2021

NATIONAL REPORT

COMPLIANCE MONITORING OF LEAD PAINT STANDARD IN NEPAL

OCTOBER 2021

- **Every Second (1 of 2) Enamel Paints you purchase is likely to contain lead concentration more than the Government of Nepal Lead Paint Standard limit of 90 ppm.**
- **Every Third (1 of 3) NS Marked Paints you purchase is likely to contain lead concentration more than the Government of Nepal Lead Paint Standard limit of 90 ppm**
- **Every Fourth (1 of 4) of No Added Lead…. Paints you purchase is likely to contain lead concentration more than the Government of Nepal Lead Paint Standard limit of 90 ppm**

RAM CHARITRA SAH

CEPHED

Center for Public Health and Environmental Development (CEPHED)
Kathmandu, Nepal

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CEPHED highly acknowledge the regular support and cooperation from central Ministry of Health and Population (MOHP), Ministry of Forest and Environment (MOFE), Department of Environment (DoEnvt), Ministry of Industry, Commerce and Supplies (MOICS), Nepal Bureau of Standard and Metrology (NBSM), as well as provincial Ministry of Industry, Tourism, Forest and Environment (MOITFE).

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This study report was produced as part of the project funded by WHO aimed to enhance effective implementation of lead paint standards through eliminating lead in paint and raise widespread awareness among business entrepreneurs, all three tires of governments and consumers about the adverse human health impacts of lead-based enamel paints, particularly on the health of children under six years old.

Ram Charitra

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PREFACE

Lead paints continue to be increasingly and widely produced, sold, and used in developing countries although most highly industrial countries banned lead paints for household use more than 40 years ago. Center for Public Health and Environmental Development (CEPHED) is participating Organization from Nepal to the Global Alliance to Eliminate Lead Paint (GAELP), a joint initiative of UNEP and WHO to eliminate lead paints.

In 2007 and 2008, NGOs in the International Pollutants Elimination Network (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 dangerously 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 including Nepal.

This report entitled "National Report on Compliance Monitoring of Lead Paint Standard in Nepal 2021" presents new data on the status of total lead content of solvent-based paints available on the market in all seven provinces of Nepal after six years of our lead paints standard became effective on June 20. 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 to ban or restrict the manufacture, import, export, distribution, sale, and use of lead paint, and provides a strong justification to effectively implement the adopt lead paint standard and enforce further regulatory controls in all the provinces of Nepal. Finally, it proposes action steps by different stakeholders to protect children and others from lead paint.

This study Compliance Monitoring of Lead Paint Standard in Nepal 2021 was conducted by CEPHED in close coordination with the central focal Ministry of Forest and Environment (MOFE), Department of Environment (DoEnvt), Ministry of Industry, Commerce and Supplies (MOICS), Nepal Bureau of Standard and Metrology (NBSM), Ministry of Health and Population (MOHP) as well as concerned Ministries of Industry, Tourism, Forest and Environment (MOITFE) of all seven provinces of Nepal and few paints industries.

World Health Organization (WHO) is a specialized agency of the United Nations responsible for international public health. The WHO Constitution, which establishes the agency's governing structure and principles, states its main objective as "the attainment by all peoples of the highest possible level of health". It is headquartered in Geneva, Switzerland, working with 194 Member States across six regions and on the ground in 150+ locations, the WHO team works to improve everyone's ability to enjoy good health and well-being worldwide(https://www.who.int/about/). This study has been undertaken in close coordination and cooperation with WHO Country Office for Nepal.

Center for Public Health and Environmental Development (CEPHED) is an environmental NGO established in the year 2004, by a group of activists and experienced people from the medical, environmental, and public health sectors. CEPHED's focus is to serve Nepalese people and communities in the field of public health and the environment. CEPHED has adopted the vision of connecting people to science and technology for healthy living and environmental safety and providing access to new scientific knowledge, technology and safety measures from the environment and public health sectors through research, coordination, capacity building, and policy advocacy etc.,.

Ram Charitra Sah
Executive Director and Environment Scientist
CEPHED

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ABBREVIATION & LEAD PAINT TERMINOLOGY

AAS	Atomic Absorption Spectroscopy
ANROEV	Asian Network for the Rights of Occupational and Environmental Victim
AOAC	Association of Official Analytical Chemists
BLL	Blood Lead Level
CAGR	Compound Annual Growth Rate
CDC	Center for Diseases Control and Prevention
CEO	Chief Executive Officer
CEPHED	Center for Public Health and Environmental Development
COVID-19	Corona Virus Disease, 2019
DALYs	Disability adjusted life years
DFO	Divisional/District Forest Officer
DoEnvt	Department of Environment
EDC	Endocrine-disrupting chemical
EU	European Union
FDI	Foreign Direct Investment
GAELP	Global Alliance to Eliminate Lead Paint
GAGR	Gross Annua Growth Rate
GDP	Gross Domestic Product
GON	Government of Nepal
GPPP	Green Public Procurement Policy
HCl	Hydrochloric acid
HNO3	conc. Nitric acid
IHME	Institute for Health Metrics and Evaluation
ILPPW	International Lead Poisoning Prevention Week
IPEN	International Pollutants Elimination Network
IQ	Intelligence Quotient
KNP	Kansai Nerolac Paint
MOFE	Ministry of Forest and Environment
MOICS	Ministry of Industry, Commerce and Supplies
MOITFE	Ministries of Industry, Tourism, Forest and Environment
MOPE	Ministry of Population and Environment
MOSTE	Ministry of Science, Technology and Environment
NBSM	Nepal Bureau of Standard and Metrology
NESS	Nepal Environmental and Scientific Services
ND	Non-Detectable
NGOs	Non Governmental Organization
NPMA	Nepal Paint Manufacturers Association
NPO	National Professional Officer

NS	Nepal Standard
OEHS	Occupational and Environmental Health and Safety
ppm	Parts per million
SMEs	Small and medium-sized Enterprises
SSNC	Swedish Society for Nature Conservation,
UN	United Nation
UNEP	United Nation Environment Programme
UNICEF	United Nations Children`s Fund
USA	The United States of America
USD	United States Dollar
UV	Ultraviolet
VOC	Volatile Organic Compound
WHO	World Health Organization

BOX 1: Lead Paint Terminology

As used in this report:

- **"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 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.
- **National Paint:** The paints purely produced from Nepalese owned paint industries
- **Multination Paint:** The paints that produced in Nepal with foreign investment like Asian, Berger and Kanasai Nepal Paints
- **International Paints:** The paints that is not produced but imported to sold & used in Nepal.

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 the 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 added. The cut-off concentration for lead paint used in the report is 90 parts per million (ppm, dry weight of paint), the strictest legal limit enacted in the world today and also by the Government of Nepal. All lead concentrations in the report are total lead levels unless otherwise specified.

The lead paint standard promulgated by the Government of Nepal, Ministry of Forest and Environment-MOFE (the then MOEST)) through a gazette notification dated 22 December 2014 with its effective dates 181 days after this notification i.e., from 20th June 2015. It has three important provisions: (a). Maximum lead-in paints imported and domestically produced in Nepal to be not more than 90 ppm; (b) Each paint cans should be labeled with lead content in the paint it contained, and (c) Each paint cans should also be labeled with a protective precautionary message for occupational safety..

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 Nepal, the lead paint standard was enacted through a gazette notification on 22 December 2014 with the effective date after 181 days i.e., 20th June 2015 required to be effectively implemented for limiting the amount of lead in paint for all uses as well as should fully adhere the mandatory labeling provision.

From July to August 2021, the CEPHED collected a total of 62 cans of solvent-based paint imported, produced, and sold from stores in some 20 cities viz Dhankuta, Biratnagar, Bhardah, Janakpur, Birgunj, Simara, Hetauda, Bharatpur, Pokhara, Damauli, Dhangadhi, Birendranagar, Nepalgunj, Butwal, Bardaghat, Kathmandu, Lalitpur, Thimi, Mahalaxmi and Bhaktapur of all seven provinces of Nepal. The majority of purchased paints (48 samples) were from 30 National Paints Companies, 9 paints samples from three multinational Paints companies (Asian, Berger Jenson & Nicolson, and Kansai Nepal Paints), and 5 paints samples from 4 International paint manufacturing companies from India, Thailand, and the USA.

The paints represented 41different brands produced by 37 (30 National, 3 Multinational, 4 International) manufacturers. Altogether 17 different sheds of 9 broad color paints were included in the samples. Most of these samples were recently produced in the years 2020 and 2021 and no samples were included in the study of older that the Government of Nepal (GON) Lead Paints Standard took effect.

All paints were analyzed by an accredited laboratory Nepal Environmental and Scientific Services (NESS) Limited in Nepal for their lead content, based on the dry weight of the paint. The test method applied for lead concentration analysis was direct air acetylene AAS, AOAC, 974.02. The accredited laboratory participates in the Association of Officials Analytical Chemists, assuring the reliability of the analytical results.

The analytical methods adopted by the AOAC (Association of Official Analytical Chemists) are used by government agencies concerned with the analysis of fertilizers, foods, feeds, pesticides, drugs, cosmetics, hazardous substances, and other materials related to agriculture, health and welfare, and the environment. AOAC methods are also used by industries to check the compliance of their products.

Results

30 out of 62 analyzed solvent-based paints (48.39 percent of paints) were not complying with the Government of Nepal`s lead paint standard, i.e., they contained lead concentrations above 90 parts per million (ppm, dry weight of paint). This is the regulatory limit for lead in paint in Nepal and several other countries e.g., India, China, Bangladesh and the United States of America, etc. Moreover, 7 paints (11.29 percent of paints) contained dangerously high lead concentrations above 10,000 ppm. The highest lead concentration detected was 22850.17 ppm (254 times more than the Government of Nepal lead paint standard of 90 ppm) in a Golden Yellow color paint, SMART brand of Manjari Paints. Ithari, Sunsari. The other paint sample of the same industry of deep orange color contained the second-highest lead concentration 15316.55 ppm (170 times more than standard).

On the other hand, 32 out of 62 solvent-based paints (51.61percent of paints) contained lead concentrations at or below 90 ppm, suggesting that the technology that produces paint without leaded ingredients exists in Nepal. 18 out of 62 (29 percent of paints) contain a Non-Detectable (ND) level of lead including many Nepalese brands. Moreover, 18 out of 32 paints (56.25 percent) that comply with the standard contain a Non-Detectable (ND) level of lead is very good news for Nepalese consumers.

24 out of 37 different industries` produced paints (64.86 percent of paint industries) sold at least one lead paint, i.e., a paint with a lead concentration above 90 ppm including the two largest multinational paint industries subsidiaries namely Asian Paints Nepal Pvt. Ltd., and Berger Jenson and Nicholson (Nepal) Pvt. Ltd. 5 out of 37 different industries` produced paint analyzed (13.51 percent of paint companies) sold at least one lead paint with dangerously high lead concentrations above 10,000 ppm.

Lead Standard Compliance Status in Enamel Paints

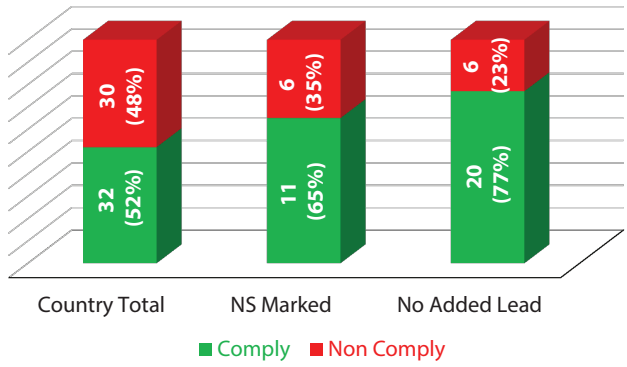


Figure 2: Compliance status of lead paint standard in Nepal

5 brands of 41 analyzed brands (12.19 percent of paint brands) sold at least one paint with a dangerously high lead concentration above 10,000 ppm.

Yellow and Red color paints most frequently contained dangerously high lead concentrations above 10,000 ppm. Of 14 Yellow color paints, 4 (28.57 percent of all yellow paints) contained lead levels above 10,000 ppm and of 18 Red color paints, 2 (11.11 percent of all red color paints) contained lead levels above 10,000 ppm. Of 6 Brown color paints, 1 (16.67 percent of all brown paints) contained lead level above 10,000 ppm.

Even white color solvent-based enamel paints of the Manjari Industry were found to be contained a very high level of lead 2335.33 ppm (25.9 times more than GON lead paint standard).

In general, paint can label did not carry meaningful information about lead content or the hazards related precautionary message to avoid occupational exposure of lead as mandatory required by the Government of Nepal, lead paint standard.

Only 26 out of 62 paints (41.93 percent of paints) have Lead free or NO Added Lead……. labels. 6 out of 26 (23.91 percent) NO ADDED LEAD labeled paints contained lead concentration above 90 ppm. Moreover, paint cans labeled with lead-free or no added label have been found to contain a dangerously high level of lead, ranking 3rd (15273.42 ppm) is single red color and ranking 7th (11880.57 ppm) is the golden yellow color of Renew brand of Tara Paint Industry Parsa. Therefore, needs to be immediately and strictly regulated.

None of the paints provided information about lead content & precautionary message as per the

requirement of the Lead paint standard on their labels and most paints carried little information about any ingredients on can labels.

Only 17 out of 62 paints (27.42 percent of paints) have Nepal Standard (NS) Mark……. labels. However, paint cans labeled with NS Mark have also contained a very high level of lead up to 2223.96 ppm (24.7 times more than GON Lead paint standard) in PO Red color, Always brand of Jasmin Paint Industry. Needs to be immediately and strictly regulated.

6 out of 17 NS Marked (35.29 percent) paints did not comply with the lead paint standard. The lead content in the non-complying NS marked paints ranges from 94.14 ppm to 2223.96 ppm. Despite NBSM awarded NS logo for enamels paints of four paint companies (Asian Paints Nepal, Jasmin paints, Yeti Paints, Suryodaya Paints), at least one paints sample from these companies did not label their cans with NS Marks for specific brighter colors (e.g., Golden Yellow, Red and Brown). Three of these four paints company`s samples without NS Marked logo did not comply with the standard and contained a very high level of 5th highest lead concentration of 14086 ppm (157 times more than standard) in case of Jasmin industry`s products. The product of yeti contained 392.5 ppm and Asian Paints contained 110.8 ppm. Products of Suryodaya contained ND levels of lead.

This is the first-ever larger comprehensive compliance monitoring study conducted after the standard took effect in June 2015 included the largest number of paints samples purchased from all Seven Provinces of Nepal. Samples distributions included in this study comprises 62 total samples coming from Province No.1 (14), Province No.2 (14), Bagmati Province (18), Gandaki Province (5), Lumbini Province (5), Sudur Paschim Province (3) and Karnali province (3). The compliance rate of lead paint standard in all seven provinces was found as Province No1 (78.57%), Province No.2 (14.29%), Bagmati Province (61.11%), Gandaki Province (60%), Lumbini Province (40%), Sudur Paschim Province (66.67%) and Karnali province (33.33%) respectively. Lead paint standard compliance was found much effective in Province No.1 whereas worst in Province No.2. Thus, immediate improvement through the robust market and industry monitoring is required in all seven provinces by all concerned government agencies.

Furthermore, the companies have suspected of adopted double standard quality concerning lead content. The Lead content of the same company products found in Province No. 2 is highly leaded than their products found in another province like in Gandaki. A separate exclusive & larger study for verifying double standard adoption by the larger company needs to be carried out.

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 a paint can labels. Manufacturing dates, batch numbers on the labels were not labeled in the few samples included in this study. Most warning symbols on the paint cans indicated the flammability of the paints, but no precautionary warnings on the effects of lead dust on children and pregnant women were provided. Very few samples have such comprehensive information on the several health and environmental safety as in the case of AkzoNobel, India.

Conclusions

This study demonstrates that solvent-based paints with high concentrations of lead are still being sold and available in Nepal since the paints included in this study were brands commonly sold in retail stores all over Nepal from all its seven provinces. However, the fact that only 32 out of 62 paints (52 percent of paints) contained lead concentrations below 90 ppm indicates that the technology to produce paints without added lead exists in Nepal. 30 out 62 (48 percent of paints) still contained above 90 ppm, urgently called for the effective implementation and strict market and industries monitoring.

Despite the results shows a slight improvement in compliance of lead paint standard (CEPHED 2021, 52 percent) over the years since formulation of lead paint standard 30 percent (MOFE 2016) and 43 percent (CEPHED, 2018), more needs to be done by all concerned to achieve 100 percent full compliance of the mandatory lead paint standard including most importantly its mandatory provision of the maximum lead content as well as labeling provision (on lead content and precautionary message of occupational exposure prevention on each paint can).

Moreover, maximum lead concentration also seems to be increased from 1925 ppm (MOPE, GON 2016) to 75046 ppm (CEPHED 2018) and reduced to 22850 ppm (CEPHED 2021) however it is still very high.

None of the paints can have complied with the mandatory provision of labeling about (a) each paint cans should be labeled with lead content in the paint it contained, and (b) each paint cans should also be labeled with a protective precautionary message to prevent the occupational exposure. Therefore, more stringent and effective implementation of the standard is urgently needed through the regular market and industry monitoring by the concerned government authorities viz Department of Environment (DoEnvt.), MOFE. The study results provide a strong justification to enforce the enacted standard that will ban the manufacture, import, export, distribution, sale, and use of all paints with total lead concentrations greater than 90 ppm and also ban the import as well as use of leaded pigments, leaded drier and leaded fillers etc. as the known source of excess lead contamination into the paints.

Recommendations

To address the problem of lead in paint, CEPHED proposes the following recommendations to all the concerned stakeholders from government agencies, paint industries to all consumers.

Provincial and Federal Government and Government Agencies

- The Government of Nepal, Ministry of Forest and Environment (MOFE), Department of Environment (DoEnvt) should establish a strong and efficient monitoring mechanism to ensure full compliance with all the three provisions inbuilt in the lead paint standard.
- Federal Government should duly inform all provincial government agencies, paint companies, importers, dealers, and the general public about the enacted mandatory 90 ppm lead limit, labeling about lead content, and precautionary protective message on each paint cans.
- Paints products of larger paints industries in different provinces are found to be largely varied in quality (e.g., regarding lead content) should be strictly regulated against being suspected to have a double standard. Larger studies on double standards should be carried out by the concerned regulating authorities.
- As NS marked pains still exhibits high lead contained exceeding the lead paint standard limits of 90 ppm, Lead limits should be made one of the mandatory criteria of awarding new NS Marks as well as strictly and regularly monitoring all NS mark awarded paints companies and their products. As we have seen the NS awarded products did not label their all cans with the NS Marks and were found to be in non-compliance with the standard needs brought under toughest regulatory actions immediately by NBSM.
- Monitor the proper labeling of paints, including lead content and other compounds; date of manufacture and date of expiry; batch numbers, and information that alerts users to the hazards of lead-contaminated dust when previously painted surfaces are scraped or sanded in preparation for repainting.
- Immediately implement the Green Public Procurement Policy (GPPP), i.e., only purchase non-leaded paints and/or the paints that fully comply with the standard in all 761 (753 Local +7 Provincial+1 Central/Federal) government units, and effectively implement it.
- Updated record-keeping of imported and exported paints and other hazardous chemicals and items as imported paints in Nepal also contained lead (3826.56 ppm in Sample NPL 19), 42.5 times more than the standard lead limit of 90 ppm.
- Provide a mandatory circular or notification to all the local government, provincial governments, schools, colleges in both the public and private sectors to only use non-leaded paints and/or paint fully complying with the government lead paint standard of 90 ppm and aforesaid labeling provisions.
- As paint industries established after the promulgation of this standard and industries under establishment mainly in Banke, Kailali, Chitwan, Bara, Parsa, and Sunsari districts found to be mostly non-compliance with the standard and also contained highest lead concentration, needs to be strictly monitored and tighten the establishment licensing process.
- Concerned government agencies should do compliance monitoring of lead paint standards in a regular and planned interval of time. There is no comprehensive lead

paint standard compliance monitoring accomplished since over six years after it became effective by the responsible regulatory government agencies.

- Concerned government agencies should envision mandatory uniform labeling and messaging about lead toxicity and any other hazardous chemicals-related information on each paint cans by paint companies including manufacturing date and expiration date/best before and batch number.
- Envision national Blood Lead Level (BLL) screening policy and program for all Nepalese children.
- Establish fully functional infrastructures including laboratory, human resources and allocation of enough annual budget for BLL testing in each provinces.
- Ban the import and use of leaded pigments, leaded driers and leaded fillers etc. and promotion of non leaded paint ingradients as leaded ingradients are the known source of excess lead contamination into the paints.

Paint Industries and Nepal Paint Manufactures Association (NPMA)

- Paint companies that still produce lead paints should expeditiously stop the use of leaded paint ingredients in paint formulations.
- Paint companies that have shifted to non-lead paint production should get their products certified through independent, third-party verification procedures to increase the customer´s ability to choose paints with no added lead.
- All paint companies should fully comply with all the three important provisions of standard 90 ppm lead limit and proper labeling about lead content and precautionary messaging as well as NS Marks (if awarded) on each paint cans.
- NS Marked paints and NS Mark Awarded paints companies should always adhere fully to the GON mandatory lead paint standard limits of 90 ppm and mandatory labeling provision about lead content and precautionary message to avoid exposure.
- Paints companies should not adopt the double standard in their product quality and should have the same quality products in all provincial states throughout the country.
- New paints companies should opt for all the control measures from the beginning to fully comply with the lead paint standard.
- All paints companies should disclose the information about the hazardous chemicals, solvent as well as manufacturing date and expiration date/best before and batch numbers as we found missing this information on some paint's cans.

Individual, Household, and Institutional Consumers

- Paint consumers should demand paints with no added lead from paint manufacturers, dealers, 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 or paints that fully comply with the standard in places frequently used by children such as homes, schools, day care centers, parks, and playgrounds.

Paints Dealers and Retailers

- Only import, sell and distribute paints that fully comply with the government's mandatory, 90 ppm lead paint standard and labeling about lead content and precautionary messages.

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 including cosmetics and food items, etc.

Consumers

- Be aware of the hazards of lead exposure and look for the lead-free and/or No added Lead……. related logo and labeling while purchasing any paints products.
- Ask for and buy paints with low lead content. Beware of companies making false low lead claims.

All Stakeholders

- All stakeholders should come together and unite in promoting a strong policy that will eliminate lead paint in Nepal.

1. BACKGROUND

Post standard promulgation study of lead levels were found little improvement in lead paint standard implementation. Study conducted by CEPHED, 2018 of 56 solvent-based paints from 27 paint industries were purchased and analyzed in which 32 of 56 paints (57.14 percent of paints) contained lead levels above 90 ppm, and 14 of 56 paints (25 percent of paints) contained lead levels above 10,000 ppm. The highest lead concentration detected was 75049.21ppm (833.88 times more than the standard limit). This clearly shows the need of conducting compliance monitoring regularly and hence this study is being carried out by the CEPHED in the year 2021 despite of prevailing COVID-19 pandemic situation in Nepal.

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 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 are 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

Figure 2: Painter continually exposed to leaded paints

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 ingested lead as adults. Children with nutritional deficiencies absorb ingested lead at an even increased rate.[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 the 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* per year.[12] The study considered the neurodevelopmental effects on lead-exposed children, as measured by reduced 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. This study revealed huge economic losses in Nepal estimated to 1.5 billion international dollars or 4% of Nepal's GDP, an amount that is likely much higher than total revenue from lead-related business as a whole in Nepal.

Furthermore, evidence that the lead content of residential paints is significant enough to result in lead poisoning among children has been building since the 1890s when it was first linked to symptoms in children in Australia. One of the first pediatric deaths linked to lead paint in a child's crib was reported in 1913.[13] Estimates from Institute for Health Metrics and Evaluation (IHME) 2017 data, the lead exposure was responsible for 1.06 million deaths from long-term effects. The IHME has also estimated that lead exposure accounts for 24.4 million disability-adjusted life years (DALYs) lost, 63.2% of the global burden of idiopathic developmental intellectual disability, and 10.3% of hypertensive disease.[14]

High blood lead levels in children aged 6 to 36 months in Kathmandu Valley, Nepal was revealed from a cross-sectional study of associated factors, 2015. Of 312 children enrolled in the study, 64.4% had BLLs 5µg/dL. A significant association was found between BLL and exposure to enamel paints in the household in the form of painting materials used in different parts of the house like walls, windows, and doors ($p = 0.001$). Furthermore, multivariate analyses showed that BLLs were 4.5 times higher in children playing with dirt and dust ($p = 0.006$) and that children belonging to the community of lower caste/ethnicity groups had significantly higher BLLs compared to those from the upper caste groups ($p = 0.02$). This study demonstrated that children living in households that have used enamel paints, children belonging to lower caste/ethnic

* 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.

groups, and children frequently playing with dirt and dust had significantly higher BLLs.[15] This finding is also coherent with three similar previous studies of BLL among school-going children of Nepal.

The recent study report entitled " The Toxic Truth: Children Exposure to Lead Pollution Undermines a Generations of Future Potential" by UNICEF and PURE EARTH, 2020 revealed that 1 in every 3 children-up to 8 million globally-have blood lead levels at or above 5 µg/dL, a level that the US Center for Diseases Control and Prevention (CDC) have determined causes for action and which the World Health Organization (WHO) says may be associated with decreased intelligence in children, behavioral difficulties and learning problems. This study estimates that 6,719, 235 Nepalese children (over 65% of the total child population of Nepal) have elevated BLL (>5 µg/dL) and some 3,512,007 children even had BLL over 10 µg/dL as per the upper bound estimates.[16] Coherence with Nepalese BLL studies and Nepalese children are under the astonishingly very high level of risk urgently needs to be addressed.

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. [17-19]

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) lead by dry weight, and frequently down to 10 ppm or less.

1.3 Paint Market and Regulatory Framework in Nepal

Industrial Coatings Market Size, Trends & Growth (2021-2026)

The global industrial Coating Market was worth USD 105.7 Billion in 2021 and is estimated to reach USD 123.8 Billion by 2026, at a GAGR of 7.3 % during the forecast period.* Industrial coatings are mainly designed products for protection against corrosion, wear-resistance, and offer good aesthetics. It is a thin sheet employed for various concrete, steel, and other industrial products. These films area employed with polymers line polyurethane, epoxy, acrylic, alkyds, and polyesters. Their durability, ease of cleaning, and high gloss make industrial coating preferable in a broad variety of applications in aircraft, oil rig towers, power plants, and conveyors, among others. Industrial coatings are present in different forms like solvent-borne, water, and powder. Solvent coatings are dangerous and harmful to the environment due to more Volatile organic compounds (VOC). To comply with environmental rules, the coating business is focusing on making durable, water-resistant, and eco-friendly industrial coatings.

* https://www.marketdataforecast.com/market-reports/industrial-coatings-market, Industrial Coatings Market | Size, Share, Growth | 2021 - 2026 (marketdataforecast.com), https://kathmandupost.com/money/2015/03/15/nepal-is-market-for-premium-products

Currently, the rising call for water-borne coatings together with a gradually rising focus on UV-curable coatings will drive the market to show a CAGR of close to 5.9% over the foreseen period of 2021 to 2026.

Asia-Pacific accounted for the highest market share and is estimated to rise at a moderate CAGR over the outlook period. This is mainly attributed to the availability of strict protection and safety rules in general engineering, automotive, and construction business. China is the leading country in the region and due to the more extensive automotive production-based and rising automotive refinish market. Initiatives to facilitate FDI, involving "Make in India", have resulted in the increased call for industrial coatings in the region. Moreover, the rising construction of metros and rail projects along with the increase in investment in the aircraft business is probable to drive the market expansion. [20] *

Nepal is a growing market. It is worth Rs 6-7 billion and has grown at the rate of 15-20 percent over the last three years. We see the growth to continue in the future. What is good about Nepal is the market for premium products, and emulsion category products are sold better here. [21]

Berger (J&N) Nepal claims it is now one of the companies with the highest compounded growth in the Nepali paints industry holding almost 30 to 34 percent share of the market.

The company's annual turnover hovers around Rs 5 billion and it has nearly 30 products in its portfolio. It has nine depots and over 1,000 dealers across the country to distribute premium quality exterior, interior, and undercoat paint products. [22] **

Article 30 of the Constitution of Nepal provides right to clean environment as one of the Fundamental Rights.

National Environment Policy, 2019 envisaged to regulate and minimize the use of the hazardous chemicals in products to protect Human Health and Environment from the effect of hazardous waste.

Environment Protection Act, 2019 and Environment Protection Regulations, 2020 has following provision related to hazardous substances.

- National definition of Hazardous waste as defined by the Basel Concention. Basel Convention Annex I, Waste Steams (Y12) defined Waste from production, formulation and use inks, pigments, paints, lacquers, varnish and (Y13) waste from production, formulation and use of resins, latex, plasticizers, glue/adhesives.
- No hazardous substances of any kinds shall be imported into Nepal (Section 16, subsection 1)
- A hazardous substance imported contrary to this Act shall be sent to the same country from which it has been imported(Section 16, subsection 5).
- Producer of haxardous waste shall be responsible for managing such a hazardous waste (Section 17, subsection 1).

1.4 Paint Market in Nepal

In recent years, growing financial capacity among the public has led to increased renovation and decoration activities and greater paint sales. Until 2012, media agencies reported an annual growth rate in paint sales of 35 percent. As of 2015, approximately 100 paint industries were registered as small and medium industries. Out of those registered industries, approximately 40 paint industries are currently operating in Nepal. The majority of these are small producers with

Market share of Paints 2012

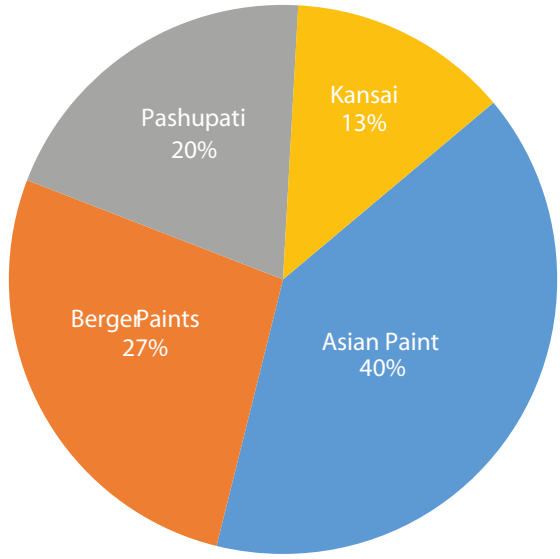


Figure 3: Paint Market Share (2012)

* https://www.marketdataforecast.com/market-reports/industrial-coatings-market, Industrial Coatings Market | Size, Share, Growth | 2021 - 2026 (marketdataforecast.com), https://kathmandupost.com/money/2015/03/15/nepal-is-market-for-premium-products

** https://www.newbusinessage.com/magazine_articles/view/2900, 2021-1-6

Market share of Paints in Nepal 2021

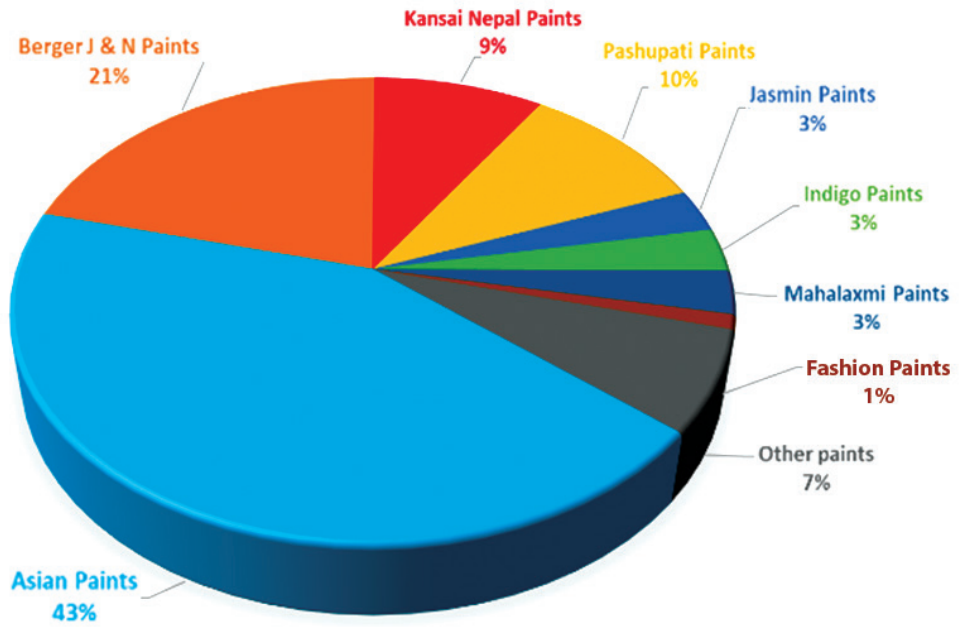


Figure 4: Paint Market Share (2021)

a relatively small share in the local market. The four major paint manufacturing industries selling enamel paint in Nepal are Asian Paints, Berger Paints, Pashupati Paints, and Kansai Nepal paints.***

According to claims from respective paint manufacturing industries, Asian Paints is the leading paint manufacturer in terms of domestic market share with 40 percent followed by Berger Jenson & Nicholson (27 percent), Pashupati Paints (20 percent), and Kansai Nepal Paints (13 percent) in 2012. However, the actual numbers are somewhat lower since additional paint manufacturers also are active in the Nepalese paint market.

There also are numerous untracked and unidentified paint products locally available in the Nepalese market. Because these paints are primarily sold in local level markets, their market share is hard to analyze.

In addition, several paint products are being imported from various countries such as the USA, Singapore, Thailand, India, China, Egypt, France, Germany, Netherland, Indonesia, Italy, Spain, Sweden, Israel, Malaysia, Oman, Russian Federation, Thailand, United Arab Emirates, United Kingdom, Republic of Korea, Pakistan, and Japan, etc. and often are not calculated in formal market share analyses. Some of these countries did not have lead paint laws and standards in places e.g., Pakistan. [23]

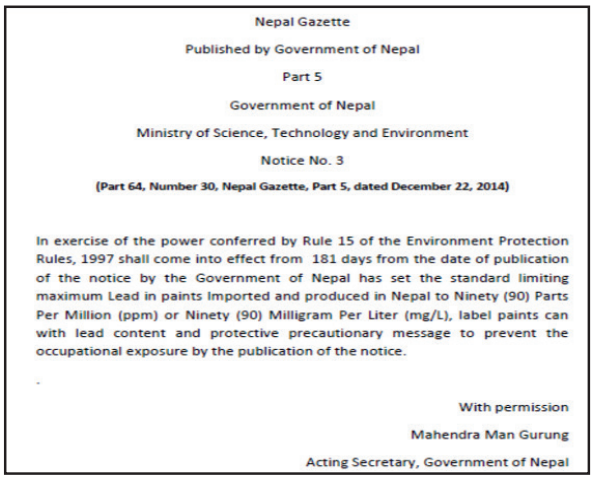
From the data obtained from the Department of Customs of the period of Mid July 2020 to 2021, paint and paint-related pigments, driers, and ink from different countries and mainly from India was worth 4526733000 Nepalese Rupees. Small and medium-sized paint manufacturers (SMEs) primarily serve local markets, which makes their percentage of market share hard to obtain. Among the different types of paint sold, a fifth are enamel decorative paints. [23]

There are three types of paint-producing companies in Nepal. They are the national paint industry (purely Nepalese investment); Multinational Paint Industry (Production unit in Nepal with foreign investment e.g., Asian, Berger and KNP), and International Paint Industry (paint imported and sold in Nepal from paint industry exist in a foreign country outside Nepal). Based on personal communication with one of the fast-growing paint industries' owners, the current market share of different paints in Nepal in 2021 is being shown in the pie diagram (Figure 4).

1.5 Lead Paint Regulatory Framework

Most highly industrial countries adopted laws or regulations to control the lead content of decorative paints beginning in the 1970s and 1980s. **The government of Nepal enacted the mandatory lead paint standard on 22 December 2014, which took effect on 20th June 2015.**

*** https://ipen.org/documents/lead-enamel-household-paints-nepal-2015



Nepal Gazette

Published by Government of Nepal

Part 5

Government of Nepal

Ministry of Science, Technology and Environment

Notice No. 3

(Part 64, Number 30, Nepal Gazette, Part 5, dated December 22, 2014)

In exercise of the power conferred by Rule 15 of the Environment Protection Rules, 1997 shall come into effect from 181 days from the date of publication of the notice by the Government of Nepal has set the standard limiting maximum Lead in paints Imported and produced in Nepal to Ninety (90) Parts Per Million (ppm) or Ninety (90) Milligram Per Liter (mg/L), label paints can with lead content and protective precautionary message to prevent the occupational exposure by the publication of the notice.

With permission

Mahendra Man Gurung

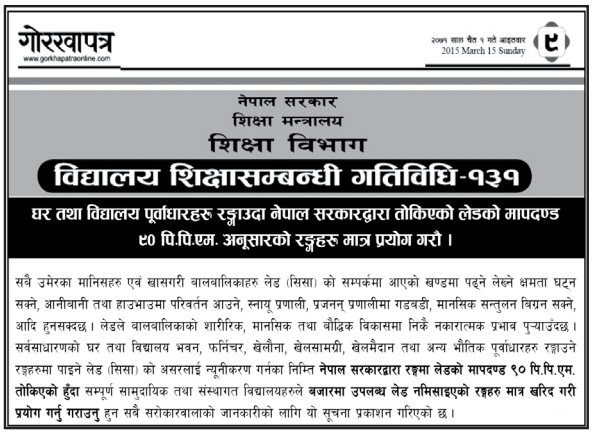
Acting Secretary, Government of Nepal

Figure 5: English translation of Gazette on Lead Paint Standard in Nepal.

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 the production of decorative paint is prohibited in the European Union through regulations related to the 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 in the U.S., the Philippines, China, Bangladesh, India, and Nepal is a total maximum lead content 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,** which was developed by the Global Alliance to Eliminate Lead Paint (GAELP) and published by the United Nations Environment Programme (UNEP) being increasingly adopted by many regulatory governments worldwide. So far more than 70 countries have some regulatory mechanism in place to regulate lead content into decorative paints.

The Government of Nepal gazette a mandatory, 90 ppm lead paint standard to protect children's health by eliminating the hazardous level of lead in paint. It was promulgated through a notification in **Nepal Gazette (Khand 64, Number 30, Part 5, Notice No.3 dated December 22, 2014) by the Government of Nepal, Ministry of Science, Technology, and Environment (MOSTE)** as per the Rule 15 of Environment Protection Regulation 1997. The standard took effect after 181 days (June 20, 2015) of the date of gazette notification.



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नेपाल सरकार
शिक्षा मन्त्रालय
शिक्षा विभाग

विद्यालय शिक्षासम्बन्धी गतिविधि-१३१

घर तथा विद्यालय पूर्वाधारहरू रङ्गाउदा नेपाल सरकारद्वारा तोकिएको लेडको मापदण्ड ९० पि.पि.एम. अनूसारको रङ्गहरू मात्र प्रयोग गरौ ।

सबै उमेरका मानिसहरु एवं खासगरी बालबालिकाहरु लेड (सिसा) को सम्पर्कमा आएको खण्डमा पढ्ने लेख्ने क्षमता घट्न सक्ने, आनीबानी तथा हाउभाउमा परिवर्तन आउने, स्नायू प्रणाली, प्रजनन् प्रणालीमा गडबडी, मानसिक सन्तुलन बिग्रन सक्ने, आदि हुनसक्दछ । लेडले बालबालिकाको शारीरिक, मानसिक तथा बौद्धिक विकासमा निकै नकारात्मक प्रभाव पुऱ्याउंदछ । सर्वसाधारणको घर तथा विद्यालय भवन, फर्निचर, खेलौना, खेलसामग्री, खेलमैदान तथा अन्य भौतिक पूर्वाधारहरु रङ्गाउने रङ्गहरुमा पाइने लेड (सिसा) को असरलाई न्यूनीकरण गर्नका निम्ति **नेपाल सरकारद्वारा रङ्गमा लेडको मापदण्ड ९० पि.पि.एम. तोकिएको हुँदा** सम्पूर्ण सामुदायिक तथा संस्थागत विद्यालयहरुले **बजारमा उपलब्ध लेड नमिसाइएको रङ्गहरु मात्र खरिद गरी प्रयोग गर्नु गराउनु** हुन सबै सरोकारवालाको जानकारीको लागि यो सूचना प्रकाशन गरिएको छ ।

Figure 6: Public Notice from Department of Education, Ministry of Education, Government of Nepal.

Based on the 90 ppm standard, the Department of Education issued a public notice on lead paint on the 15th March 2015. According to notice, "all private and public schools must use non-leaded paints or the paints that comply with government standard of 90 ppm lead during their repainting and renovating activities on school furniture and buildings (Figure 6)."

This lead paint standard enacted by the GON was challenged in the Supreme Court of Nepal by some paint industry and Nepal Paint Manufacturers Association (NPMA) on 17 June 2015, just three days ahead of it supposed to become effective. This writ was sought to nullify a mandatory standard for lead in paint enacted by the Government of Nepal. After several rounds of hearing, On 1st January 2018, Honorable Justice Om Prakash Mishra and Honorable Justice Bam Kumar Shrestha of the Supreme Court of Nepal dismissed the writ filled by NPMA and allied paint industries and reinstate the mandatory lead paint standard is the crucial steps taken by the Supreme Court of Nepal towards the protection of public health especially children health and environment. [24]

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

2. STUDY PROCEDURE

From July to August 2021, the CEPHED purchased a total of 62 cans of solvent-based paint imported, produced, and sold from stores in some 20 cities viz Dhankuta, Biratnagar, Bhardah, Janakpur, Birgunj, Simara, Hetauda, Bharatpur, Pokhara, Damauli, Dhangadhi, Birendranagar, Nepalgunj, Butwal, Bardaghat, Kathmandu, Lalitpur, Thimi, Mahalaxmi and Bhaktapur of all seven provinces of Nepal. The paints represented 41 different brands produced by 37 paint manufacture companies/industries.

In most cases, more bright-colored paint such as red, green, blue, black, chocolate, brown, phiroza, yellow, and even white of some new paints was selected. Additionally, the availability of these paints in retail establishments suggested that they were intended to be used by the consumers.

During the paint sample preparation, information such as color, brand, manufacturer, the country where manufactured, product codes, production dates, and other details as provided on the label of the paint such as Nepal Standard (NS) Mark and Lead-Free and/or No Added Lead……. on each can be recorded. All color shades (17) were recorded and later broadly grouped into the generic paint colors (9) for better analysis purposes and send to the laboratory for the test of total lead.

2.1 Objective of Study

The objectives the study are:

1. Carrying out compliance monitoring lead paint standards in Nepal.
2. Publish the report and share among the stakeholders
3. Release of compliance monitoring report of lead paint standard in Nepal through organizing stakeholder workshops during ILPPW 2021 week of action.

2.2 Study area

Enamel paints of different brands which are used widely was collected from different parts of the country including all 7 provinces of Nepal. Samples were purchased from paint retail shops and dealers shops etc. located in major cities/ towns in Nepal. This study will cover 100% (6 of 6) metropolitan cities, 54% (6 of 11) sub-metropolitan cities, and 2.9% (8 of 276) municipalities.

Table 1: Geo political distribution of paint sample collection

Geopolitical locations	Province 1	Province 2	Bagmati	Gandaki	Lumbini	Karnali	Sudur Paschim
Metropolitan city	Biratnagar	Birgunj	Kathmandu, Lalitpur	Pokhara			
Sub metropolitan city		Janakpur, Simara	Hetauda		Nepalgunj, Butwal		Dhangadhi
Municipality	Dhankuta	Bhardaha	Bhaktapur, Thimi, Mahalaxmi	Byas (Damauli)	Bardaghat	Birendranagar	

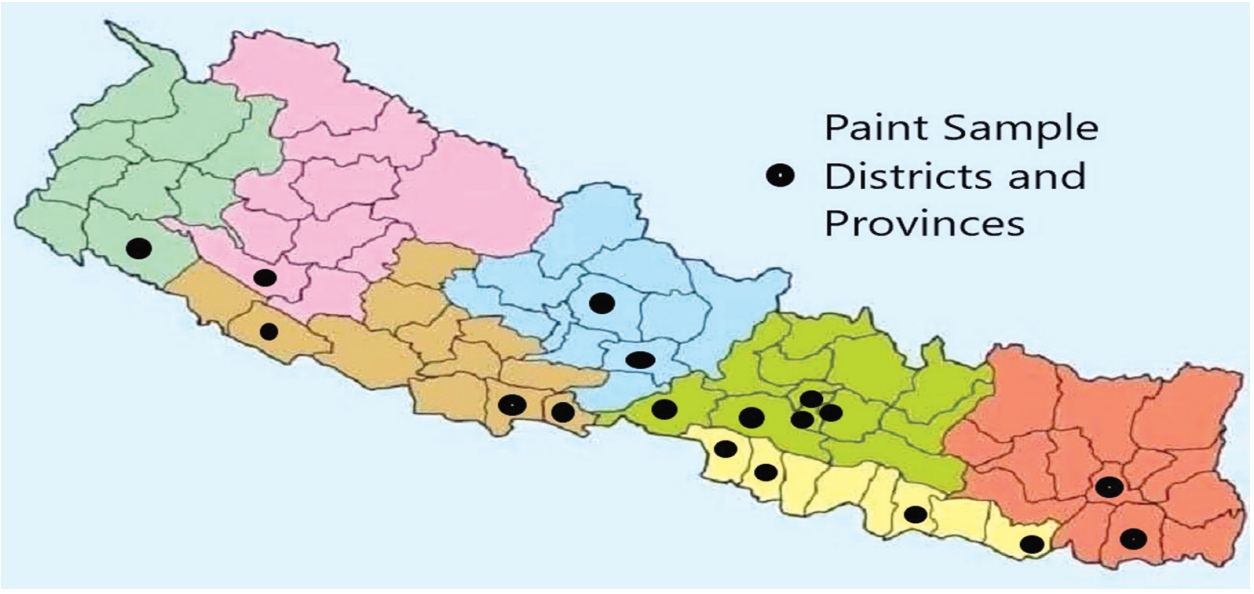

Figure 7: Paint samples collection cities, districts, and provinces.

2.3 Methodology

Sampling

National industry products was given more priority and few multinational and international paint were purchased during sampling. A total of 62 samples of commercially available paint intended for decorative applications were collected. The samples from different companies covering both domestic and imported products were purchased. Sample logs were prepared of paint labeling information to determine the country of origin, presence of any listed ingredients, warning labels, or any specified lead content, lead-related information (e.g., NO Added Lead or Lead-Free), other certification, etc. The manufacture date, batch number, and expiration date were recorded if available. In addition, paint labels with the Nepal Quality Certification as Nepal Standard Mark (NS) and/or any self certification label were noted. The size and retail price of the paint products purchased will also be recorded. A stratified sampling plan was devised to ensure that selected paints representative of most available brands from national and multinational ones including some international manufacturers. Multiple colors and brands were selected. Individual colors were selected mainly based on availability with a preference for red, yellow, green and blue, and even white from new paints and to include samples from all common colors and a wide range of brands available in Nepal. Paint samples were coded with the help of templates Excel Sheet and were taken to the laboratory of Nepal Environmental and Scientific Services (NESS) for total lead concentration testing using Atomic Absorption Spectroscopy (AAS).

2.4 Lab test

To determine the total lead level in the paint samples, firstly Paint samples were thoroughly mixed by shaking for about 5 minutes. The lid was opened carefully and the paint was stirred until it is completely/thoroughly mixed and the consistency of the paint became uniform. The sample was prepared by subsequently applying paint sample on a clean glass plate with a new glass rod and left for at least 72 hrs. for air dry. The air-dried paint was then scrapped off with a clean razor and then kept 2 hours into a hot air oven at 105°C for further drying. 0.2gm of the dried sample was weighed using an analytical balance and kept in a crucible. The weight of the sample to four decimal places were recorded. The sample was then placed in a furnace maintaining the temperature of 560°C for converting into ash. In the same crucible 4ml 6N hydrochloric acid (HCl), 4ml 6N conc. Nitric acid (HNO3) and 10ml of distilled water were added. The solution will be digested in low heat up to a minimum amount. The solution was filtered by using 4l membrane filters to remove volatile organic compounds. Volume was adjusted up to 25ml in a volumetric flask. The solution was then shaken

well and pour into the test tube and aspirated in AAS (Atomic Absorption Spectroscopy) where the concentration was determined through an automatic calibration curve.

The laboratory's lower limit of detection for the lead concentration in the paint samples is dependent on the best art of standard laboratory with available equipment. The equipment was used to analyzed all these paint samples included in this study have a very good lower detection limit of 0.01 ppm. One of the sophisticated equipment available in Nepal.

All paints were analyzed by an accredited laboratory Nepal Environmental and Scientific Services (NESS) Limited in Nepal for their lead content, based on the dry weight of the paint. The test method applied for lead concentration analysis was direct air acetylene AAS, AOAC, 974.02. The accredited laboratory participates in the Association of Officials Analytical Chemists, assuring the reliability of the analytical results.

The analytical methods adopted by the AOAC (Association of Official Analytical Chemists) are used by government agencies concerned with the analysis of fertilizers, foods, feeds, pesticides, drugs, cosmetics, hazardous substances, and other materials related to agriculture, health and welfare, and the environment. AOAC methods are also used by industries to check the compliance of their products.

Figure 8: Paints samples included in the study (CEPHED 2021)

3. RESULTS

3.1 Country-level compliance status of lead in Paints standard

This study shows that:

- **Every Second (1 of 2) Enamel Paints you purchase is likely to contain lead concentration more than the Government of Nepal Lead Paint Standard limit of 90 ppm.**
- 30 out of 62 analyzed solvent-based paints (48.39 percent of paints) were lead paints, i.e., they contained lead concentrations above 90 parts per million (ppm), dry weight. In addition, 7 paints (11.29 percent of paints) contained dangerously high lead concentrations above 10,000 ppm.
- On the other hand, 32 out of 62 solvent-based paints (51.61 percent of paints) contained lead concentrations at or below 90 ppm, complying with the standard, suggesting that the technology that produces paint without leaded ingredients exists in Nepal.

18 out of 62 (29 percent of paints) contain a Non-Detectable (ND) level of lead including many Nepalese brands. Moreover, 18 out of 32 paints (56.25 percent) that comply with the standard contain a Non-Detectable (ND) level of lead is very good news for Nepalese consumers.

- The highest lead concentration detected was 22850.17 ppm (254 times more than the Government of Nepal lead paint standard of 90 ppm) in a Golden Yellow color paint, SMART brand of Manjari Paints, Ithari, Sunsari. The other paint sample of the same industry of deep orange color contained the second-highest lead concentration 15316.55 ppm (170 times more than lead paint standard of Nepal) paint sold.
- None of the paints provided information about lead content & Precautionary message as per the requirement of the Lead paint standard on their labels and most paints carried little information about any ingredients on can labels.

Compliance Status of Paints in Nepal (CEPHED 2021)

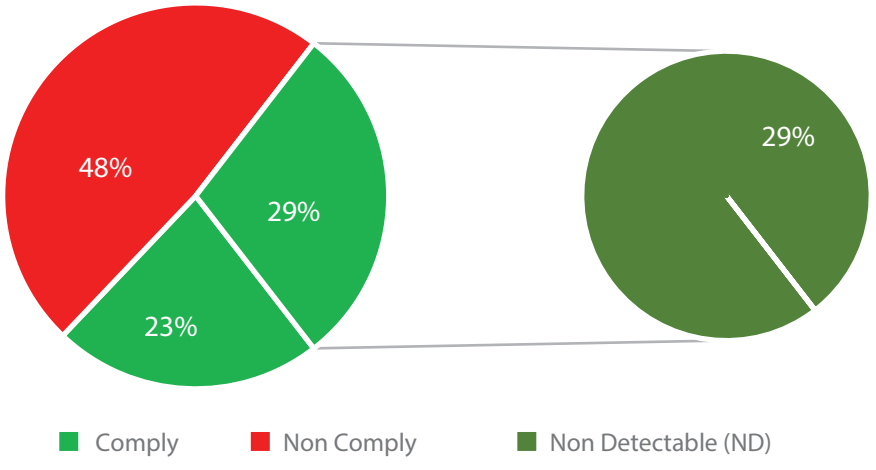

Figure 9: The country-level compliance status of lead paint standard

The 15 solvent-based paints with the highest amounts of lead are summarized in Table.

Table 2: Top 15 Solvent-Based Paints with the Highest Lead Content

Rank	Sample No.	Manufacturer	Brand	Color	Lead Content (ppm)	Times > GON Std. 90 ppm
1	NPL 2	Manjari Paints, Ithari-12, Sunsari	SMART	Golden Yellow	22850.17	253.89
2	NPL 3	Manjari Paints, Ithari-12, Sunsari	SMART	Deep Orange	15316.55	170.18
3	NPL 6	Tara Paints and chemical industries, Birgunj, Parsa, Nepal	Renew	Signal Red	15273.42	169.70
4	NPL 23	Tara Paints & Chemical industries, Bara, Nepal	Tara gold	Leaf brown	15057.37	167.30
5	NPL 42	Jasmine Paints Pvt Ltd, Chitwan, Nepal	Quitelite	Golden Yellow	14086.00	156.51
6	NPL 20	Dalmia Paints and Chemicals industries, Birgunj, Nepal	Dalmia	PO Red	11972.74	133.03
7	NPL 4	Tara Paints and chemical ind., Birgunj, Parsa, Nepal	Renew	Golden Yellow	11880.57	132.01
8	NPL 55	Ashoka paint and chemical industries, Birgunj, Parsa, Nepal	Apcolac	Golden Yellow	5473.37	60.82
9	NPL 28	Biraj Paints Pvt Ltd, Chitwan, Nepal	B-Eden	PO Red	4968.74	55.21
10	NPL 62	Aratee paints Udhyog Pvt.Ltd, Industrial Estate, Pokhara	Mayur	PO red	3899.76	43.33
11	NPL 19	Jain Paints and Chemicals, Delhi, India	Timex	Phiroza	3826.56	42.52
12	NPL 1	Manjari Paints, Ithari-12, Sunsari	SMART	White	2335.33	25.95
13	NPL 43	Jasmine Paints Pvt Ltd, Chitwan, Nepal	Always	PO Red	2223.96	24.71
14	NPL 49	Sarvottam Paint Industries Pvt. Ltd, Attaria-04, Kailali, Nepal	Sarvottam	Golden Yellow	2116.63	23.52
15	NPL 50	Tata Paints & Chemicals Industries Pvt Ltd, Chitwan, Nepal	Tata	Buss Green	2018.04	22.42

3.2 Province wise Lead Paint Standard compliance status

The lead concentration varies immeasurably among the samples taken from different provinces. Compliance of lead paint standard highest in Province No. 1 (78.57%), Sudur Paschim (66.67%), Bagmati (61/11%), Gandaki (60%), Lumbini (40%) Karnali (33.33%), and Province No. 2 (14.29%) only. Worst Province concerning compliance status. 6 out of 7 highest lead concentrations exceedingly more than 10000 ppm were found in Province No. 2. Another one with the highest lead was from Bagmati province. Paints industries are also suspected to adopted the double standard concerning the quality of the paints with lead contents. Therefore, need for larger studies to validate these suspicions of adoption of the double standard by paint industries across the provinces of Nepal.

The table below summarizes and graphs below illustrate the lead concentration and status of the compliance of lead paint standards across the seven provinces of Nepal.

Table 3. Province wise compliance status of lead paint standard in Nepal

Parameters	Prov1	Prov2	Bagmati	Gandaki	Lumbini	Sudur Paschim	Karnali	Total
No. of Samples	14	14	18	5	5	3	3	62
ND	8	1	6	1	0	1	1	18
Complying	11	2	11	3	2	2	1	32
Complying %	**78.57**	**14.29**	**61.11**	**60.00**	**40.00**	**66.67**	**33.33**	**51.61**
Non Complying	3	12	7	2	3	1	2	30
Non-Complying %	**21.43**	**85.71**	**38.89**	**40.00**	**60.00**	**33.33**	**66.67**	**48.39**
Min ND (<0.01) ppm	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Min Lead (ppm)	15.98	48.25	18.57	23.45	30.66	15.83	2018.04	15.83
Max Lead (ppm)	728.35	22850.17	14086	3899.46	871.25	5473.37	2116.63	22850.17
Time more than Standard (90 ppm)	**8.09**	**253.89**	**156.51**	**43.33**	**9.68**	**60.82**	**23.52**	**253.89**

Province wise Compliance Status of Lead Paint Standard of 90 ppm in Nepal

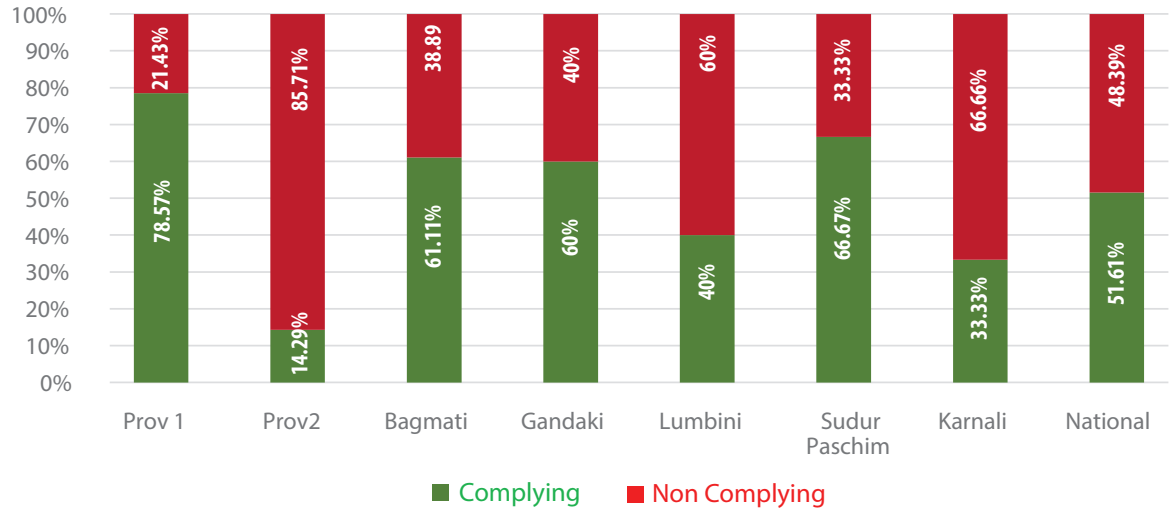

Figure 10: Province wise lead paint standard compliance status

Province wise leaded paints sample distribution

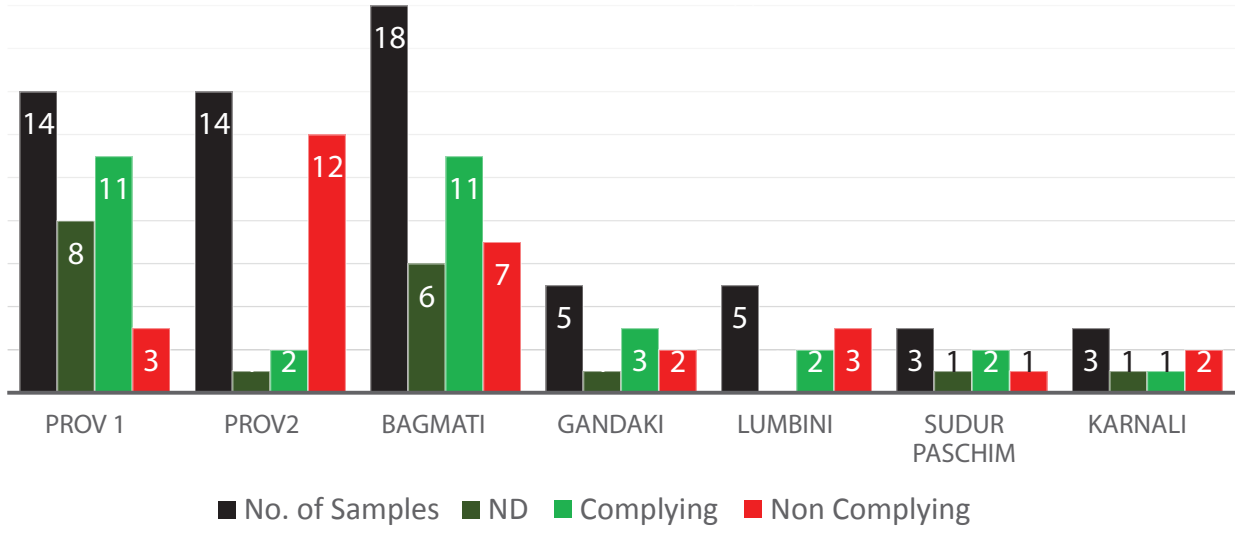

Figure 11: Province wise leaded paints distribution

3.3 Brands and Industries wise lead concentration distribution

Lead concentration across the various brands and paints industries varies greatly.

- 32 paint samples comprising at least one from 23 different brands and of 22 different paints industries comply with the standard (lead contained below 90 ppm)
- 30 paint samples comprising at least one from 25 different brands and of 24 different paints industries do not comply with the standard (lead contained above 90 ppm)
- 5 brands of 41 analyzed brands (12.19 percent of paint brands) sold at least one paint with a dangerously high lead concentration above 10,000 ppm.
- 7 paints of 41 brands sold paint with a dangerously high lead concentration above 10,000 ppm.
- 7 paints samples of 5 brands from 5 Paints companies sold paint with a dangerously high lead concentration above 10,000 ppm.
- 6 out of 7 paints with a dangerously high lead concentration above 10,000 ppm were found in Province No. 2 and the remaining 1 in Bagmati Provinces.

Brand and Industries Comparison with respect to Lead Concentration

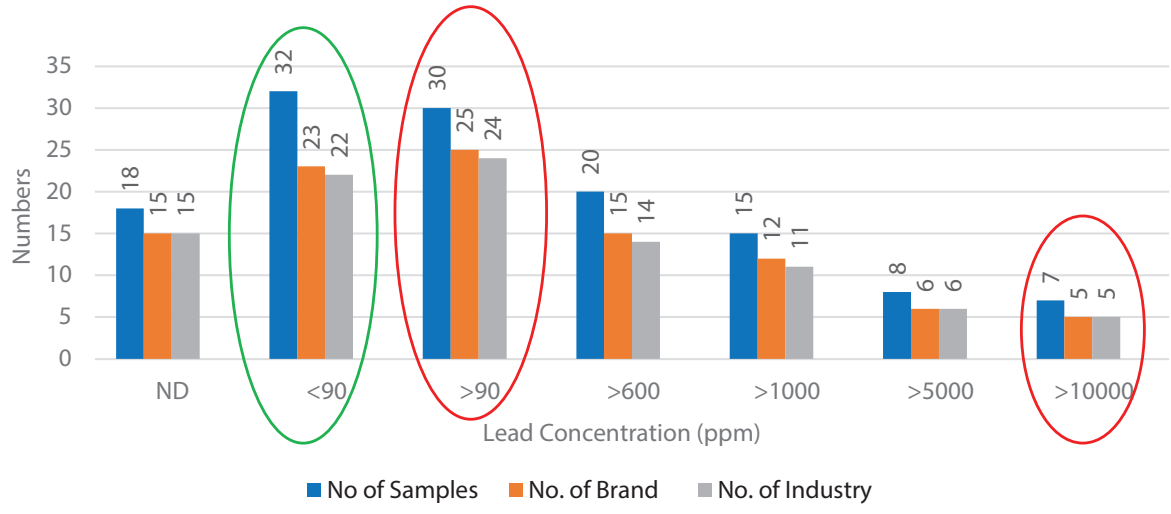

Figure 12: Brand and Industries wise lead concentration distribution

Lead concentration distribution across Paints companies and brands (at least a sample)

Among solvent-based decorative paints, the SMART brand of Manjari Paints industry Sunsari has contained the highest concentration of lead at 22850.17 ppm. On the other hand, at least one paint from each of the following brands contained lead below 90 ppm as shown in the table 4.

Some of the brands even producing brighter colors such as Golden Yellow, PO Red, Black, Single Red, Phiroza, Dark Brown, Gulf Red, Buss Green, and blue with no detectable level of Lead (<0.01 ppm). This indicates that the technology to produce even brighter color paints without added lead exists in Nepal.

Table 4: Brands and Paint Industry-wise lead concentration distribution

Brand	Paint Industries	No. of Samples	No. of Brands	No. of Samples Above 90 ppm	No. of Samples Above 10,000 ppm	Non-Detectable (<0.01ppm) & <90 ppm	Minimum Lead Content (ppm)	Maximum Lead Content (ppm) ranks
Smart	Manjari Paints, Sunsari	3	1	3	2	0	2335.33	22850.17
Renew	Tara Paints, Parsa	3	1	3	2	0	689.85	15273.42
Tara Gold	Tara Paints, Bara	1	1	1	1	0	15057.37	15057.37
Quitelite	Jasmin Paint, Chitwan	2	2	2	1	0	2223.96	14086.00
Dalmia	Dalmia Paints, Birgunj	1	1	1	1	0	11972.74	11972.74
Apcolac	Ashoka Paint, Parsa	1	1	1	0	0	5473.37	5473.37
B-Eden	Biraj Paints, Chitwan	1	1	1	0	0	4968.74	4968.74
Mayur	Aratee Paints, Pokhara	3	1	2	0	1	ND	3899.76
Timex	Jain Paints, India	1	1	1	0	0	3826.56	3826.56
Sarvottam	Sarvottam Paints, Kailali	2	1	1	0	1	ND	2116.63
Tata	Tata Paints, Chitwan	1	1	1	0	0	2018.04	2018.04
Sunlight	Himal Home, Biratnagar	1	1	1	0	0	942.68	942.68
Jureli	Everest Color, Chitwan	1	1	1	0	0	871.26	871.26
Baba	Baba Paints, Sunsari	1	1	1	0	0	728.35	728.35
Apollo GP	Appollo Paints, Chitwan	2	1	1	0	1	ND	649.8
Canvas	Ashirbad Paints, Banke	2	1	1	0	1	84.15	563.65
Borolac	Berger J & N, Bhaktapur	4	2	1	0	3	ND	469.57
Cheery	American Paints, Chitwan	1	1	1	0	0	402.66	402.66
Starlite	Nepal Paints, Bhaktapur	2	2	1	0	1	ND	394.28
Yeti	Yeti Paints, Hetauda	1	1	1	0	0	392.5	392.5
Danfe	Pashupati Paints, Biratnagar	3	1	1	0	2	ND	221.1
Tractor	Asian Paint, Hetauda	3	2	1	0	2	ND	110.8
Rainbow	Jenish Paint, Kathmandu	1	1	1	0	0	97.87	98.87
Ruby	Tirupati Paints, Chitwan	2	1	1	0	1	30.66	94.14
Fashion	Fashion Paints	4	1	0	0	4	42.77	75.96

Brand	Paint Industries	No. of Samples	No. of Brands	No. of Samples Above 90 ppm	No. of Samples Above 10,000 ppm	Non-Detectable (<0.01ppm) & <90 ppm	Minimum Lead Content (ppm)	Maximum Lead Content (ppm) ranks
Raunak	Rico Paints, Birgunj	1	1	0	0	1	48.25	48.25
Maya	Indigo Paints, Kathmandu	1	1	0	0	1	44.63	44.63
Compac	Taceepaibul, Thailand	1	1	0	0	1	37.34	37.34
Shangri- La	Reliance Paints, KTM	2	1	0	0	2	15.98	37.18
Dulux	AkzoNobel, India	2	1	0	0	2	ND	28.61
Syntecgleam	Surya Paints, Hetauda	1	1	0	0	1	18.57	18.57
Goldac	KNP-Japan, Birgunj	2	1	0	0	2	ND	ND
SPN Marco	Suryodaya Paints, Chitwan	1	1	0	0	1	ND	ND
Marco	Surya Paints, Chitwan	1	1	0	0	1	ND	ND
Color lite	Mahalaxmi, Bhaktapur	1	1	0	0	1	ND	ND
Super	ICI Dulux Paints, USA	1	1	0	0	1	ND	ND
Euro	Jagannath Groups, Chitwan	1	1	0	0	1	ND	ND
Total	**37**	**62**	**41**	**30**	**7**	**32**	**ND**	**22850.17**

3.4 Color wise lead concentration distribution

This study included 17 different shades of paints grouped into 9 broad colors including 18 Red, 14 Yellow, 9 Black, 6 Phiroza, 4 Brown, 4 Green, 3 Blue, 2 white, and 2 Chocolates color (see pie chart).

Nine different brighter color paints including red, yellow, black, phiroza, green, chocolate, blue, brown, and white were included in this compliance monitoring of lead paint standard 2021.

The good news for Nepalese consumers is that 18 out of 62 (29.03%) from most different bright colors including red, yellow, black, phiroza, brown,

Color Combination of Studied Samples

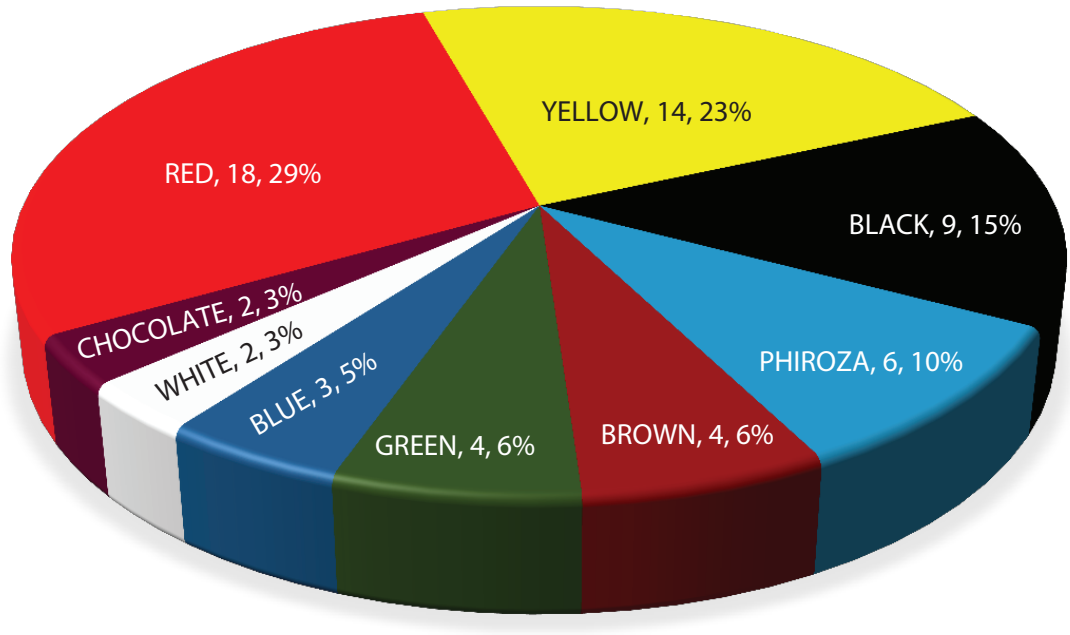

Figure 13: The color distribution of studied paint samples

green, and blue out of total 62 samples have a non-detectable level (0.01 ppm) of lead and additional 14 out of total samples have lead content below government of Nepal lead regulatory limit of 90 ppm. Thus altogether 32 out of 62 (51.61%) of these brighter color paints comply with the lead paint limits of 90 ppm. This indicates that the paints industries in Nepal can produce almost lead-free paints or paints that comply with the Government of Nepal`s lead paint standard.

30 out of 62 (48.39%) different brighter color paints including red, yellow, black, phiroza, green, brown chocolate, blue, and even white color paints contained lead more than the prescribed limit of 90 ppm.

20 out of 62 (32.26%) of all brighter colors including white were found to be lead contained even more than 600 ppm.

14 out of 62 (22.58%) of all brighter colors including white were found to be lead contained even more than 1000 ppm.

7 out of 62 (11.29%) of three brighter colors found to be lead contained even more than 10,000 ppm and were mostly yellow, red, and brown color.

Color-wise, 44.44 % (8 of 18) red, 57.14% (8 of 14) yellow, 33.33% (3 of 9) black, 50% (3 of 6) phiroza, 50% (2 of 4) Brown, 25% (1 of 4) green 33.33% (1 of 3) blue, 100 % (2 of 2) white and 100% (2 of 2) chocolates contained lead concentrations above 90 ppm. Once again yellow, red and brown color paints contained dangerously high lead concentrations above 10,000 ppm.

The details of lead contained in paints color-wise (rows) and range-wise (columns) are shown in the given table.

Table 5: Color-wise lead concentration distribution

Color	No. of Samples	No. of paint samples contained lead						%age of Color Samples exceeding >90
		ND (<0.01) ppm	<90 ppm	>90 ppm	>600 ppm	>1000 ppm	>10000 ppm	
Red	18	7	3	8	5	5	2	**44.44**
Yellow	14	3	3	8	7	6	4	**57.14**
Black	9	3	3	3	1			**33.33**
Phiroza	6	2	1	3	1	1		**50.00**
Brown	4	1	1	2	1	1	1	**50.00**
Green	4	1	2	1	1			**25.00**
Blue	3	1	1	1	1			**33.33**
White	2			2	2	1		**100.00**
Chocolate	2			2	1			**100.00**
Total	**62**	**18**	**14**	**30**	**20**	**14**	**7**	
% of Total	**100**	**29.03**	**22.58**	**48.39**	**32.26**	**22.58**	**11.29**	
Total	**100**		**51.61**	**48.39**	**32.36**	**22.58**	**11.29**	

4 Yellow-colored paints, 2 Red-colored paints, and 1 Brown colored paints contain an excessively dangerous level of lead of more than 10,000 ppm. On one hand, Yellow, Red, and Brown color paints contained the highest lead concentrations whereas 7 of 18 Red, 3 of 14 Yellow, 3 of 9 Black, 2 of 6 phiroza, 1 of 4 Brown, 1 of 4 Green, and 1 of 3 Blue colored paints sampled contained no detectable (ND) level of lead.

Lead content distribution across different colour paints

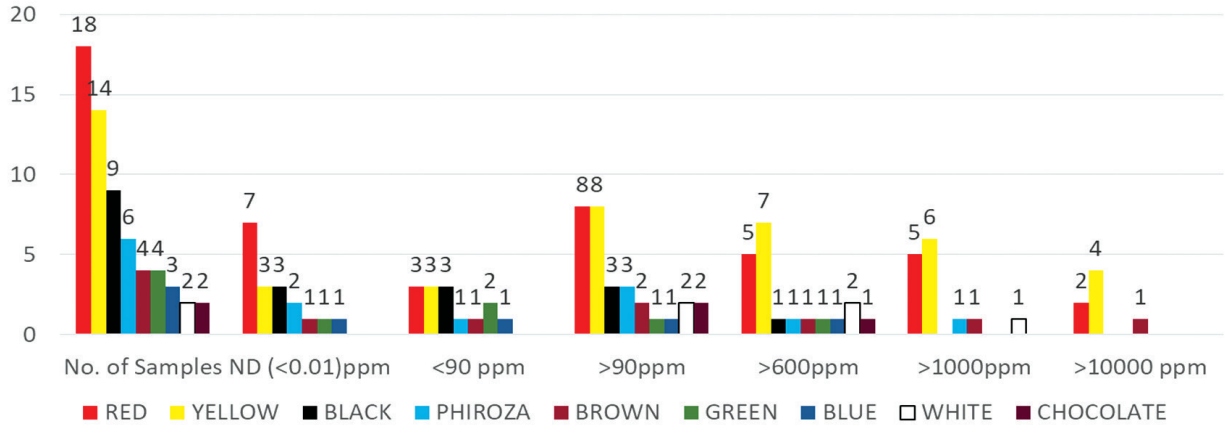

Figure 14: Lead concentration distribution across sample paint color

Lead concentration in the sample's percentage of the same color distribution can be shown in the given diagram.

Lead concentration across the samples colour (%)

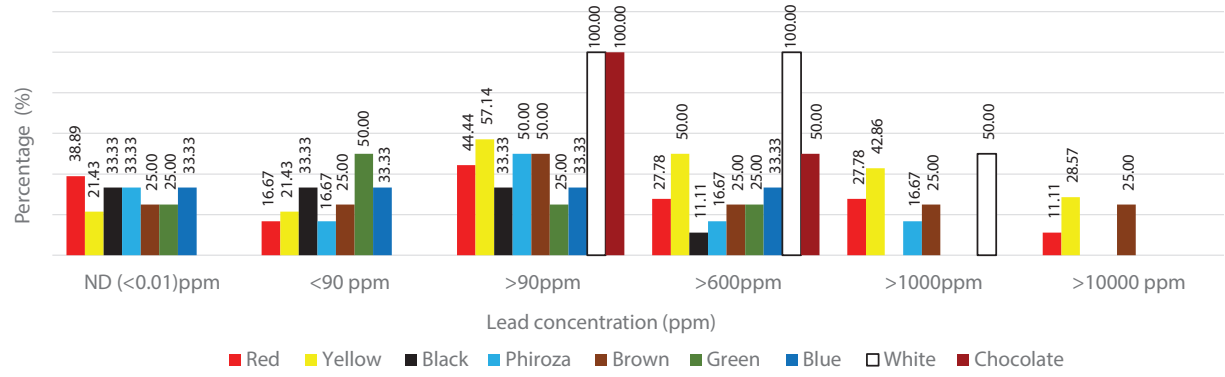

Figure 15: Lead concentration distribution across paint color

3.5 Lead concentrations in labeled paint cans

There are three mandatory provisions included in the lead paint standard promulgated by the Government of Nepal on 22 December 2014 that took effect on 20th June 2015.

a) Maximum lead-in paints imported and domestically produced in Nepal to be not more than 90 ppm;
b) Each paint cans should be labeled with lead content in the paint it contained, and
c) Each paint cans should also be labeled with a protective precautionary message for occupational safety.

So looking at these important provisions of mandatory labeling in our standard, in general, NONE OF THE PAINTS that are being imported into and produced within the country of any national (purely Nepalese investment), multinational (Foreign investment /collaboration in Nepal), and International paints (Purely produced outside Nepal) industries carry meaningful information about exact lead content as well as the hazards of the lead paint-related precautionary message as per the mandatory requirement of the lead paint standard provisions.

Moreover, very few of them are adhering to what they labeled where as others have misused the labeling provision and hence Nepalese consumers have been cheated and continued to be cheated if not concrete actions being taken by the regulatory authorities from the Federal, Provincial, and Local government level.

The following tables clearly show the status of labeling and adherence with their claims regarding the lead limit of 90 ppm provision in the lead paint standard.

Table 6: Compliance status of lead limits in NS and NO ADDED LEAD ....labeled paints

Labeling	No. of Samples (%of all)	No. of paint samples contained lead (% of labeled)						%age of labeled Samples exceeding >90
		ND (<0.01) ppm	<90 ppm	>90 ppm	>600 ppm	>1000 ppm	>10000 ppm	
Lead Free/No Added Lead, Mercury, Arsenic & Chromium	26 **(41.93%)**	9 **(34.62%)**	11 **(42.31%)**	6 **(23.08%)**	2 **(7.69%)**	2 **(7.69%)**	2 **(7.69%)**	**23.08**
Nepal Standard (NS)	17 **(27.42%)**	5 **(29.41%)**	6 **(35.29%)**	6 **(35.29%)**	3 **(17.65%)**	1 **(5.88%)**		**35.29**
No Added Mercury, Arsenic, and Chromium	1 (1.61%)			1 (100%)	1 (100%)	1 (100%)	1 (100%)	**100.00**

51 (26 No added lead ….+ 1 No added Mercury….+ 17 NS Marked+ 5 ISO + 2 Quality tested…) out of 62 (82%) samples are of either Nepal Standard (NS) Marked or contain the information regarding the presence of lead in the form of "LEAD-FREE or NO ADDED LEAD…., No ADDED MERCURY…" or different type of certification such as ISO certified and Quality tested and passed certified.

Standard compliance across NS MARKED paints

Every Third (1 of 3) NS Marked Paints you purchase is likely to contain lead concentration more than the Government of Nepal Lead Paint Standard limit of 90 ppm.

The Nepal Bureau of Standard & Metrology (NBSM), Ministry of Industry, Commerce and Supplies (MOICS), Government of Nepal awards NS MARK to Nepalese industries to motivate high-quality goods produced according to relevant Nepalese standards and to enable Nepalese products to compete more efficiently in regional (or global) markets. According to NBSM information made available to the study team, enamel paints of some 14 Industries awarded with NS Mark so far. Some paints industry like Nepal Paints industries earlier received NS mark now no longer use this NS Mark and not listed in the NBSM list either.

17 paint cans of 62 (27.42%) paint samples accounting for at least one sample from 8 paint companies contain the NS MARK logo. These paints samples were from Asian, Berger, Apollo, Tirupati, Jasmin, Baba, Pashupati, and Reliance paint companies. 11of 17 (64.71 %) NS MARK paints comply with the 90 ppm lead paint standard limit. Whereas 6 of 17 (35.29%) labeled samples did not comply with the standard lead limit of 90 ppm.

Some of the NS Awarded paints company`s products have got a high level of lead concentration above 90 ppm in them and a maximum up to 14086 ppm. For example, enamel paints of Jasmin, Yeti, Suryodaya, and Asian Paints Companies have been awarded NS MARK from a regulating authority named Nepal Bureau of Standard and Metrology (NBSM), Ministry of Industry Commerce and Supply (MOICS), Government of Nepal. However, at least one sample among 3 Asian Paints, 2 Jasmin Paints, 1 Suryodaya, and 1 yeti paints company`s samples did not contain NS MARK and also found to be contained lead concentration more than 90 ppm except Suryodaya's paint samples. In the case of Jasmin Paints and Chemical Company products, Golden Yellow of Quitelite Brand, lead concentration was found to be 14086 ppm (156.5 times more than GON lead paints standard. This is the 5th highest lead concentration among all tested samples. The other samples of PO Red Color of the same Jasmin paints company with NS marked have also got 2223.96 ppm (24.7 times more than standard). Both of these Jasmin Paints samples have also been labeled with "Quality Tested and Passed" (who tested and passed it should be a

matter of further examination?). Yeti paints sample without NS Mark contained 392.5 ppm of lead.

In this study, enamel samples of 8 of 14 NS Awarded paint companies were included. Unfortunately, at least one sample (with and without NS Marks) of 6 out of 8 (75%) NS Awarded Paint companies have lead concentration more than the GON lead paint standard limit of 90 ppm. So, these are just a few extreme cases of miss use of labeling protocol that immediately needs to be fixed and regulated by all concerned authorities especially by NBSM, MOICS, and Department of Environment, MOFE, Government of Nepal,

Standard compliance across NO ADDED LEAD …labeled paints

Every Fourth (1 of 4) of No Added Lead…. Paints you purchase is likely to contain lead concentration more than the Government of Nepal Lead Paint Standard limit of 90 ppm.

26 of 62 (41.93%) paints samples accounting for at least one sample from 13 paint companies included in this study contain an indication of "LEAD-FREE and/or NO ADDED LEAD, MERCURY, ARSENIC, and CHROMIUM ". These paint samples were from Reliance, Asian, Berger, Apollo, Fashion, Jaganath groups, Surya, Indigo, Everest Color, KNP, Tara (Parsa), AkzoNobel's (India), and Taveepailbul (Thailand) paint companies.

20 of 26 (76.92 %) NO ADDED LEAD labeled paints comply with the 90 ppm lead paint standard limit. Whereas 6 of 26 (23.08%) labeled samples did not comply with the standard lead limit of 90 ppm.

Furthermore, all paint samples from (8 of 13) paint companies with their products labeled with NO ADDED LEAD of Reliance, Fashion, Jaganath groups, Surya, Indigo, KNP, AkzoNobel's (India), and Taveepailbul (Thailand) paint companies comply with the standard maximum limit of 90 ppm of lead.

On the other hand at least one paints sample from (5 of 13) paint companies with their products labeled with NO ADDED LEAD of Asian, Berger, Apollo, Everest Colors, and Tara (Parsa) paint companies did not comply with the standard limit of 90 ppm of lead. They were found with lead concentrations exceeding 90 ppm.

Two from Tara Paints and Chemicals Industry, Parsa, Birgunj labeled with NO ADDED LEAD …. were found to contain dangerously high concentrations

BOX B: Best Example of Labeling on Safety and Security

Health safety and Environmental security

- Flammable
- Keep away from combustible material
- Store container in upright position, with lid tightly closed, in a cool, dry place, away from ignition sources
- Keep out of reach of children and away from combustible material, food, drink and animal feeding stuffs
- May cause sensitization by skin contact.
- Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment
- Vapors may cause drowsiness and dizziness
- Repeated exposure may cause skin dryness or cracking.
- Avoid contact with skin or eyes. After contact with skin wash immediately with soap and water or a proprietary skin cleanser.
- Do not use solvent thinners or white spirits.
- Do not pour leftover paint down drains or in watercourses.
- Wear suitable gloves
- If swallowed seek medical advice immediately and show this container or label.
- Use only in well ventilated areas.
- Remove as much paint as possible from brushes and rollers before cleaning.
- Safety data sheet available for professional user on request.
- Avoid release to the environment. Refer to special instruction/ safety data sheet.
- In case of fire use foam, dry powder, AAAF, CO2, never use water.
- Contains ethyl methyl ketoxime. May produce an allergic reaction.
- No added Lead, Mercury or Chromium compounds.
- **Lead content in dried paint film does not exceed 90 parts per million.**

of Lead 15273.42 ppm (169.7 times more than standard) in Renew Brand of Single Red Color paint. This is the third-highest lead concentration among all tested samples and other same brand and same paint company samples also got 7th highest concentration of lead 11880.57 ppm (132 times more than standard) in Golden Yellow color.

Another one from …. were Tara Paints and Chemicals Industry, Bara labeled with NO ADDED MERCURY, ARSENIC AND CHROMIUM were contained a dangerously high concentration of lead 15057.37 ppm (167.3 times more than standard) in Tara Gold Brand of Leaf Brown color paint. This is the 4th highest lead concentration among all tested samples.

5 paint samples from 4 paint companies (Surya, Baba, Tata, and Reliance) are either ISO certified or contain "Quality Tested and Passed certification. However, these certifications did not guarantee low lead as the products of Baba and Tata paints companies were having lead more than 90 ppm.

18 of 62 paints samples also contain either website and/or Email addresses for the customer care services. Some others have just got the contact number for customer care.

Two paints samples of Jasmin paints have labeling about "Quality Tested and Passed" have found to be highly leaded. The lead contained ranges from 2223 to 140086 ppm. Consumers did not have any information on who from what regulatory authorities have tested and issues the passed certificate.

Labeling like Maya Synthetic Enamel is a Lead-Free Solvent Paints of Indigo Paint Industry was found to comply with the GON Lead paints standard limits of 90 ppm.

Labeling like Lead content in dried paint film does not exceed 90 parts per million (ppm) labeled in the Dulux brands of AkzoNobel India Ltd, Kolkata, India, and found to be contained lead concentration ranges from ND to 28 ppm, well below the GON lead limits and thus comply with the standard.

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 the paint can labels.

Almost all of the paint samples included in this study have got manufacturing dates and batch numbers mostly in writing except a few with Bar Code. Most warning symbols on the paint cans indicated the flammability of the paints, but no precautionary warnings on the effects of lead dust on children, painters and pregnant women were provided.

3.6 Compliance status of lead paint standard over the years

This is the first-ever largest compliance monitoring of lead paint standard in Nepal since the standard was enacted and became effective on 20th June 2015 and tried to extract the situation whether it's improving or need the intervention after this study findings. The present study included 62 paint samples from 37 paint manufacturers clearly shows the increasing trend of compliance with lead paint standards over the years. However, more needs to be urgently done to achieve 100 percent and fully comply with all three provisions of the standard.

Complaince Status of Lead Paint Standard in Nepal

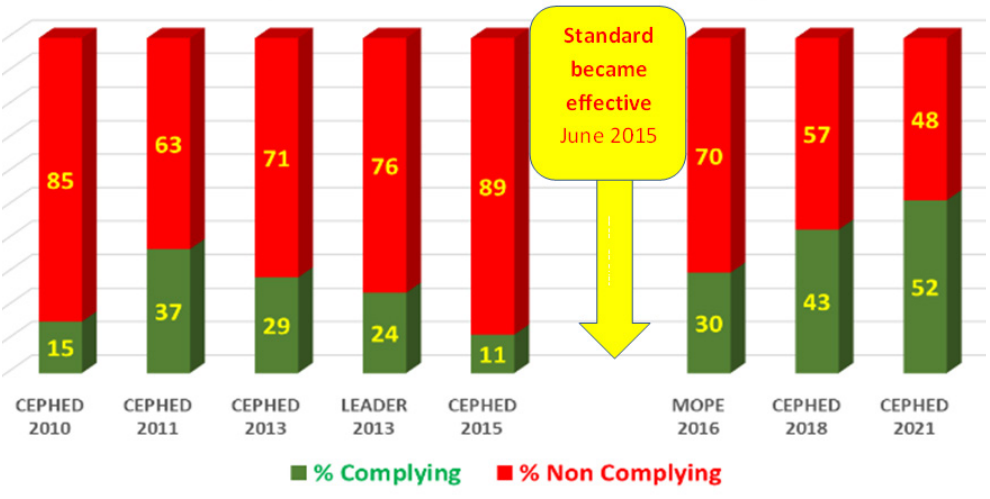

Figure 16: **Compliance trend of the lead paint standard over the years**

Table 7: Comparison of Lead Concentration of present studies with previous studies

Organization, Years of Studies	Total No. of Samples studied	Sample No. containing Lead <90ppm	Sample No. containing Lead >90ppm	Min Lead (ppm)	Max Lead (ppm)	Times > 90 ppm Standard
CEPHED 2010	13	2 (15%)	11 (85%)	3.98	73966.44	822
CEPHED 2011	27	10(37%)	17(63%)	60	212700	2363
CEPHED 2013	49	14(29%)	35(71%)	9	130000	1444
LEADERS 2013	75	18(24%)	57(76%)	60	200000	2222
CEPHED 2015	87	10(11%)	77(89%)	10	125000	1389
Standard Enacted on 22nd December 2014 and Took Effect on 20th June 2015						
MOPE 2016	10	3(30%)	7(70%)	1.8	1925	21
CEPHED/ LEADERS 2017	37	23(59%)	14(41%)	ND*	50347.22	559
CEPHED 2018	56	24(43%)	32(57%)	ND	75049.21	833
CEPHED 2021	62	32(52%)	30(48%)	ND	22850.17	254

*ND=Not Detectable

Among the compared 62 paint samples, it shows the improvement in terms of lead contamination in paint samples. In the 2018 study, 57 percent of the paints (32 of 56 paints) had lead contamination higher than the acceptable limit of 90 ppm which is reduced to 48 percent (30 of 62 paints) in 2021. Similarly, in the 2018 study, 25 percent of paints (14 of 56 paints) had lead concentration greater than 10000 ppm which is reduced to 11.29 percent (7 of 62) in 2021.

Over the years, the highest lead concentration found in the paints was also got reduced substantially. However, still found above the dangerous level of lead. In the 2018 study, the highest lead concentration was 75049.21 ppm, while in 2021 the highest lead concentration was 22850.17 ppm.

Figure 17: Paints samples included in the study (CEPHED 2021)

4. CONCLUSION

This study demonstrates that solvent-based paints with high concentrations of lead are still sold and available even after passing more than six years of mandatory lead paint standard became effective in Nepal. Since the paints sampled for this study are brands commonly sold in retail stores all over Nepal in all its seven provinces.

However, the fact that 32 out of 62 paints (52 percent of paints) contained lead concentrations below 90 ppm including even 18 of 62 (29 percent of paints) even have non-detectable (ND) levels of lead indicate that the technology to produce paints without added lead exists in Nepal. The study results provide a strong justification to strictly enforce a regulation/standard that will ban the manufacture, import, export, distribution, sale, and use of all paints with total lead concentrations greater than 90 ppm. This also prevailed for the non-compiled paints samples concerning the mandatory requirement provision of labeling about the exact lead content and precautionary message of exposure prevention.

The NS Mark, NO ADDED LEAD …. labeled paints did not guarantee of containing low lead or lead-free all the times. Additionally, none of the paints imported, marketed, and used in Nepal meets the mandatory provision of labeling of lead contained in the paints on the cans and precautionary message for preventing occupational exposure.

5. RECOMMENDATIONS

5.1 Government and government agencies

a) Ministry of Forest and Environment (MOFE) & Department of Environment (DoEnvt).

- Inform all concerned government agencies (Federal, Provincial and Local), paint companies, importers, dealers, retailers, and the general public about the newly enacted mandatory standard of 90 ppm of lead in paint and labeling provision.
- Establish a strong and efficient monitoring mechanism to ensure the compliance of 90 ppm standards by paint manufacturers, importers, distributors, dealers, and retailers.
- Monitor the proper labeling of paints including lead content, other compounds; date of manufacture; and date of expiry; and information that alerts users to the hazards of lead-contaminated dust when previously painted surfaces are scraped or sanded in preparation for repainting.
- Implement the Green Public Procurement Policy (GPPP) i.e., only purchase non-leaded paints, and effectively implement it, starting from public sectors and then to all other sectors.
- Formulate a policy regarding the provision of incentives for small-scale paint manufacturing industries to encourage a shift towards non-lead production.
- Initiate a third-party certification process to ensure that statements of lead-free paints are valid.
- Envision uniform labeling provision and mandatory labeling about lead content and precautionary messaging.
- Ban the import and use of leaded pigments, leaded driers and leaded fillers etc. and promotion of non leaded paint ingradients as leaded ingradients are the known source of excess lead contamination into the paints.

b) Ministry of Industry and Nepal Bureau of Standard and Metrology (NBSM).

- Incorporation of Lead paint mandatory standard of 90 ppm in NS standard criteria as soon as possible and regulate all paint industries as per the mandatory standard.
- Inform every concerned government agency, paint companies, importers, dealers, retailers, and the general public about the enacted mandatory standard of 90 ppm of lead in paint and labeling provision.
- Compliance monitoring of 90 ppm standard of lead in paint and regulate the sectors.
- Provide technical assistance to small and medium-sized paint manufacturers to provide laboratory setup for product analyses.
- Made access and affordable laboratory testing facilities for lead paint testing for the SMEs Paint Manufacturers.
- Develop and execute the third-party certification system of lead in paints.
- Ban the import and use of leaded pigments, leaded driers and leaded fillers etc. as the known source of excess lead contamination into the paints.

c) Ministry of Industry, Supply and Commerce & Department of Commerce, Supplies & Consumer Protection.

- Inform every concerned government agency, paint companies, importers, dealers, retailers, and the general public about the enacted mandatory standard of 90 ppm of lead in paint and labeling provision.
- Ensure the import of paints complies with the government of Nepal Standard of 90 ppm of lead content.
- Regularly market monitoring for compliance of lead paint standards and labeling.
- Help paint manufacturers of getting their paint tested and have proper labeling on the paint cans.
- Updated record-keeping of import and export of paints and other hazardous chemicals and items in the country.

- Regulate pricing and billing malpractices at the industry, dealers, and retailer's level.
- Massive consumer educations about using quality and paints that only fully comply with the standard.

d) Ministry of Education and Department of Education

- Make a mandatory circular or notification to all the schools, colleges both in public and private sectors to only use non-leaded paints and/or paint under the government standard of 90 ppm lead in paint.
- Immediately ban the use of leaded paints for all school infrastructures, e.g., buildings, furniture, playing gardens/ground/parks, and toys. Also, in Kitten Garden and Montessori.
- Ask and look for Material Safety Data Sheets (Chemical Data Sheet) and labels indicating lead content and information about lead and other heavy metals when purchasing paints and toys.
- Establish programs at the district level to raise awareness among school children throughout the country.
- Ensure the inclusion of lead toxicity appropriately and timely manners in school/ college level curricula through its concerned departments and curriculum boards.
- Declare schools, playgrounds, day-care centers, and health care facilities as lead-free zones.
- Immediately take the decisions of Green Public Procurement Policy (GPPP), i.e., only purchase non-leaded paints, and effectively implement it.
- Regular monitoring of all academic institutions and facilities for overall chemical safety-related issues.

e) Ministry of Finance and Department of Custom

- Inform every concerned government agency, paint companies, importers, dealers, retailers, and the general public about the newly enacted mandatory standard of 90 ppm of lead in paint and labeling provision.
- Circulate the government decision among all the custom points.
- Monitor the lead contamination in imported paint and exported paints.
- Strong legal actions against the non-compliance of local suppliers and/or import companies.
- Updated record-keeping of import and export of paints and other hazardous chemicals and items in the country.
- Full and effective implementation of the GHS system in import and export.
- Regulate pricing and billing malpractices at the industry, dealers, and retailer's level.

f) Ministry of Health and Population (MOHP), Department of Health Services (DoHS) and Nepal Paediatricts Society of Nepal.

- Envision national Blood Lead Level (BLL) screening policy and program for all Nepalese children.
- Establish fully functional infrastructures including laboratory, human resources and allocation of enough annual budget for BLL testing in each provinces.
- Carry out the researches/bio monitoring on lead and other chemical contamination in vulnerable groups of people, workers and communities and make result public.
- Mass public awareness about health impact of lead toxicity and other hazardous chemicals etc.

5.2 Paint Industry, Nepal Paint Manufacturers Associations, and Chamber of Commerce Organizations

- Effectively comply with the 90 ppm standard of lead in the paint during the paint manufacturing stage by discontinuing the use of leaded driers, leaded pigments, leaded fillers, and other purposes in paint formulations and shift with non-lead substitutes.
- Have a strong cooperation mechanism between manufacturing industries regarding technical support to remove lead from their

paint production and supply chain.

- Commit to a third-party certification and labeling program to ensure that all paints sold in the market meet the regulatory standard of 90 ppm and to help customers distinguish between safe paints and those that are not.
- Provide training on ways to minimize exposure when re-painting and other work involving surfaces previously painted with leaded paints.
- Provide information to paint dealers and retailers on lead hazards that can be distributed to customers.
- Ensure the periodical health checkup and full personal protective equipment to all workers at paint production and handling units.
- Regulate and check pricing and billing malpractices at the industry, dealers, and retailer levels.
- Make uniform labeling about lead-free or no added lead paints. Place all the labeling on each paint can for all types of awarded certified paints.

5.3 Paints Dealers, Retailers, and Their Associations

- Only import, sale and distribute paints complying with the government mandatory standard of 90 ppm lead in paints.
- Ensure all the pains can bear the proper labeling of lead content, lead-related precautionary information, date of manufactures, and pricing as per the gazette notification.
- Issue the original VAT bills only for each product sold.
- Educate consumers, painters, and the general public about lead and its impacts.

5.4 Consumers

- Check the labeling on paint products when purchasing a paint to ensure that they are low lead paints.
- Inform the concerned government agencies about the availability of paint without a logo and information about lead and other chemicals on the market shelf.
- Keep all the receipts of paint purchased to realize the compensation if something goes wrong from the use of such paints.
- Get their children tested for blood lead level and practice hygienic practices at home and schools.

5.5. Awareness Raising

- Government must inform every concerning other government agency, paint companies, importers, dealers, retailers, and the general public about the enacted mandatory standard of 90 ppm of lead in paint and labeling provision.
- Government must disseminate information about childhood lead poisoning in communities and occupationally vulnerable painters and paints industries' workers to make everyone aware of lead poisoning, lead content in paints, and its consequences for human health as well as the environment.
- All the government bodies, organizations, stakeholders, and parents must cooperate and join hands to raise awareness among the public about childhood health and occupational health risks linked with lead paints and lead dust.
- Government agencies, as well as non-governmental organizations, must study lead in paints and disseminate the results on regular basis.
- Lead poisoning-related issues and prevention measures must be included in the school or college level course syllabus to educate students from an early level.
- Media personals and modeling agencies must educate their staff before producing and publishing the advertisement of paints regarding the ingredients used in the product.
- Doctors and other health professionals especially pediatricians' must be aware of lead poisoning and educated about the ways to minimize exposure from surfaces previously coated with lead paints.

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Figure 18: StudyTeam: Mr. Ram Charitra Sah, Ms. Deena Parjapati, and Ms. Sachita Banmala

APPENDICES

Table 8: Details Province-wise Paint Sampling log with their lead content test results.

Provinces	Sample ID	Place of Purchase	Company name	Brand name	Color	Quantity (Liter)	Batch number	MFD. date	Lead-free (Y/N)	NS Mark (Y/N)	Lead Content (ppm)	Times >90
Province Number 1	NPL 7	Dharan Road Biratnagar	Reliance Paints Industries Pvt. Ltd, Jorpati, Kathmandu, Nepal	Sangri-La	PO Red	0.5	Aug-20	8/8/2077	yes	Yes	15.98	0.2
	NPL 8	Dharan Road Biratnagar	Reliance Paints Industries Pvt. Ltd, Jorpati, Kathmandu, Nepal	Sangri-La	Golden Yellow	0.5	Aug-25	8/17/2077	Yes	Yes	37.18	0.4
	NPL 9	Dharan Road Brt2	Pashupati Paints Pvt. Ltd, Biratnagar	Danfe	Golden Yellow	0.5	J01420	10/1/2020		Yes	ND	
	NPL 10	Dharan Road Brt2	Pashupati Paints Pvt. Ltd, Biratnagar	Danfe	PO Red	0.5	I02120	Sep-20		yes	ND	
	NPL 11	Biratnagar	KNP Japan Pvt. Ltd, Adarshanagar-13, Birgunj Nepal	Goldlac	Black	1	3017286	7/3/2077	yes		ND	
	NPL 12	Biratnagar	KNP Japan Pvt. Ltd, Adarshanagar-13, Birgunj Nepal	Goldlac	Phiroza	0.5	3027022	7/23/2077	yes		ND	
	NPL 13	Biratnagar	AkzoNobel India Ltd, Kolkata, India	Dulux	Dark Brown	0.5	BX H0810131	Feb-21	yes		ND	
	NPL 14	Biratnagar	AkzoNobel India Ltd, Kolkata, India	Dulux	Black	0.5	BX H08044022	Oct-20	yes		28.61	0.3
	NPL 15	Dhankuta	Pashupati Paints Pvt. Ltd, Biratnagar	Danfe	Orange	0.5	K00718	Nov. 2018		Yes	221.1	2.5
	NPL 16	Dhankuta	Berger Jenson and Nicholson (Nepal) Pvt Ltd, Byansi tole, Bhaktapur	Umbrella	Gulf Red	0.5	H-0075	Aug-18	yes	Yes	ND	
	NPL 17	Dhankuta	Baba Paints Pvt. Ltd, Sonapur, Sunsari, Nepal	Baba	White	0.5	290576	Sep-19		yes	728.35	8.1
	NPL 18	Dhankuta	American Paints Pvt. Ltd, Bharatpur-5, Chitwan, Nepal	Cheery	Phirozi	0.5	AP2543	Dec-20			402.66	4.5
	NPL 29	Biratnagar	Suryodaya Paints Nepal Pvt Ltd, Chitwan, Nepal	SPN Marco	Golden Yellow	0.5	314	5/14/2077			ND	
	NPL 30	Biratnagar	Surya Paints Pvt Ltd, Chitwan, Nepal	Marco	Signal Red	0.5	61	2/9/2076			ND	

Provinces	Sample ID	Place of Purchase	Company name	Brand name	Color	Quantity (Liter)	Batch number	MFD. date	Lead-free (Y/N)	NS Mark (Y/N)	Lead Content (ppm)	Times >90
Province Number 2	NPL 1	Bhardaha, Saptami	Manjari Paints, Ithari-12, Sunsari	SMART	White	1	238	7/2/2077			2335.33	25.9
	NPL 2	Bhardaha, Saptari	Manjari Paints, Ithari-12, Sunsari	SMART	Golden Yellow	0.5	143	6/12/2077			22850.17	253.9
	NPL 3	Bhardaha, Saptami	Manjiro Paints, Ithari-12, Sunsari	SMART	Deep Orange	0.5	216	6/26/2077			15316.55	170.2
	NPL 4	Bhardaha, Saptami	Tara Paints and chemical industry, Birgunj, Parsa, Nepal	Renew	Golden Yellow	0.5	GGYEW 01B5Y76	Aug-19	Yes		11880.57	132.0
	NPL 5	Bhardaha, Saptami	Tara Paints and chemical industry, Birgunj, Parsa, Nepal	Renew	Sky Blue	0.5	GPW01P9Y77	Nov-20			689.85	7.7
	NPL 6	Bhardaha, Saptami	Tara Paints and chemical industry, Birgunj, Parsa, Nepal	Renew	Signal Red	0.5	AP02M12Y75	Bar code	yes		15273.42	169.7
	NPL 19	Birgunj	Jain Paints and Chemicals, Delhi, India	Timex	Phiroza	1	3	Jul-20			3826.56	42.5
	NPL 20	Birgunj	Dalmia Paints and Chemicals industries, Birgunj, Nepal	Dalmia	PO Red	1	12323	Oct 2020			11972.74	133.0
	NPL 21	Birgunj	Rico Paints and chemical Industries, Birgunj, Nepal	Raunak	Oxford Blue	0.5	761035	Oct-20			48.25	0.5
	NPL 22	Simara	Himal Home care, Biratnagar	Sunlight	Black	0.5	1107	6/16/2077			942.68	10.5
	NPL 23	Simara	Tara Paints & Chemical industries, Bara, Nepal	Tara gold	Leaf brown	0.5	PLB01P9Y77	Oct-20			15057.37	167.3
	NPL 31	Janakpur	Apollo Paints Pvt Ltd, Chitwan, Nepal	Apollo GP	PO Red	0.5	6434	11/8/2076	yes	yes	ND	
	NPL 32	Janakpur	Asian Paints Nepal Pvt Ltd, Hetauda, Nepal	Tractor	PO Red	0.5	1P30072003	2020/07	yes		110.8	1.2
	NPL 33	Janakpur	Berger Jenson and Nicholson (Nepal) Pvt Ltd, Byansi tole, Bhaktapur	Brolac	PO Red	0.5	905/4209	Nov-20		yes	469.57	5.2

Provinces	Sample ID	Place of Purchase	Company name	Brand name	Color	Quantity (Liter)	Batch number	MFD. date	Lead-free (Y/N)	NS Mark (Y/N)	Lead Content (ppm)	Times >90
Bagmati Province	NPL 24	Hetauda	Fashion Paints Pvt Ltd. Hetauda, Makwanpur	Fashion	PO Red	0.5	1972	2076/09	yes		ND	
	NPL 25	Hetauda	Fashion Paints Pvt Ltd. Hetauda, Makwanpur	Fashion	Black	0.5	1983	2076/20	yes		ND	
	NPL 26	Hetauda	Fashion Paints Pvt Ltd. Hetauda, Makwanpur	Fashion	Golden Yellow	0.5	1964	2076/09	yes		75.96	0.8
	NPL 27	Hetauda	Fashion Paints Pvt Ltd. Hetauda, Makwanpur	Fashion	Bus Green	0.5	1719	2076/06	yes		42.77	0.5
	NPL 28	Hetauda	Biraj Paints Pvt Ltd., Chitwan, Nepal	B-Eden	PO Red	0.5	131	Mar-21			4968.74	55.2
	NPL 34	Thimi	Yeti Paints Nepal Pvt Ltd, Hetauda, Nepal	Yeti	Leaf Brown	0.5	52923	2077/09			392.5	4.4
	NPL 35	Bhaktapur	Mahalaxmi paints, Bhaktapur	Color lite	Blue	0.5	760224	5/1/2019			ND	
	NPL 36	Patan, Lalitpur	Indigo Paints Pvt Ltd, Tarkeshwor-9, Kathmandu, Nepal	Maya	Golden Yellow	0.5	yes, not clear	2077	Yes		44.63	0.5
	NPL 37	Lagankhel, Lalitpur	Nepal Paint industries Pvt Ltd, Bhaktapur, Nepal	Starlite	Phiroza	0.5	9208	Oct-20			394.28	4.4
	NPL 38	Lagankhel, Lalitpur	Nepal Paint industries Pvt Ltd, Bhaktapur, Nepal	Swallow	Signal red	0.5	7341	Sep-19			ND	
	NPL 39	Babarmahal Kathmandu	Jenish Paints and chemicals, Kathmandu, Nepal	Rainbow	Black	0.5	210611-232	2078/02			97.87	1.1
	NPL 40	Soltimode, Kathmandu	ICI Dulux Paints, USA	Super	Golden Yellow	1	bar code	2236733150			ND	
	NPL 41	Soltimode, Kathmandu	Taveepaibul Co. Ltd, Thailand	Compac	PO Red	0.5	529-634	76/7			37.34	0.4
	NPL 42	Bharatpur, Chitwan	Jasmine Paints Pvt Ltd, Chitwan, Nepal	Quitelite	Golden Yellow	0.5	239	20-Nov-17			14086.00	156.5
	NPL 43	Bharatpur, Chitwan	Jasmine Paints Pvt Ltd, Chitwan, Nepal	Always	PO Red	0.5	2594	27-Apr-18		yes	2223.96	24.7
	NPL 44	Bharatpur, Chitwan	Jagannath group of industries Pvt Ltd, Bharatpur-16, Chitwan	Euro	PO Red	0.5	E226	3/18/2077	yes		ND	
	NPL 45	Imadol, Lalitpur	Surya Paints and chemical industries Pvt Ltd, Hetauda, Nepal	Syntec gleam	PO Red	1	CODE SYGLMPORD 21042311		yes		18.57	0.2
	NPL 52	Narayanghat, Chitwan	Tirupati Paints Pvt Ltd, Ratna Nagar-1 Chitwan	Ruby	Chocolate	0.5	430	8/21/2077		Yes	94.14	1.0

Provinces	Sample ID	Place of Purchase	Company name	Brand name	Color	Quantity (Liter)	Batch number	MFD. date	Lead-free (Y/N)	NS Mark (Y/N)	Lead Content (ppm)	Times >90
Lumbini Province	NPL 46	Nepalgunj, Banke	Ashirbad Paints Private Limited, Nepalgunj Industrial Estate-13-Banke, Nepal	Canvas	Black	0.5	4415	2077/12			84.15	0.9
	NPL 47	Nepalgunj, Banke	Ashirbad Paints Private Limited, Nepalgunj Industrial Estate-13-Banke, Nepal	Canvas	PO Red	0.5	4384	2077/12			563.65	6.3
	NPL 51	Butwal, Rupandehi	Tirupati Paints Pvt Ltd, Ratna Nagar-1 Chitwan	Ruby	Black	0.5	151	3/1/2078		Yes	30.66	0.3
	NPL 53	Butwal, Rupandehi	Everest Color Pvt. Ltd, Chitwan, Nepal	Jureli	Chocolate	0.5	KA07705058	10/21/2020	Yes		871.26	9.7
	NPL 54	Bardaghat Nawalparasi	Apollo Paints Pvt Ltd, Chitwan, Nepal	Apollo GP	Golden Yellow	0.5	6702	9/22/2077	Yes	Yes	649.8	7.2
Karnali Province	NPL 48	Birendranagar, Surkhet	Sarvottam Paint Industries Pvt. Ltd, Attaria-04, Kailali, Nepal	Sarvottam	Black	0.5	SPI210111-064	Jan-21			ND	
	NPL 49	Birendranagar, Surkhet	Sarvottam Paint Industries Pvt. Ltd, Attaria-04, Kailali, Nepal	Sarvottam	Golden Yellow	0.5	SPI 191123-014	Nov-19			2116.63	23.5
	NPL 50	Birendranagar, Surkhet	Tata Paints & Chemicals Industries Pvt Ltd, Chitwan, Nepal	Tata	Buss Green	0.5	319	5/9/2077	7 yr. Expiry		2018.04	22.4

Provinces	Sample ID	Place of Purchase	Company name	Brand name	Color	Quantity (Liter)	Batch number	MFD. date	Lead-free (Y/N)	NS Mark (Y/N)	Lead Content (ppm)	Times >90
Sudur Paschim Province	NPL 55	Dhangadhi	Ashoka paint and chemical industries, Birgunj, Parsa, Nepal	Apcolac	Golden Yellow	0.5	8602	Aug-20			5473.37	60.8
	NPL 56	Dhangadhi	Berger Jenson and Nicholson (Nepal) Pvt Ltd, Byansi tole, Bhaktapur	Umbrella	Buss green	0.5	905/4055	Nov-20	yes	yes	15.83	0.2
	NPL 57	Dhangadhi	Asian Paints Nepal Pvt Ltd, Hetauda, Nepal	Premium	Buss Green	0.5	1P07032103	2021/03		yes	ND	
Gandaki Province	NPL 58	Byas Municipality, Damauli	Asian Paints Nepal Pvt Ltd, Hetauda, Nepal	Premium	Phirozi	0.5	1P05022103	2021/02		Yes	23.45	0.3
	NPL 59	Byas Municipality, Damauli	Berger Jenson and Nicholson (Nepal) Pvt Ltd, Byansi tole, Bhaktapur	Brolac	Truck brown	0.5	910/3417	Dec-19	Yes	Yes	56.47	0.6
	NPL 60	Pokhara	Aratee paints Udhyog Pvt.Ltd, Industrial Estate, Pokhara	Mayur	Black	200ml	108	9/7/2020			112.22	1.2
	NPL 61	Pokhara	Aratee paints Udhyog Pvt.Ltd, Industrial Estate, Pokhara	Mayur	Phiroza	200ml	142	6/21/2021			ND	
	NPL 62	Pokhara	Aratee paints udhyog Pvt.Ltd, Industrial Estate, Pokhara	Mayur	PO red	200ml	108	11/5/2020			3899.76	43.3

खण्ड ६४ संख्या ३० नेपाल राजपत्र, भाग ५ मिति २०७१।५।७

सुचना ३

नेपाल सरकारले वातावरण संरक्षण नियमावली, २०५४ को नियम १५ ले दिएको अधिकार प्रयोग गरी यो सूचना प्रकाशन भएको मितिले १८१ औं दिनदेखि लागू हुने गरी नेपालमा आयात एवं उत्पादन हुने रङ्गहरूमा Lead को अधिकतम मात्रा Ninety (90) Part Per Million (ppm) वा Ninety (90) Milligram Per Liter (mg/L) हुनुपर्ने, बट्टामा Lead को मात्रा र व्यवसायजन्य सुरक्षासम्बन्धी सावधानी मूलक सन्देश समेत उल्लेख गर्नुपर्ने गरी मापदण्ड तोकेकोले यो सूचना प्रकाशन गरिएको छ ।

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2015 March 15 Sunday
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नेपाल सरकार
शिक्षा मन्त्रालय
शिक्षा विभाग

विद्यालय शिक्षासम्बन्धी गतिविधि-१३१

घर तथा विद्यालय पूर्वाधारहरु रङ्गाउँदा नेपाल सरकारद्वारा तोकिएको लेडको मापदण्ड ९० पि.पि.एम. अनुसारको रङ्गहरु मात्र प्रयोग गरौं ।

सबै उमेरका मानिसहरू एवं खासगरी बालबालिकाहरू लेड (सिसा) को सम्पर्कमा आएको खण्डमा पढ्ने लेख्ने क्षमता घट्न सक्ने, आनीबानी तथा हाउभाउमा परिवर्तन आउने, स्नायू प्रणाली, प्रजनन् प्रणालीमा गडबडी, मानसिक सन्तुलन बिग्रन सक्ने, आदि हुनसक्दछ । लेडले बालबालिकाको शारीरिक, मानसिक तथा बौद्धिक विकासमा निकै नकारात्मक प्रभाव पुऱ्याउँदछ । सर्वसाधारणको घर तथा विद्यालय भवन, फर्निचर, खेलौना, खेलसामग्री, खेलमैदान तथा अन्य भौतिक पूर्वाधारहरू रङ्गाउने रङ्गहरूमा पाइने लेड (सिसा) को असरलाई न्यूनीकरण गर्नका निम्ति नेपाल सरकारद्वारा रङ्गमा लेडको मापदण्ड ९० पि.पि.एम. तोकिएको हुँदा सम्पूर्ण सामुदायिक तथा संस्थागत विद्यालयहरूले बजारमा उपलब्ध लेड नमिसाइएको रङ्गहरू मात्र खरिद गरी प्रयोग गर्नु गराउनु हुन सबै सरोकारवालाको जानकारीको लागि यो सूचना प्रकाशन गरिएको छ ।

GLOBAL ALLIANCE TO ELIMINATE LEAD PAINT
unep.org/noleadinpaint

सिसा मुक्त बालबालिका
स्वस्थ्य भविष्यका लागि

BAN LEAD PAINT

24–30 October 2021

Learn the Risks

Join the Action

International Lead Poisoning Prevention Week

Celebration in Nepal

Eliminate Lead Paint

#BanLeadPaint

#ILPPW2021

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