA-409	Goldstar (Hi Gloss Enamel)	white	< 200	< 200	80	Remains no "intentionally added lead" just like in 2017 and 2015
TZA-425	Master Paints (Synthetic Enamel Gloss 1)	white	< 90	< 60	< 60	Remains no "intentionally added lead" just like in 2017 and 2015
TZA-410	Goldstar (Hi Gloss Enamel)	red	< 100	< 200	3,800	Contains no "intentionally added lead" since 217
TZA-411	Goldstar (Hi Gloss Enamel)	yellow	< 200	17,000	61,000	Now contains no "intentionally added lead"
TZA-412	Goldstar (Hi Gloss Enamel)	green	< 200	< 100	24,000	Contains no "intentionally added lead" since 2017
TZA-416	Kiboko (Hi Gloss Enamel)	white	< 200	2,500	4,800	Now contains no "intentionally added lead"
TZA-417	Kiboko (Hi Gloss Enamel)	red	< 200	24,000	2,900	Now contains no "intentionally added lead"
TZA-420	Robbialac (Shield Enamel Undercoat)	white	< 100	< 200	2,600	Contains no "intentionally added lead" since 2017
TZA-422	Robbialac (Shield Enamel Undercoat)	yellow	< 90	500	44,000	Now contains no "intentionally added lead"
TZA-425	Master Paints (Synthetic Enamel Gloss 1)	red	< 100	< 60	2,500	Contains no "intentionally added lead" since 2017
TZA-426	Master Paints (Synthetic Enamel Gloss 1)	yellow	< 200	< 60	62,000	Contains no "intentionally added lead" since 2017

4. CONCLUSIONS AND RECOMMENDATIONS

This study demonstrates that solvent-based paints with high concentrations of lead are still sold in the market in Tanzania despite the adoption of standards that set regulatory limits on lead in paint in 2017. However, the fact that 23 out of 34 paints (68%) did not contain intentionally added lead indicates that the technology to produce paints without added lead exists in Tanzania. The study results provide a strong justification to strengthen compliance monitoring and enforcement mechanisms to ensure adherence to the national ban on the manufacture, import, export, distribution, sale, and use of paints in Tanzania.

In the interest of upholding the national ban on lead-containing paints, thereby protecting the health of children and other vulnerable populations, AGENDA and IPEN propose the following recommendations:

FOR GOVERNMENT AND GOVERNMENT AGENCIES

The Tanzania Bureau of Standards (TBS), with collaboration with other relevant government agencies, should implement stricter enforcement of several East African Community (EAC) lead paint standards that was adopted by Tanzania in 2017 and conduct continuous monitoring schemes to ensure that paint manufacturers, distributors of locally manufactured and imported paints, and local vendors comply with the law. They should require paint companies to display sufficient information indicating the level of lead and other toxic materials on paint can labels and provide relevant warnings on possible lead paint exposure and hazards when disturbing painted surfaces where paint is released as dust. They should integrate lead toxicity awareness and poisoning prevention programs about potential health hazards of lead in paint targeting the public and specific vulnerable groups such as painters and school children. They should institutionalize the mandatory procurement and use of lead-safe paints in all construction projects and activities for government infrastructure. The government can also initiate monitoring for children's toys to ensure those in the market are not coated with lead paint.

FOR THE PAINT INDUSTRY

Due to weak enforcement of the lead paint standards by regulatory bodies, paint companies that still produce lead-containing paints should expeditiously stop the use of leaded paint ingredients in paint formulations in support of government efforts towards eliminating lead paint in the country. Paint companies that have shifted to non-lead paint manufacturing procedures should get their products certified through independent, third-party verification procedures to increase the customer's ability to choose paints with no added lead. Apparently, no guidance to inform the consumers on this.

FOR INDIVIDUAL, HOUSEHOLD, AND INSTITUTIONAL CONSUMERS

All paint consumers, including painters and workers in the construction industry, need to demand paints with no added lead from paint manufacturers and retailers, as well as full disclosure of a paint product's content. Household and institutional consumers should ask for, consciously buy, and apply only paints with no added lead in places frequently used by children such as homes, schools, health facilities, day care centers, parks, and playgrounds.

FOR ORGANIZATIONS AND PROFESSIONAL GROUPS

Public health groups, consumer organizations and other concerned entities should support the elimination of lead paint, and conduct activities to inform the public and protect children from lead exposure through lead paint, lead in dust and soil, and other sources of lead.

FOR ALL STAKEHOLDERS

Stakeholders from the government, business and industry, health care sector, academia, and the civil society should actively support policies and programs that will contribute to the reduction of children's, women's, and workers' exposures to lead from lead-containing paint, as well as from lead-contaminated dust and soil towards a lead-safe future for all.

REFERENCES

1. Clark, S., et al., Occurrence and determinants of increases in blood lead levels in children shortly after lead hazard control activities. Environmental Research, 2004. 96(2): p. 196-205.
2. World Health Organization. Childhood lead poisoning. 2010.
3. Lanphear, B.P., et al., The contribution of lead-contaminated house dust and residential soil to children's blood lead levels. Environmental Research, 1998. 79(1): p. 51-68.
4. Bellinger, D.C., Very low lead exposures and children's neurodevelopment. Current Opinion in Pediatrics, 2008. 20(2): p. 172-177.
5. Bjorklund, K.L., et al., Metals and trace element concentrations in breast milk of first time healthy mothers: a biological monitoring study. Environmental Health, 2012. 11.
6. Needleman, H., Lead Poisoning. Annual Review of Medicine, 2004. 55(1): p. 209-222.
7. Iavicoli, I., L. Fontana, and A. Bergamaschi, THE EFFECTS OF METALS AS ENDOCRINE DISRUPTORS. Journal of Toxicology and Environmental Health-Part B-Critical Reviews, 2009. 12(3): p. 206-223.
8. Verstraeten, S., L. Aimo, and P. Oteiza, Aluminium and lead: molecular mechanisms of brain toxicity. Archives of Toxicology, 2008. 82(11): p. 789-802.
9. Prüss-Üstün, A. and C. Corvalán Preventing disease through healthy environments: Towards an estimate of the environmental burden of disease. 2006.
10. World Health Organization. Lead poisoning and health. 2015; Available from: http://www.who.int/mediacentre/factsheets/fs379/en/.
11. Mielke, H.W. and S. Zahran, The urban rise and fall of air lead (Pb) and the latent surge and retreat of societal violence. Environment International, 2012. 43: p. 48-55.
12. Attina, T.M. and L. Trasande, Economic Costs of Childhood Lead Exposure in Low- and Middle-Income Countries. Environmental Health Perspectives, 2013. 121(9): p. 1097-1102.
13. Brosché, S., et al., Asia Regional Paint Report. 2014.
14. Clark, C.S., et al., The lead content of currently available new residential paint in several Asian countries. Environmental Research, 2006. 102(1): p. 9-12.
15. Clark, C.S., et al., Lead levels in new enamel household paints from Asia, Africa and South America. Environmental Research, 2009. 109(7): p. 930-936.
16. World Health Organization, Brief guide to analytical methods for measuring lead in paint. 2011, WHO Library Cataloguing-in-Publication Data.

PHOTOGRAPHY

Cover (top): © AGENDA; (bottom left): © AGENDA; (bottom right): © IPEN/Colnodo; page 4: © IPEN/Colnodo; page 5: © AGENDA; page 7: © Manny Calonzo, EcoWaste Coalition/IPEN; page 9: © IPEN/Colnodo; pages 13 and 16: © AGENDA

ANNEX

Table 3 Solvent-Based Paints Included in the Study.

SAMPLE NO.	BRAND	COLOR OF PAINT	PAINT CAN SIZE (L)	DATE OF MANUFACTURE (M/D/Y)	BATCH NO.	DATE OF PURCHASE (M/D/Y)	PURCHASE PRICE (LOCAL CURRENCY)	IS THERE WEBSITE ON LABEL?
TZA-401	Plascon (Hi Gloss Synthetic Paint)	White	4	4/8/2021	21080028	9/6/2023	25,000 TZS	www.kansaiplascon.co.tz
TZA-402	Plascon (Hi Gloss Synthetic Paint)	Red	4	worn out	worn out	9/6/2023	25,000 TZS	www.kansaiplascon.co.tz
TZA-403	Plascon (Hi Gloss Synthetic Paint)	Yellow	4	3/10/2022	22100177	9/6/2023	25,000 TZS	www.kansaiplascon.co.tz
TZA-404	Plascon (2K Acrylic Refinish)	Red	4	Not seen	Not seen	14/6/2023	50,000 TZS	www.kansaiplascon.co.tz
TZA-405	Plascon (2K Acrylic Primer Beige)	Yellow	4	Not seen	Not seen	14/6/2023	50,000 TZS	www.kansaiplascon.co.tz
TZA-406	Coral (High Gloss Enamel)	White	0.5	2022 Dec	22-42145	9/6/2023	5,000 TZS	www.insignia.co.tz
TZA-407	Coral (Red Oxide Primer)	Red	0.5	2023 Jan	23-604	9/6/2023	5,000 TZS	www.insignia.co.tz
TZA-408	Coral (High Gloss Enamel)	Yellow	0.5	2022 Jan	22-3732	9/6/2023	5,000 TZS	www.insignia.co.tz
TZA-409	Goldstar (Hi Gloss Enamel)	White	0.5	25/2/2023	2301943	9/6/2023	5,000 TZS	www.goldstarpaints.co.tz
TZA-410	Goldstar (Hi Gloss Enamel)	Red	0.5	1/11/2022	2211990	9/6/2023	5,000 TZS	www.goldstarpaints.co.tz
TZA-411	Goldstar (Hi Gloss Enamel)	Yellow	0.5	26/9/2022	2210430	9/6/2023	5,000 TZS	www.goldstarpaints.co.tz
TZA-412	Goldstar (Hi Gloss Enamel)	Green	0.5	3/3/2022	2201908	9/6/2023	5,000 TZS	www.goldstarpaints.co.tz
TZA-413	Goldstar (Red Oxide Primer)	Red	0.5	22/9/2022	2210511	10/6/2023	5,000 TZS	www.goldstarpaints.co.tz
TZA-414	Goldstar (Bitumi-nous Paint)	Black	4	21/3/2023	2302438	14/6/2023	25,000 TZS	www.goldstarpaints.co.tz
TZA-415	Goldstar (Etch Primer)	Yellow	4	19/1/2022	2200341	14/6/2023	50,000 TZS	www.goldstarpaints.co.tz
TZA-416	Kiboko (Hi Gloss)	White	1	2021 Sept	21I0080	15/6/2023	10,000 TZS	www.kibokopaints.com
TZA-417	Kiboko (Hi Gloss)	Red	4	2022 Feb	22B0155	15/6/2023	24,000 TZS	www.kibokopaints.com
TZA-418	Kiboko (Hi Gloss Enamel)	Yellow	4	2023 May	23 E 00 23	15/6/2023	25,000 TZS	www.kibokopaints.com
TZA-419	Kiboko (Hi Gloss)	Blue	1	2020 Nov	20K1708	15/6/2023	10,000 TZS	www.kibokopaints.com
TZA-420	Robbialac (Shield - Enamel Undercoat)	White	4	2023 May	5231672	15/6/2023	25,000 TZS	www.bergerpaintsintl.com
TZA-421	Robbialac (Shield Undercoat)	Red	4	Not seen	9212615	15/6/2023	25,000 TZS	www.bergerpaintsintl.com
TZA-422	Robbialac (Shield Undercoat)	Yellow	4	Not seen	9222344	15/6/2023	25,000 TZS	www.bergerpaintsintl.com
TZA-423	Robbialac (Shield Undercoat)	Orange	4	Not seen	10222190	15/6/2023	25,000 TZS	www.bergerpaintsintl.com
TZA-424	Master Paints (Synthetic Enamel Gloss 1)	White	0.4	Not seen	Not seen	14/6/2023	8,000 TZS	www.national-paints.com

Table 3 Solvent-Based Paints Included in the Study. (continued)

SAMPLE NO.	BRAND	COLOR OF PAINT	PAINT CAN SIZE (L)	DATE OF MANUFACTURE (M/D/Y)	BATCH NO.	DATE OF PURCHASE (M/D/Y)	PURCHASE PRICE (LOCAL CURRENCY)	IS THERE WEBSITE ON LABEL?
TZA-425	Master Paints (Synthetic Enamel Gloss 1)	Red	0.4	Not seen	Not seen	14/6/2023	8,000 TZS	www.national-paints.com
TZA-426	Master Paints (Synthetic Enamel Gloss 1)	Yellow	0.4	Not seen	Not seen	14/6/2023	8,000 TZS	www.national-paints.com
TZA-427	Master Paints (Synthetic Enamel Gloss 1)	Green	0.5	Not seen	Not seen	14/6/2023	8,000 TZS	www.national-paints.com
TZA-428	DUCO (2K Acrylic Paints)	Red	4	worn out	worn out	14/6/2023	62,500 TZS	www.crownpaints.co.tz
TZA-429	DUCO (2K Acrylic Paints)	Yellow	4	2021 May	21MAY-WK19-TA000010	14/6/2023	62,500 TZS	www.crownpaints.co.tz
TZA-430	DAVOS (Aerosol Paint)	Yellow	0.4	7/11/2021	Not shown	14/6/2023	3,000 TZS	None
TZA-432	Bosny (Spray Paint)	Red	300 g	10/11/2022	0516-2-1#23	14/6/2023	8,500 TZS	www.bosny.com
TZA-433	Basco Paints (NC Sanding Sealer)	Clear	1	2022 May	880868	14/6/2023	12,000 TZS	www.bascopaints.com
TZA-434	Wellcoat (Maxi-gloss Enamel Clementon-395)	Clear	0.9	2022 June	65587F22	14/6/2023	15,000 TZS	www.wellcoatpaints.com
TZA-435	Wellcoat (Clear Varnish)	Clear	0.9	2022 June	65799F22	14/6/2023	15,000 TZS	www.wellcoatpaints.com

Legend:

Green - decorative paint
Orange - anticorrosive paint
Yellow - spray paint
Blue - industrial paint

Table 4 Results of Laboratory Analysis of Solvent-Based Paints.

SAMPLE NO.	BRAND	COLOR OF PAINT	LEAD CONTENT (ppm)	COUNTRY OF BRAND HEADQUARTERS	COUNTRY WHERE MANUFACTURED	IS THERE INFORMATION ON CAN ABOUT LEAD CONTENT OF PAINT?
TZA-401	Plascon (Hi Gloss Synthetic Paint)	White	< 200	Japan	Tanzania	No
TZA-402	Plascon (Hi Gloss Synthetic Paint)	Red	200	Japan	Tanzania	No
TZA-403	Plascon (Hi Gloss Synthetic Paint)	Yellow	< 200	Japan	Tanzania	No
TZA-404	Plascon (2K Acrylic Refinish)	Red	1,700	Japan	Tanzania	No
TZA-405	Plascon (2K Acrylic Primer Beige)	Yellow	1,200	Japan	Tanzania	No
TZA-406	Coral (High Gloss Enamel)	White	< 200	Tanzania	Tanzania	No
TZA-407	Coral (Red Oxide Primer)	Red	< 200	Tanzania	Tanzania	No
TZA-408	Coral (High Gloss Enamel)	Yellow	< 200	Tanzania	Tanzania	No
TZA-409	Goldstar (Hi Gloss Enamel)	White	< 200	Tanzania	Tanzania	No
TZA-410	Goldstar (Hi Gloss Enamel)	Red	< 100	Tanzania	Tanzania	No
TZA-411	Goldstar (Hi Gloss Enamel)	Yellow	< 200	Tanzania	Tanzania	No
TZA-412	Goldstar (Hi Gloss Enamel)	Green	< 200	Tanzania	Tanzania	No
TZA-413	Goldstar (Red Oxide Primer)	Red	< 200	Tanzania	Tanzania	No
TZA-414	Goldstar (Bituminous Paint)	Black	< 100	Tanzania	Tanzania	No
TZA-415	Goldstar (Etch Primer)	Yellow	< 200	Tanzania	Tanzania	No
TZA-416	Kiboko (Hi Gloss)	White	< 200	Tanzania	Tanzania	No
TZA-417	Kiboko (Hi Gloss)	Red	< 200	Tanzania	Tanzania	No
TZA-418	Kiboko (Hi Gloss Enamel)	Yellow	36,000	Tanzania	Tanzania	No
TZA-419	Kiboko (Hi Gloss)	Blue	300	Tanzania	Tanzania	No
TZA-420	Robbialac (Shield - Enamel Undercoat)	White	< 100	Tanzania	Tanzania	No
TZA-421	Robbialac (Shield Undercoat)	Red	7,700	Tanzania	Tanzania	No
TZA-422	Robbialac (Shield Undercoat)	Yellow	< 90	Tanzania	Tanzania	No
TZA-423	Robbialac (Shield Undercoat)	Orange	600	Tanzania	Tanzania	No
TZA-424	Master Paints (Synthetic Enamel Gloss 1)	White	< 90	UAE	United Arab Emirates	No
TZA-425	Master Paints (Synthetic Enamel Gloss 1)	Red	< 100	UAE	United Arab Emirates	No

Table 4 Results of Laboratory Analysis of Solvent-Based Paints. (continued)

SAMPLE NO.	BRAND	COLOR OF PAINT	LEAD CONTENT (ppm)	COUNTRY OF BRAND HEADQUARTERS	COUNTRY WHERE MANUFACTURED	IS THERE INFORMATION ON CAN ABOUT LEAD CONTENT OF PAINT?
TZA-426	Master Paints (Synthetic Enamel Gloss 1)	Yellow	< 200	UAE	United Arab Emirates	No
TZA-427	Master Paints (Synthetic Enamel Gloss 1)	Green	9,000	UAE	United Arab Emirates	No
TZA-428	DUCO (2K Acrylic Paints)	Red	< 200	Tanzania	Tanzania	No
TZA-429	DUCO (2K Acrylic Paints)	Yellow	120,000	Tanzania	Tanzania	No
TZA-430	DAVOS (Aerosol Paint)	Yellow	140,000	Not shown	China	No
TZA-432	Bosny (Spray Paint)	Red	< 600	Not shown	Thailand	Yes. "no lead" symbol or pictogram
TZA-433	Basco Paints (NC sanding sealer)	Clear	< 500	Kenya	Kenya	No
TZA-434	Wellcoat (Maxigloss Enamel Clementon-395)	Clear	15,000	United Arab Emirates	United Arab Emirates	No
TZA-435	Wellcoat (Clear Varnish)	Clear	< 100	United Arab Emirates	United Arab Emirates	No

Legend:

Green - decorative paint
Orange - anticorrosive paint
Yellow - spray paint
Blue - industrial paint

Table 5 Distribution of Lead Concentration by Color.

COLOR	NO. OF SAMPLES	NO. OF SAMPLES ABOVE 90 ppm	NO. OF SAMPLES ABOVE 10,000 ppm	MINIMUM LEAD CONTENT (ppm)	MAXIMUM LEAD CONTENT (ppm)
Yellow	10	4	3	< 90	140,000
Red	10	3	0	< 100	7,700
White	6	0	0	< 90	< 200
Clear	3	1	1	< 100	15,000
Green	2	1	0	< 200	9,000
Orange	1	1	0	600	600
Blue	1	1	0	300	300
Black	1	0	0	< 100	< 100

agendatz.org
agenda.environment1997@gmail.com

www.ipen.org