



Toxics Link
for a toxics-free world

LIVING DANGEROUSLY

The Kolkata Hotspots





The background is a dark, almost black, textured surface. On the left side, there is a vertical metal rod or pipe, showing signs of rust and wear. The rod has some bolts or fasteners attached to it. The overall tone is gritty and industrial.

LIVING DANGEROUSLY

T h e K o l k a t a H o t s p o t s

About Toxics Link

Toxics Link emerged from a need to establish a mechanism for disseminating credible information about toxics in India, and for raising the level of the debate on these issues. The goal was to develop an information exchange and support organisation that would use research and advocacy in strengthening campaigns against toxics pollution, help push industries towards cleaner production and link groups working on toxics and waste issues.

Toxics Link has unique experience in the areas of hazardous, medical and municipal wastes, as well as in specific issues such as the international waste trade and the emerging issues of pesticides and POP's. It has implemented various best practices models based on pilot projects in some of these areas. It is responding to demands upon it to share the experiences of these projects, upscale some of them and to apply past experience to larger and more significant campaigns.

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FOR FURTHER INFORMATION:

Toxics Link

H-2, Jungpura Extension

New Delhi – 110014

Phone: +91-(11)-24328006, 24320711

Fax: +91-(11)-24321747

Email: info@toxicslink.org

Web: www.toxicslink.org

Study and Report Supervision: Priti Banthia Mahesh

Research Team: Monalisa Datta, Mondipa Barman, Soumik Manna

FOREWORD

India is witnessing rapid pace of urbanization and significant migration of population to cities and towns. Cities today are visualized as nucleus of growth and land of opportunities, drawing people from rural areas into urban centers in hope of better lifestyle, employability, education, healthcare and other benefits. UN figures suggest that 32% of Indian population now live in cities and towns and this is likely to further increase. This pace of urbanization and migration places enormous pressure on cities infrastructure, resulting in unsustainable use of urban spaces- leading to human settlements in slums and ghettos and industrial activities & processes that have serious consequences on the cities' environment. The air quality index from various cities in India clearly indicates this trend of environmental degradation in our urban spaces.

The land use pattern in the cities has also got completely muddled up, with mushrooming of clusters that are hubs of hazardous industrial processes in and around residential areas. Many of these units may not have the requisite permission to undertake such hazardous process but operate in full glare of authorities. The issue of multiplicity of authorities creates further confusion and there is reluctance in initiating action against such activities. The local population is perhaps left with no option but to accept this as fate accompli.

It is worrying that the regulatory and civic authorities have not acted to control such mushrooming and have allowed the situation to worsen over the years. The environmental and health damage due to such clusters is serious and needs immediate attention and action. Hence it becomes critical to identify and document the areas where such activities flourish and also initiate measures to reduce the pollution loads in the city. Our earlier effort to document probable 'Hotspots' in Delhi met with an encouraging response, with not just environmentalists understanding the gravity of the situation, but also regulatory agencies and common people taking note of it. It gave us the impetus to look at other cities and carry on our attempts to identify such high risk areas and also push stakeholders to make efforts to mitigate them.

This study in city of Kolkata has made earnest attempt to document the hubs of such polluting activity in the city. The process of documentation is through visit to sites, observing material flows and processes with a perspective of environmental impacts and occupational safety and interaction with workers and residents. The report identifies such Hotspots of the city and the magnitude of the problem associated with these clusters and is expected to be of use to the regulators, civic authorities and communities. The current trend of increasing pollution loads in cities will need to be arrested and reversed and hope this study is a step in that direction.

Satish Sinha
Associate Director

ACKNOWLEDGEMENTS

During the research and the report preparation, we have received help from many quarters and we take this opportunity to thank all of them.

We are grateful to the people from all the identified areas for their cooperation by sharing site information with us.

We would like to thank Mr. Ravi Agarwal, Director, Toxics Link for his continued guidance and support. We would like to thank Mr. Satish Sinha, Associate Director, Toxics Link who guided us through the entire research process and helped us in shaping the report.

We express our sincere thanks to Swedish Society for Nature Conservation (SSNC) for their support towards this study.

We would also like to extend special thanks to Aastha Elawadhi for helping us in editing and designing the report. Our sincere thanks are also to all team members of Toxics Link for their valuable inputs and suggestions.

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ABBREVIATIONS

BMW	Bio Medical Waste
BOD	Biochemical Oxygen Demand
CESC	Calcutta Electrical Supply Corporation
CNCNI	Chitaranjan National Cancer Institute
CSE	Centre for Science and Environment
COD	Chemical Oxygen Demand
CPCB	Central Pollution Control Board
EKW	East Kolkata Wetlands
EKWMA	East Kolkata Wetlands Management Authority
ETPs	Effluent Treatment Plants
HMA	Howrah Municipal Corporation
KMA	Kolkata Metropolitan Area
KMC	Kolkata Municipal Corporation
KMDA	Kolkata Metropolitan Development Authority
LABs	Lead Acid Batteries
MSW	Municipal Solid Waste
OH&S	Occupational Health and Safety
Pb	Lead
PPE	Personal Protection Equipment
PVC	Poly Vinyl Chloride
SAFE	South Asia Forum for Environment
SPM	Suspended Particular Matter
SSI	Small Scale Industries
TDS	Total Dissolved Solids
WBPCB	West Bengal Pollution Control Board
WBSIDC	West Bengal Small Industries Development Corporation
WHO	World Health Organisation

1 Introduction

Environmental pollution has no boundaries since the ramifications are not just at the spot of pollution but spread to other areas have a chain effect and impact life greatly. The World Health Organisation (WHO) estimates that about a quarter of the diseases facing mankind today occur due to prolonged exposure to environmental pollution.¹ Most of these environment related diseases are, however, not easily detected since they may be acquired during childhood with symptoms being visible in adulthood. The impact of such exposure takes a long time to manifest itself and in developing countries like India, where there is little work and focuses on these issues, the links are often ignored.

Industrial development has been rampant in the past few years, most of the time there is noncompliance with environmental standards causing high levels of pollution all over the globe. Contaminants can take a variety of forms and may impact human beings, flora and fauna, property, heritage buildings and assets, etc., in different ways. For example, leaching of contaminants into the water through runoff not only affects the aquatic system but also pollutes drinking water. Some contaminants may also create explosions leading to hazards or be corrosive to building material. The mode of exposure to contaminants may vary depending on the type of pollutant and its carrier. For example impact could be because of inhalation of volatile or poisonous fumes, contamination of drinking groundwater by effluents discharged from industries etc.

Industrial growth in India saw the expansion of manufacturing industries like chemical, steel, automobile, food and beverages etc., over the past three decades providing scope for employment as well as economic growth. Unfortunately, in a bid to make strides in socio-economic growth on priority, environmental impact assessments and compliances took a back seat. The consequences

¹ Environmental Pollution and Impacts on Public Health - United Nations Environment Programme

of industrial growth on the environment were not fully understood due to lack of knowledge and expertise. Hence planning for sustainable growth was a challenge. For example, Small Scale Industries (SSI) that exist and operate without permissions in the country often defy prescribed environmental standards, making this a critical issue. Further to this, industrial pollution in India significantly impacts the health of the poorest communities, especially that of women and children. To add to this, industrial pollution is a huge waste burden and its impact on the environment and people is immense, especially in urban centres which are seeing an influx of migrants. With informal recycling operations, for which there are no checks, taking care of the majority of waste, recycling processes and standards are big concerns.

Over time, this negligence and resulting contamination end up creating Hotspots. Hotspots are considered delicate areas not only for the environment but also for public health as they have adverse impacts on health. Therefore, they require identification, periodic remediation and continuous monitoring. Further, over the years capacities of various institutions have been built and there is better understanding and recognition of the environmental impacts, however, huge gaps still remain. Going by the lax implementation of environmental standards and huge non-licensed operations (production and recycling), there is a huge possibility of high-risk areas and Hotspots, developing in India but very few studies have been done to identify and manage them in a proper way.

To identify and assess the threat, it is important to identify the sites of environmental Hotspots and document the activities in the area, from the past and in present times. A study was undertaken to document such probable Hotspots in Delhi last year and is the foundation for the study completed in Kolkata. Guidance was taken from the study report "On the Edge: Potential Hotspots in Delhi" published by Toxics Link in year 2014 to conduct the study in Kolkata effectively.

Kolkata is one of the largest metropolitan cities in India and the capital of the State of West Bengal, located on the east bank of the Hooghly River. As of 2011 National Census, the city has 4.5 million residents. The urban agglomeration comprising of the city and its suburbs, is home to approximately 14.1 million, making it the third-most populous metropolitan area in India. Being the state capital and a commercial hub of the eastern region, the city attracts people from all parts of the country, especially of east & north-east India. A sizable portion of Kolkata population is formed by migrants.

Migrants come to Kolkata in search of employment and education opportunities and become permanent resident of the city. Thus the city is facing unsustainable influx of migrants. A consequence of such migration is poverty which is pushing many unemployed people to turn to informal businesses to eke out a living, some of which are detrimental to health and the environment. Due to the increasing number of rural migrants (who end up as a cheap labour force) and availability of land in neighbouring districts, informal businesses have mushroomed in and around the city. They are unaccounted in industrial data and as a consequence of inadequate surveillance, have no environmental standards in place.

Depending upon the pollution potential, the West Bengal Pollution Control Board (WBPCB) has classified the industrial units into three different categories: Red, Orange and Green. Under the current siting policy of WBPCB, the Red industries are not permitted in Kolkata Metropolitan Area (KMA) areas, and Orange industries are not permitted in Kolkata Municipal Corporation (KMC) and Howrah Municipal Corporation (HMC) areas, excepting the industrial estates of KMC and HMC. The policy ensures that compliance to environmental standards is attained through negotiated agreements and technical guidance. However, even now, thousands of small, micro and medium polluting enterprises, recycling units, coming under Red & Orange category industries along with unorganized markets are operating within the city and its nearby areas violating the above mentioned industrial policy. Many of the polluting industries are either located in unauthorized or residential or village areas which are very difficult to track down and the overall situation is of high concern in terms of ways and means for protecting the city's environment and safeguarding human health by reducing/ eliminating risks and their causes.

2 Objective & Methodology

Kolkata is a mix of high technology industrial development along with an extensive informal sector. These burgeoning industries and non-licensed units have made Kolkata one of the most polluted cities in India. In spite of the WBPCB's industrial siting policy, banned industries still exist and function within KMC and its surrounding areas which are not designated as industrial estate. It is, therefore, important to understand and document such operations and the affected areas. Given that there is need to understand risks to environment and health in Hotspots and mitigation measures thereof, following are the objectives and methodology designed for the purpose.

2.1 Objective

Though there have been studies to document water or air pollution in the city, there have hardly been any studies to identify pockets which have hazardous activities or activities which may lead to contamination. This study focuses on identifying such high-risk areas or Hotspots. For the purpose of this study, Hotspots are defined as areas with a long history of industrial production or activities which might lead to contamination of the soil, air and water of the site in the near future.

The aim of this report is to identify potential environmental Hotspots in Kolkata, provide basic information about the processes there, and provide information which could be used to initiate projects for developing more detailed studies and help address this issue in the future.

The main objectives of the study are as follows:

- Identifying the possible high-risk areas or Hotspots in Kolkata.
- Preliminary assessment of these sites, identifying needs and setting the priorities for future policy.

2.2 Methodology

Kolkata has 14 identified industrial areas in which various kinds of industries are given space to operate. Apart from these, there are multiple unauthorized areas in Kolkata and its nearby areas where industries, including polluting & banned ones, still persist and operations continue without hindrance. Industries in this sector are scattered and hidden, so getting information about them is very difficult.

Some of these informal units are also located in the notified industrial areas. But the industrial area associations were not always forthcoming about giving information regarding these operations. Hence, a systematic methodology had to be followed to identify the high-risk areas in Kolkata as part of this study. Guidance was taken from the study report "On the Edge: Potential Hotspots in Delhi" published by Toxics Link in year 2014 to conduct the study in Kolkata effectively.

The methodology comprises of the following steps:

- Literature review
- Field Study

2.2.1 Literature Review

A literature review is the most important part of any research. It helps identification of issues related to the study, which can be validated by collection of data. Hence, a review of existing studies and data on high-risk areas or contaminated sites, industrial processes that can lead to contamination etc. was undertaken to understand problems and areas of concern in connection with Hotspots.

Although various studies relating to Kolkata was reviewed, there was hardly any historical data on risks due to pollution or areas marked as Hotspots in Kolkata.

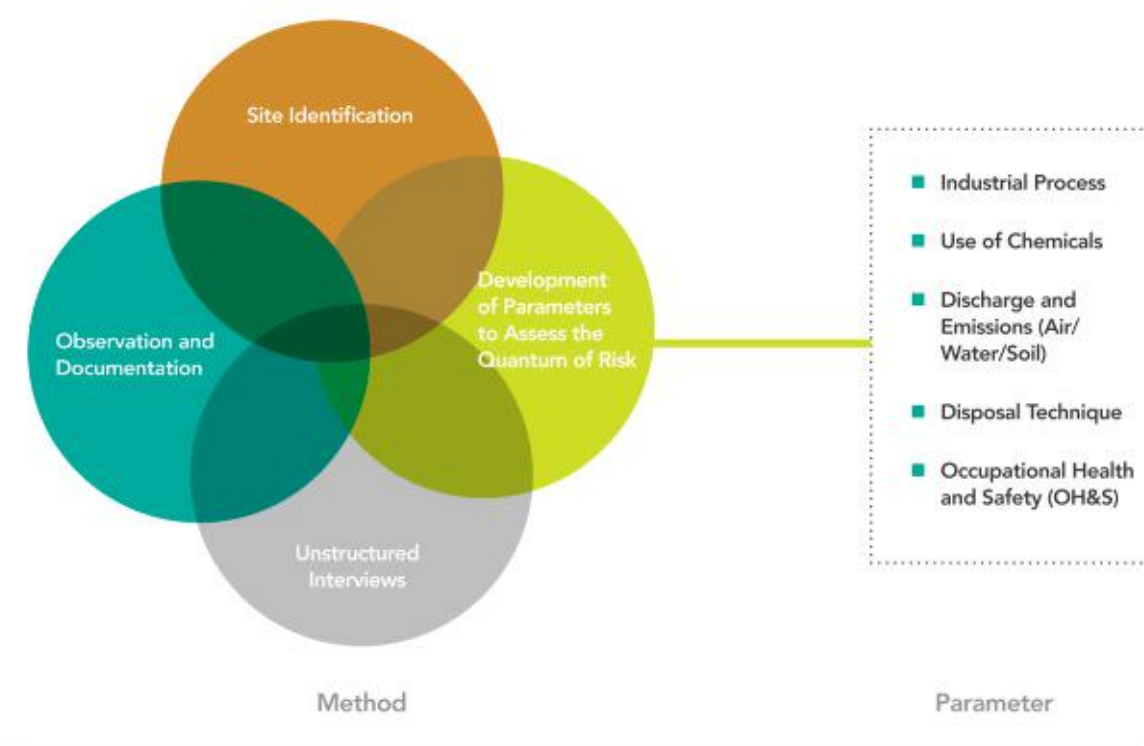
2.2.2 Field Study

To identify possible areas under risk it was essential to conduct field visits to the sites. Unstructured interview schedules were used as tools for capturing relevant information from industrial units and local residents of the place. Data for preparation of the report was collected from site visits, meetings, and contact with various government and non-government institutions; from the projects carried out in these areas, as well as from public enterprises that manage these areas. The field visit had the following components.

Details of the methodology for the field study are as described below:

1. **Site Identification:** For this particular study, 30 sites were identified as prospective Hotspots based on the kind of activities/operations happening there currently or historically. Identification was done with the help of literature review, information obtained from various reports of WBPCB (see References). These sites are scattered throughout the city and were evaluated according to the parameters identified by the team.

FIGURE 1.1: FIELD STUDY METHODOLOGY



2. **Development of Parameters to Assess the Quantum of Risk:** Industrial activity significantly contributes to development and economic growth, however, such activity also has the potential to degrade the environment if non-compliant to safe environment norms. Environmental degradation occurs not only due to large industries and factories but also small-scale, unauthorized units, which exist in abundance. Such units are largely unmonitored by the government, and they do not follow any safety norms, thus causing tremendous damage to the environment.

The following parameters were considered for this study-

- Industrial Process:** To identify different types of industrial activities or processes happening in different industrial clusters, so that we can get an idea about the possible environmental and health issues that may arise.
 - Use of Chemicals:** Different processes use different kinds of chemicals. Some may be toxic and hazardous in nature. Hence, it is essential to identify such chemicals and their end disposal in these areas.
 - Discharge and Emissions (Air/Water/Soil):** This is a vital parameter which would decide the contamination level of an industrial cluster or areas with industrial activity. Understanding the possible emissions or discharges during the process is important when we are looking at high-risk areas and also helps to determine if there are any measures taken to mitigate these.
 - Disposal Technique:** Waste and chemical disposal remains a big cause for contamination in India. Hence it is important to look at this as a parameter to identify possible Hotspots.
 - Occupational Health and Safety (OH&S):** Occupational safety is a neglected area in India, not just in the unorganized but also in the organized industry, especially in small and medium-scale industries. Workers in factories and small units are in direct contact with chemicals and contaminants on a daily basis and at a great risk of exposure.
- iii) **Unstructured Interviews:** A site inspection plan was made and visits were made to these sites. One-to-one interviews with local workers and residents helped us find information and build knowledge about

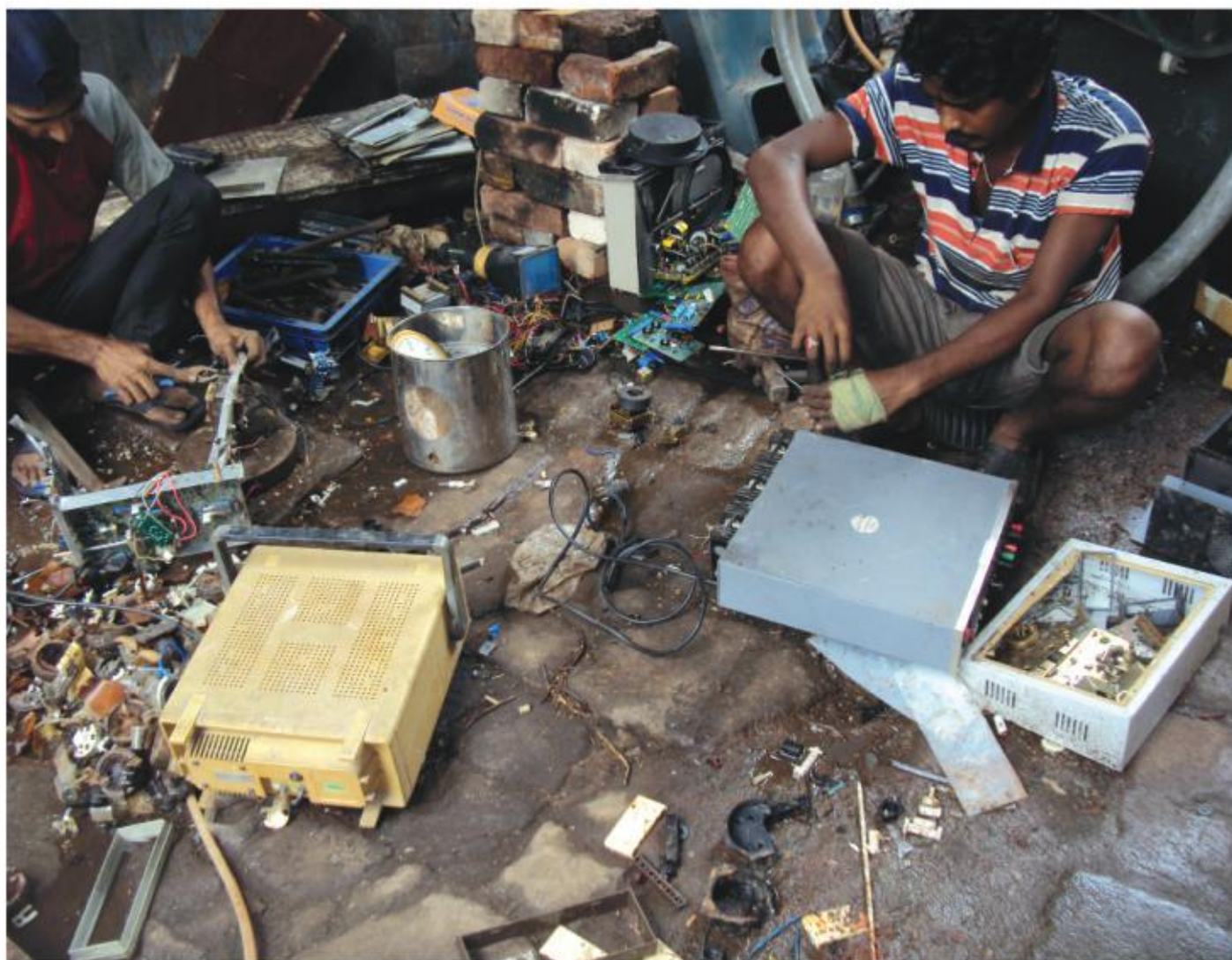
the area. Leads from the interviews helped to identify various units and areas and these leads were followed. Some units in each area were visited to understand industrial practices and processes.

- iv) Observation and Documentation: It was quite difficult to get information from workers at the sites as they were not very forthcoming. Photography was not allowed in most places. Information was gathered mostly by observing and talking to workers, people living around the area and residents.

2.3 Limitations of the Study

There were various challenges faced during the study. Of these, the most prominent one was to study operational industrial units which do not have no licenses or permissions and their activities. As in unauthorized industrial units their operations are illegal, even finding their location is extremely challenging. Moreover, collecting information from workers at the units regarding their operations, productions, source of material, and the value chain is difficult as they are not very cooperative.

Even formal industrial plants and units were conservative with regard to sharing any information or allowing the study team to view their operations. Also, there were limitations to the number of sites which could be visited during the study. The team shortlisted the sites based on secondary research and prior experience and hence it is a possibility that some sites may have been missed. This study also did not have provisions for testing air, water and soil for possible contamination.



3 Profile of Kolkata

The current section is a detailed description of the City of Kolkata. Although it is known as the City of Joy it is also marked by a high influx of migrants, poverty, increase in number of people involved in the unorganized sector and of course the environmental Hotspots.

3.1 The Area and Location

The capital city of the State of West Bengal, Kolkata is located in the eastern part of India.

KMC area falls between north latitudes of 22 degree 28' 00" and 22 degree 37' 30" and east longitudes 88 degree 17' 30" and 88 degree 25' 00". The city is near sea level, with the average elevation being 17 feet. It has spread linearly along the east bank of the Hooghly River. The whole area is within the lower Ganges Delta of eastern India and is monotonously plain. The Bay of Bengal coastline is about 60 miles to the south. The Sundarbans National Park starts within 100 km south to the city. The east–west dimension of the city is comparatively narrow, stretching from the Hooghly River in the west to roughly the Eastern Metropolitan Bypass in the east— a span of 9–10 km (5.6–6.2 mi). The north–south distance is greater, and its axis is used to section the city into North, Central, and South Kolkata.

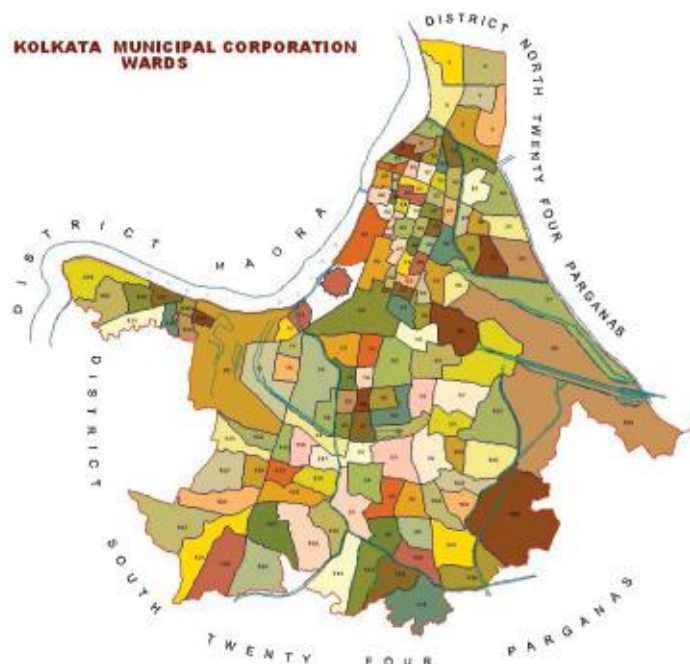
Another ancillary civic body is the Kolkata Metropolitan Development Authority (KMDA) responsible for the statutory planning and development of the Kolkata Metropolitan Area (KMA).

Urban structure

The KMA spread over 1,886.67 sq. km comprises of 3 municipal corporations (including Kolkata Municipal Corporation), 39 local municipalities and 24 panchayat Samities, as of 2011. The urban agglomeration

encompassed 72 cities and 527 towns and villages, as of 2006. KMA incorporates parts of the following districts: North 24 Parganas, South 24 Parganas, Howrah, Hooghly, and Nadia.

FIG 3.1: MAP SHOWING KMC BOUNDARIES



Kolkata, which is under the jurisdiction of the KMC, has an area of 187.33 sq. km and is divided into 141 wards and 15 numbers of borough. As of 2011 National Census, the city has 4.5 million residents; the urban agglomeration, which comprises the city and its suburbs, is home to approximately 14.1 million, making it the third-most populous metropolitan area in India.

3.2 Geology

Most of the city was originally a marshy wetland that was reclaimed over the decades to accommodate a burgeoning population. The remaining undeveloped areas, which can still be found especially towards the eastern parts of the city, known as the East Kolkata Wetlands, were designated a "wetland of international importance" by the Ramsar Convention (1975).

Human habitation has led to the establishment of mature trees and shrubs. The original marshland has been changed to a primarily moist deciduous habitat which flourishes under the high rainfall and sunny humid climate. As in most of the Indo-Gangetic plain, the soil type is predominantly alluvial.

Kolkata is located over the "Bengal basin", a peri-cratonic tertiary basin and according to the Bureau of Indian Standards, on a scale ranging from I to V in order of increasing susceptibility to earthquakes, the city lies inside seismic zone III.

City water supply is dependent on both surface water source from the river Hooghly and ground water sources. The river Hooghly is the main source of water supply for Kolkata. Several canals like Bagjola Khal in the north Circular Khal in the central part and Adi-Ganga (a paleo channel) & Talli nala in the southern part cover a large area of the city.

Land use under Kolkata Municipal Corporation is predominantly for urban development.

3.3 History of Environmental Pollution

Pollution is a major concern in Kolkata because of the rising levels of pollutants day by day. There are many environmental issues in Kolkata, severely affecting its biophysical environment as well as putting at risk, the human health. Air pollution, water pollution, garbage, and pollution of the natural environment are prevalent in Kolkata. This poses as a threat to Kolkata and its citizens. The contamination levels of river Ganga is increasing day by day. But the concern is more critical due to polluting industries and hazardous activities in the city, especially in residential areas and those that are not identified as industrial areas.

Air Pollution: The main reason behind severe air pollution in the city is high volume of vehicles on roads and presence of industries (like jute mills, engineering, electrical, chemical, pharmaceutical, food & beverages etc.) around and near Kolkata. These industries release harmful gases in the atmosphere causing acid precipitate and other environmental problems in the city.

According to data released by the Scientific and Environmental Research Institute, atmospheric suspended particulate matter (SPM) in Kolkata was alarming making Kolkata the most polluted metropolitan city in India. Kolkata is followed respectively by Mumbai, Delhi and Chennai. The study conducted by Chittaranjan National Cancer Institute (CNCI) found that 70% of residents of Kolkata suffer from respiratory diseases, like lung cancer, dyspnea and asthma, caused by air pollution. According to the CNCI study, 18.4 cases of lung cancer per 100,000 people were reported from Kolkata.

Data collected by the Central Pollution Control Board (CPCB) indicates that Kolkata along with Delhi, is among the worst affected Indian cities when it comes to air pollution. From 2009 to 2011, the highest number of lung cancer cases in India were reported from Kolkata, Delhi and Mumbai. According to a report prepared by the Centre for Science and Environment (CSE), among the number of cancer cases reported between 2009 and 2011, the most frequent cases were of lung cancer with a share of 12%. In ranking of cities on air pollution the World Health Organization's (WHO) ranked Kolkata 25th among a total of 1100 cities².

Water Pollution: Water pollution is a major concern for Kolkata, especially for the river Ganga. The river Ganga is getting more and more contaminated day by day due to the discharge of industrial pollutants into the river. The Industries besides and around Kolkata use Ganga as a discharge for their liquid and solid wastes without treating the wastes properly and are then responsible for causing pollution in the city.

Further sewage and domestic wastes are also discharged into the River Ganga. The river is used as a source of discharging the wasteland wares of the city. A report released by the Federation of Consumer Associations (FCA) in 2003 found that much of the drinking water in Kolkata was polluted with human waste. According to this report, 87% of reservoirs supplying water to residential buildings were contaminated with human excrement. There were significant traces of fecal matter in 63% of faucets, and 20% of the water samples collected from various city hospitals were also found to be contaminated. The study reported that approximately one-fifth of the deep water wells and hand pumps operated by the Kolkata Municipal Corporation were polluted with human waste.³

Kolkata, India's third-largest city by population is also at risk of arsenic contamination. Of the 141 wards that the city is divided into, as many as 77 have "high levels" of arsenic in groundwater, shows a study by the School of Environmental Studies (SOES) of Jadavpur University.⁴

2 Source: http://www.telegraphindia.com/1131021/jsp/calcutta/story_17474042.jsp

3 Source: http://news.bbc.co.uk/2/hi/south_asia/3192957.stm

4 <http://article.sapub.org/10.5923.c.jje.201501.14.html>

Though scientists have yet not been able to establish how arsenic leaches out into the aquifers, the layers from which groundwater is extracted, there is enough evidence to show that prolonged water depletion raises the risk of contamination. The most threatened areas are those that are dependent on groundwater.

Industrial Pollution: Kolkata is home to many industrial units operated by large public and private-sector corporations. Major sectors include steel, heavy engineering, mining, minerals, cement, pharmaceuticals, food processing, leather processing, agriculture, electronics, IT & software, textiles, and jute. The rapid industrial expansion in West Bengal has given rise to significant pressure on the environment. The industrial units have now become a major point source of pollution.

For example, Tangra area of Kolkata was famous for its leather tanning industry. A Supreme Court order forced the tanneries to relocate to a self-contained leather-processing complex in the Bantala area under South 24 Parganas. This was in response to public interest litigation filed by environmentalists alleging that pollution from the industries exceeded the state pollution standards. However some tanneries still exist here to this day despite relocation orders. This region has a very high water table and several wetlands around the old tannery sites. The entire area is about half a dozen city blocks in size.

The Industries besides and around Kolkata release harmful gases in the atmosphere as well as discharge their liquid & solid wastes into the river without treating the wastes properly rising the pollution level of the city.

3.6 Industrial Units in Kolkata

As per the District Statistical Handbook of BAES & Economic Review, 2011-12, Government of West Bengal, Kolkata has 986 registered industrial units and 14 recognized industrial estates.⁵ The estimated average number of daily worker employed in small scale industries and employment in large and medium industries is almost same, near about 19500 in each sector. Most of the industrial estates were developed long back and over the years have deteriorated considerably in terms of physical infrastructure.

Industrial Categorization and Siting Policy of WBPCB: One of the major mandates of the West Bengal Pollution Control Board (WBPCB), is to reduce industrial emission or effluent generation, and to control the quality of the same within safe limits.

Therefore, depending upon their pollution potential, the WBPCB has classified the industrial units into three different categories: Red, Orange and Green. The Red category units have maximum pollution potential, the Orange category units have moderate pollution potential and the Green units have the least pollution potential. Further, considering the degree of pollution among the Red units, these are classified into Special Red and Ordinary Red categories. In addition, a few units under the Green category with no pollution potential are classified as Exempted category units. The policy ensures that compliance to environmental standards is attained through negotiated agreements and technical guidance. Under the current siting policy of the Board, the Red industries are not permitted in Kolkata Metropolitan Area (KMA) areas, and Orange industries are not permitted in Kolkata Municipal Corporation (KMC) and Howrah Municipal Corporation (HMC) areas, excepting the industrial estates of KMC and HMC.⁶

However, even now, thousands of small and medium polluting enterprises, recycling units, and coming under Red & Orange category industries as well as unorganized markets are operating within the city and its nearby areas violating the above mentioned industrial policy and this is a real concern in respect to protect the city's environment and human health.

5 *Brief industrial profile of Kolkata district West Bengal, MSME-Development Institute Kolkata, <http://dcmsme.gov.in/dips/kolkata.pdf>*

6 Source: <http://www.wbpcb.gov.in/pages/view/38/52-list-of-industries-under-special-red-category>



-  Industrial area
-  E-waste dismantling
-  Lead acid battery processing
-  Automobile workshops
-  Gold smelting
-  Landfill
-  Leather processing
-  Waste plastic processing
-  Lead Smelting
-  Smelting



4 Findings

This section reports on probable Hotspots within Kolkata city area & in adjacent parts of two bordered districts – South & North 24 Parganas, based on site visits, key findings and the perceived risks. The team visited each of these areas and tried to access the units carrying out the industrial activities. We also tried to speak to the unit owners, workers and the local populace to find out the risks and also to understand their perspectives.

4.1 Probable Hotspots in and around Kolkata

17 critical areas that can be labeled as probable Hotspots were identified. These include:

- Pyrabagan, Maniktala
- Topsia
- Picnic Garden
- Tangra –Tiljala –Topsia (Chamra Patti)
- Tangra-Kill Khana-Pangladanga
- Hazra- Ritchie Road
- Raja Bazar
- Khiddapore- Garden Reach-Metiabruz
- Cossipur- Chitpur
- Bowbazar (Nabin Chand Boral Lane)
- Mullick Bazar
- Jadubabur Bazar (JD Nath Road)



- Maniktala-Phool Bagan
- Taratola Industrial Estate
- Dhapa Landfills
- Mollar Bheri (North 24 Parganas)
- Chowbaga (South 24 Parganas)

Key findings, identified hazards and risks have been described for each of these sites in the following sections.

Pyarabagan, Maniktala (Battery Patti)

As the name “Battery Patti” suggests, the area is home to batteries- more specifically to dismantling units of lead acid batteries. This neighbourhood has been hub of illegal hazardous activities for close to 45-50 years, with some reports suggesting that there were more than hundred small or medium lead battery units operating on the stretch of Acharya Prafulla Chandra Road (Upper Circular Road) from Manicktala Crossing to Khanna Crossing till few years back. Though the numbers have come down in recent times, even today one can find more than 15 units processing lead batteries in this locality, also known as Pyarabagan. According to the unit owners, these units have trade licenses⁷ for the business. However, they were not willing to share if the license allows them to deal with old discarded lead acid batteries or not. In addition, they do not have any authorization from Pollution Control Board, as one of the owners shared.

Battery-breaking and lead-smelting is a very profitable business but a highly polluting one. The used batteries are broken down to extract the lead plates; this lead is then smelted and made into ingots to be sold to industry. The process of lead smelting is a primary source of air pollution.

A walk through the narrow lanes in this locality reveals many one-room workshops where men are dismantling lead acid batteries. The workers of some units are seen sitting on the road side or in the open space in front of the shops and breaking down the batteries. Workers, mainly male, dismantle the batteries using tools like screw drivers, hammer to remove lead plates and acid from it. Acid spillage during recovery is a common occurrence.



⁷ Trade License is a license issued by the municipal corporation which gives you permission to carry on the particular trade or business for which it is issued. It does not grant ownership of property or permission for any other activity than for which it is issued.

Generally these batteries have been collected from different companies and offices. Neither the workers nor owners were able to quantify properly the amount they usually receive in a month or even in a week. According to them, it is not uniform, sometimes it's around 50 pieces in a week and sometime they get this quantity in a month. Collected batteries and its dismantled parts are being stored over permeable soil on the road side.

The units here carry out three primary steps:

- Opening the plastic cover of the battery
- Removing Pb plates from it
- Washing the plastic cover, paper used within the battery, gloves etc. with water to recover traces of Pb from these

The operations are carried out in open air without taking any pollution control measures. Presence of these chemicals in the environment leaves a pungent smell all the time in the locality. Water used in such operations is regularly discharged into local municipal drains. The wastewater produced during the battery washing process has a huge probability of containing heavy metals.

Extracted Pb is generally sent to Secondary Lead Smelting Units at Picnic Garden area of the city. The acid recovered from the battery is stored in a bucket and then sold to other acid vendors for reuse purpose. During the storage process, there is acid spillage, increasing the risk to the workers.

Most units have 2-3 workers, aged 45 – 50 years. The working conditions in these dismantling units are appalling, with small non-ventilated rooms and no safety measures. For getting a salary as low as Rs. 1500 – 2000 per month, these workers carry out such operations for 7 hours a day, 6 days a week. Many of them have been involved in this hazardous work for close to 40 years, with some of them doing these processes for around 10 -15 years. Most of the workers neither use gloves nor masks to protect them from lead dust, acid fumes etc. Only few of them use gloves during Lead (Pb) extraction process. "We use gloves so that we can recover Pb from it easily. At the end of the day we wash our gloves with water and recover traces of Pb from it." one of the workers who was wearing gloves only in one hand informed. The workers use a drum of water to wash the parts of dismantled batteries and they also used the same water to wash their hands during work. This water is kept & used for several days and has lead particles which is recovered after a certain period. The water is then treated with lime and disposed off into local drains.

Exposure Pathways

Throughout the informal recycling process, there are possibilities for exposure. Most often the spilled battery acid, which contains lead particulates, is haphazardly flowing on the ground, waste pile or into the nearest water body. During dismantling & Pb recovery processes, lead ash falls into the surrounding environment, collects on clothing, or is directly inhaled by people in close proximity.

Most of the workers were quite nonchalant about their health. "We are working in this field for several years and do not have any health problems" – the workers declared. This has led to careless attitude among the workers regarding use of personal protective equipment. Few workers were aware of hazards involved in their job and said that they wear gloves to protect themselves. Most owners, met during the visit did not seem concerned about the health of their workers and did not feel the need to provide PPEs. Workers shared that the employers provide monetary support to them for treatment in case of any site accident or problems.

However the local residents shared a different story. "Almost everyone residing in this area is having respiratory problem due to presence of Pb dust in the air. We cannot open our windows due to this reason.

We have children and aged people in our family who are suffering from such exposure. We made several complaints to local party office but nothing has happened. Now we are helpless and frustrated" said one local resident. "We can feel the difference in the taste of our drinking water. Besides it's quite irritating to live with this pungent smell all the time" was told by one of the local shop keepers.

The presence of such units in residential areas does not just pose a serious threat to the health and safety of the workers, but also puts the residents living in the area at the risk of exposure to such hazardous chemicals. Low level of awareness among the workers & negligence among owners regarding hazards of LAB dismantling without any protective measures is making the situation worse. Most unit owners, though tried to project that they have trade license and hence their units are allowed to operate, were aware of the fact that these operations are illegal. Hence, most unit owners were hesitant and did not disclose much information, with many of them not allowing the study team to enter their units.

Risks

- **Illegal units:** The area is not industrial and falls under the Kolkata Metropolitan Area (KMA). The lead dismantling process come under "Special Red Category Industry" and according to WBPCB's policy cannot be permitted in Municipal areas falling under (KMA).
- Emission of Pb aerosol and dust due to open air operations
- Acid spillage increases the risks to workers and also contaminates the soil and groundwater.
- Lead extraction done without any precaution, leading to occupational risks and environmental damage.
- Units are situated in midst of residential colonies and hence risk of exposure to the residents in the area.



Topsia

Topsia, a large slum region on the edge of wetlands in east Kolkata. It is under KMC. However completely dirty roads and poor basic infrastructure observed during the visit indicate that the area is not developed and there is limited developmental initiatives by the municipal corporation. Adding to the woes is the fact that the area is home to more than 500 units involved in reprocessing of waste plastic.

Segregation of waste plastics and its shredding are the main operations in these units and have been carried out in this area since past 40 – 45 years. These units deal with almost all types of waste plastic materials including bottles, utensils, toys, sheets, plastic bags and plastic from e-wastes etc. Waste pickers collect these materials mainly from Dhapa landfill and sell it to the units located in this area. It is difficult to assess quantities handled in this area, as the owners refused to share details.

Areas are demarcated for different operations within the units. In one of the units visited during survey, in an unventilated, tiny room, workers, amidst heaps of waste, were squatting on the floor and segregating

plastic. They sit like this for hours, bending downwards and straining their necks and backs. In an adjacent room plastic was being shredded using a machine, with the plastic pieces and dust flying out. Shredding rooms in most units were a bit larger in size with proper ventilation, but were full with plastic dusts. The situation in these rooms are so bad that it causes eye irritation, respiration problem, makes the vision completely blur if one stays here for some duration. In such an environment, it is difficult to imagine how the workers work for 8 hours per day for six days a week.



Open burning of metal wires having plastic coating and other discarded plastic materials also is done in this area, making the condition worse. Metals, mainly iron, copper, are recovered from the wires. The melted metal is sold to smelting units, situated in other parts of the city, which they refused to disclose. The melted plastic is generally left behind at the burning place or thrown away in the neighbourhood, mainly because of the negligible quantities. If the quantities are large, it is collected and sold to waste plastic units located here for processing. Though burning operations could not be seen at the segregation & shredding units during the visits, but study team observed such operation in an open field near water body. The burning is usually done secretly to avoid attention.



The canal just beside the units is the main source of water required for waste plastic cleaning purpose. Canal water is normally stored in a tub in each unit and both male & female workers clean the plastics standing hip-deep in water. The waste water after cleaning is also drained into the same canal. As a result the canal water has turned blackish in color. Dust level in air both inside the units as well as in the surrounding locality appeared to be very high due to presence of high level of plastic dusts in the environment.

Though the unit owners informed that they have trade license for doing this business, however according to WBPCB's Industrial Siting Policy, reprocessing of waste plastic (excluding PVC) comes under "Orange Category Industries". Industries mentioned in the list of Orange category can be permitted in all municipal areas other than KMC, HMC areas [except added areas of HMC] or within Industrial Estates in case of KMC & HMC area with adequate pollution control measures. The unit owners seemed to know that their operations are illegal and were reluctant to share much information with the study team.

Most workers knew about the health hazards due to these operations. "We suffer from breathing problems, skin irritation due to use of dirty canal water, but what can we do? This is our only livelihood" – voiced the workers. The workers were quite hesitant about sharing too many details as they feared losing their only earning source. In spite of understanding the risks, it was observed during the study, that the workers were not using any PPEs. The owners' also, though fully aware, did not provide any protective equipment and do not provide any monetary support to the workers for any kind of health problem, except in case of any major accident.

Residents from neighbouring slums (just behind the plastic processing units) worked in these units and therefore probably did not want to share their problems. They claimed that they did not face any problem

due to these units. Though they mentioned that the canal water is highly polluted, but stressed that they did not think the plastic units were responsible for this. But they also pointed out that the ground water is highly contaminated and cannot be used for drinking purposes.

Feedback from people residing in the neighbourhood high rise apartments and teachers of local school gave a completely contrary picture. "The area is highly polluted due to presence of these units. We get a foul smell whole day due to these operations. We may not feel the effects of such activities at this moment, but I am definite after few years we will certainly see adverse effects of this" said the Principal of LLR Public School, located in this area. The students & teachers have been instructed to close the roadside windows during daytime. "Quite often we get a smell of plastic melting during the afternoon time" the Principal added. After making several complaints the units now have stopped doing any activity right in front of the school.

The residents also complained regarding the burning process and said that they suffer from excessive respiratory problem, especially during the burning process. They made several complaints but nothing has changed.

The area is very close to East Calcutta Wetlands which is recognized as one of the Ramsar⁸ Sites in India. However lack of monitoring leads to continuation of such illegal operations at this area which not only harm the environment but is also a serious threat to the health of workers and the local residents.



Risks

- **Illegal units:** not recognized as industrial area, come under "Orange Category Industry" according to WBPCB's policy and can be permitted in all municipal areas other than Kolkata Municipal Corporation (KMC) and Howrah Municipal Corporation (HMC) areas [except added areas of HMC] or within Industrial Estates in case of KMC & HMC area with adequate pollution control measures
- Units operating in residential colonies and hence risk of exposure to the residents
- Open burning of plastic materials releases toxic materials into environment
- Emission of plastic dusts due to plastic shredding without taking any protective measures
- Occupational exposure to the workers for not using PPEs
- Waste water disposed off into the local canal, leading to contamination.

⁸ Ramsar sites (related to wetland) in India comprises Indian wetlands deemed to be of "international importance" under the Ramsar Convention. The Ramsar Convention (formally, the Convention on Wetlands of International Importance, especially as Waterfowl Habitat) is an international treaty for the conservation and sustainable utilization of wetlands, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific, and recreational value. It is named after the city of Ramsar in Iran, where the Convention was signed in 1971.

Picnic Garden

Picnic Garden is one of the low lying areas of Kolkata, with the solid waste dump site of Dhapa on its East and Tangra, known for its tannery belt, on its north. Like Pyrabagan, this area is also known for lead acid battery processing. Besides battery dismantling, the area is also one of the major clusters of secondary lead smelting operations in and around Kolkata. Secondary research (see References) and interactions with the locals indicate that currently there are 7 operating units and 5 non-operating units (reasons not known, but probably due to intervention of PCB) within ward no. 66 & 67 of Kolkata Municipal Corporation which fall under Picnic Garden area. These two densely populated wards of Picnic Garden area are inhabited by more than 1,10,000 people as per Census of India, 1991⁹, most of them living in slum like condition. The area is inhabited by mostly migrants from states of Bihar and Uttar Pradesh many of whom work in these smelting units. The area also has some scattered buildings belonging to educated & upper middle income group.

The lead smelting units are operating in this area for more than 40 years and have only trade licenses. Though at present only 7 units were found to be in operation, according to the local people, few years back the number was quite high. Though environmental information was displayed at the entrance of one unit, but the units were far from following those. According to the annual report of WBPCB of 2007-2008 lead smelting units of this area were identified among the grossly polluting industries of the state by WB-PCB¹⁰. Units receive raw materials mainly from Pyrabagan area of the city which is known for handling and dismantling of lead acid batteries (LABs). However, they collect scrap as well as working LABs from other sources too.

The used batteries are opened & broken down manually using screw driver & hammers to extract lead plates. This lead is then smelted and made into ingots to be sold to the industry. During the process, lead scrap is put into the Bhatti (furnace) manually from the charging door¹¹ and is heated at more than 800°C for 8 – 10 hours. The lead scrap, ash, dross and slag are mainly used as feed material. Molten metal along with slag is collected from the bottom of the Bhatti into an open pit below the ground level. The slag is stored until a substantial amount has been accumulated and is then re-smelted several times for extraction. The molten lead which separates from the slag is collected and transferred to a plate like structure to cool down & make into ingots. The paper used on the inside wall of the LAB's plastic cover are also collected and then burnt to recover traces of lead found on that. Like Pyrabagan, lead traces are also



9 http://wbplan.gov.in/docs/Handbook_2004/Kolkata.pdf

10 <http://web.wbpcb.gov.in/html/annualreps/ar0708/annexure5.pdf>

11 The charge is put into the furnace through a charge door along with replacement coke.

recovered from the water which is used for washing battery parts, hands etc. It is finally treated with lime & disposed off on the ground.

Each of the units have about 8-10 workers on an average, working on an 8 hour shift for six days a week. Mainly male workers of age group of 20-50 years are employed in the smelting process and get paid around 7000-8000 per month. Some of the workers have been engaged in this work for close to 35-40 years. Most of the workers hail from Bihar, UP and other districts of West Bengal. The working condition in these units is deplorable. Heaps of lead scrap, lead ash lie on the ground. Sitting on the mud floor along with lead heaps workers dismantle batteries and extract lead. As a result of these activities the soil in these parts has turned blackish in color, indicating possible contamination. Since the units are not fully covered; lead bearing dust also has the risk of spreading in the adjoining areas. The study report of Blacksmith Institute's 'Site Assessment of Lead Pollution at Picnic Garden Kolkata, India' in 2006¹² which looked at this site found that the lead content in water, soil and sludge & kitchen dust was exceeding the standard.

Most workers also live in the factory premises and are exposed to these conditions for 24X7. They use water from the well situated within the factory premises for cleaning machineries, hands (after work), utensils etc. The water was observed to be turbid in color and thick white sediment was seen on the utensils lying beside the well. The workers do not take any occupational safety measures except wearing gloves and are directly exposed to fire, fumes and fugitive dust. Furnace operation for lead melting is also carried out in these units without any health safety measures. In addition, most of them are not aware about lead hazards.

Though Emission Control Equipment, like cyclones, bag filters and scrubbers have been installed but these are not used regularly. The reasons for nonuse are many- carelessness or technical problem with machines, general practice of not bothering to use etc. Whatever may be the reason, ultimately the environment & the health of local people are at stake. During the study team's visit, melting operations were being carried in one of the units. Due to some technical problems, the emission control equipment was not in operation and the toxic materials were directly released into environment.

Even at one of the non-operating units, which we could access, dismantled parts of lead acid batteries, heap of paper with traces of lead were found. Couple of these units have also become habitat for local people, increasing the risk for its residents. The area has mixed land use and is industrial-cum-residential in nature. It is dotted with ponds but, as revealed by locals, they do not use pond or hand pump water



12 Source: www.ilmc.org/Pilot%20Programs/India/Draft%20reportpicnicgarden.pdf

for drinking purposes since the quality of water is really bad. The pond water is mainly used for bathing, cleaning of clothes, utensils and other household purposes. But it was seen that local people were fishing in those ponds for personal consumption.

"Several times lead bearing fume formed due to furnace operations has been directly released to the air through chimney without undergoing any emission control treatment" – a local resident informed. "We suffer a lot during those times. We asked them to stop the operation immediately and got relief for few days, but after few days it started again" – he added. Due to complaints from neighbourhood, units have shifted furnace operation from day to night (12 o'clock – 6 am). Though comparatively lesser in number, units continue to carry out such operations even during day time. Due to fugitive emissions from bhatti, molten metal, handling raw materials, charging door the air might be getting polluted with lead. The local residents face problems like respiratory problems, headaches and eye irritation and attribute it to the existing lead smelting units.

People staying on higher floors suffer the most. Residents have to close their windows during smoke emission from chimneys, otherwise within few minutes a thick & black layer of dust becomes visible on their ceiling fans. The residents complained that most of the time the units are not using emission control units and release the smoke directly into environment. Few residents sold their houses & shifted to other places because of the lead issue. The residents also complain about bad water quality. Blacksmith Institute's study also pointed out that the water sources are polluted and generally not fit for human consumption.

Secondary research also indicates that the children in this area are faced with disorders¹³ but no study has been done to establish the link between lead pollution and its health impact on the population. In a study conducted by a reputed environmental NGO, lead was even found in the cow's milk. But due to some local pressure they had to leave the area without completing their investigation.¹⁴



Risks

- Not a recognized industrial area
- Lead Smelting comes under "Special Red Category Industry" according to WBPCB's policy and cannot be permitted in Municipal areas falling under Kolkata Metropolitan Area (KMA).
- Units operating in residential colonies and hence risk of exposure to the residents
- Storage & dismantling of raw material over permeable soil that also lead to easy spread out of lead dust in adjoining areas
- Rainwater flows over the area where raw materials are being stored
- Lead dust might be contaminating the entire area
- Occupational exposure to the workers as no PPEs are being used
- The area is dotted with ponds/wetlands/bheries, lead contaminated rain water runoff flows down to these wetlands which are used for domestic & fishing purposes

13 Source: www.ilmc.org/Pilot%20Programs/India/Draft%20reportpicnicgarden.pdf

14 Source: www.ilmc.org/Pilot%20Programs/India/Draft%20reportpicnicgarden.pdf

Tangra –Tiljala -Topsia (Chamra Patti)

Tangra part of east Kolkata. Traditionally it houses a large number of tanneries owned by people of Hakka Chinese origin. The units had been operating in this area for more than 40 years. Due to concerns of pollution caused by the effluents from these units, in 1996 the court ordered the closure of tanneries and their shifting to a new modern complex built on equal cost sharing by the state and the Centre. Even after the February 28, 2002¹⁵ deadline set by the Supreme Court for about 550 Kolkata tanneries located at Tiljala, Topsia, Tangra and Pagladanga areas to either shift or stop production and the state government's allotment of a new location to them more than a decade ago at Bantala, a suburb in the east of Kolkata, the leather operations still continue within the city, mainly in the areas like Tangra, Tiljala & Topsia and the entire area locally is known as "Chamra Patti".



The tanneries were shifted to Bantala after reviewing the environment & health status in the region. Tannery units were located in highly congested habitations, offering little or no scope for future expansion, modernisation or installation of effluent treatment plants (ETPs). The surroundings became extremely unhygienic due to discharge of untreated effluents in open drains, stagnation of wastewater in low-lying areas around the tannery units, and accumulation of solid waste in tanneries. Alarming, till date more than 50 unauthorised tanneries are supposedly still functioning secretly in this belt and continue to pollute the environment.

Small units, each with 5-6 workers, are scattered throughout Tangra-Tiljala-Topsia area which makes it difficult to locate all the units and get an idea about the exact number of units operational currently. A visit to the Tangra, Topsia and Tiljala area reveals how pollutant tanneries are functioning on the backside of high rise buildings in the area. There is always a whiff of the foul smelling air and unclean roads with rotting animal hair, fat and other tannery effluents in this belt which gives them away. Mounds of chemical mixed leather shavings and trimmings at the roadside makes things worse. Even the colour of water in the drains is turbid with grimy bubbles on top.

Local people reveal that some tannery owners, who had stopped their business following the court orders, have now restarted their operations. Though the units in this area have trade license, they do not have no-objection certificates from the WBPCB, which is mandatory for operating such units. This was probably the reason why most unit owners did not allow the study team to enter their units.

Leather tanning process in Kolkata is predominantly chrome based. The units use a kind of rolling machine filled with water & other necessary chemicals for different stages of leather processing. Chromium compounds are applied to protect hides from decay and to make them more durable against moisture and aging. Chromium interacts with fibers in the raw hide during a bathing process, after which the tanned hides are wrung and prepared for finishing. Other materials that are used in the pretreatment and tanning processes include sulfuric acid, sodium chlorate, limestone, and limestone soda ash.

Due to the repeated processes of soaking raw hides and wringing them out, the tanning process creates large amounts of wastewater, which is discharged through open drains present inside the units. Because

¹⁵ <http://www.downtoearth.org.in/coverage/at-a-tangent-14466>



there is a wide variety of chemicals in use during the tanning process, wastewater from this industry can have very different chemical compositions. However, chromium contamination and high chemical oxygen demand are typical problems associated with tannery effluents, both of which can pose serious risks to the environment and human health.

In addition to creating potentially toxic wastewater, tanneries also produce large amounts of solid waste that contain chromium, including: hide scraps, skins, and excess fats which were observed at the roadside near the units. Toxins from this waste can leach into nearby soil and water, placing nearby residents at risk of contamination.

Around 2000 people, mainly male workers aged between 20-50 years, work at these tanneries and spend almost 10 hours daily for six days a week to earn an average monthly wage of Rs 5000. The workers, many of them involved in this work for close to 30 years, do not use any other PPEs except gloves & sandals and do not feel the need for wearing the same. Some of them even work bare foot. "I am working here for last 30 years and now I have become habituated with this foul smell and tanning processes. So it does not make any difference to me. Rather this smell is good for the health, mainly for our heart" informed one of the workers.

Locals however complained about the foul smell & dirty roads. "We are aware of the health hazards posed by such tanneries. But since they have some backing, it can't be stopped. The owners, for their own benefit, are spreading incorrect information regarding health benefits of this foul smell coming out of tanneries." said a local resident.



Risks

- Illegal tannery units behind high rise buildings running within the city despite of Supreme Court's order
- Tannery comes under "Special Red Category Industry"
- Tannery effluents pass through local drains making it clogged with chemical foams
- Storage of processed leather & excesses over permeable soil
- Rainwater run-off over raw material yard
- Tannery effluents get in touch with soil
- Occupational exposure to the workers for not using PPEs

Tangra-Kill-Khana-Pangladanga

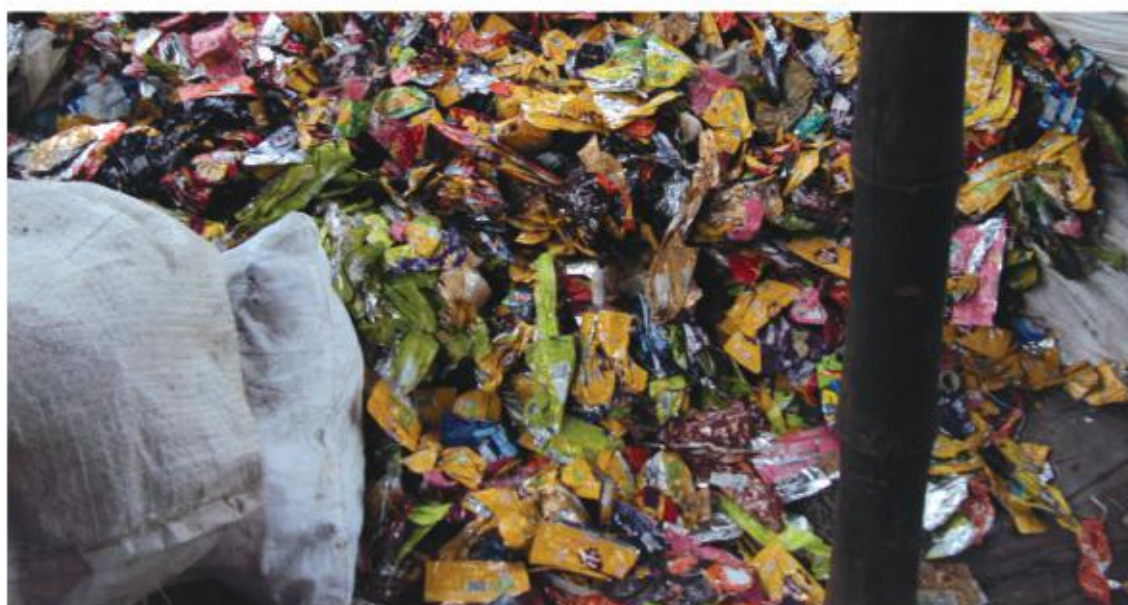
Tangra Kill Khana-Pangladanga area of the city is very close to Sealdah Railway Station, one of the two big railway stations in Kolkata. Like Topsia, this area is also marked for reprocessing of waste plastic and more than 500 active units are located here. These operations have been carried out since last 40 – 45 years. Segregation of waste plastics, melting and shredding of plastic are the key operations in the area. Like Topsia, unit owners here also claimed that they have trade license for doing this business. However according to WBPCB's Industrial Siting Policy, reprocessing of waste plastic (excluding PVC) comes under "Orange Category Industries" (guideline are mentioned in Topsia area) and thus such operations are not allowed within the city.

Though these units dealt with almost all types of waste plastic materials, plastic bottles were a major waste stream. Some of the units also processed plastic wrappers of food items, like biscuits, potato chips etc. Waste pickers collect these materials mainly from Dhapa landfill and sell to the units in this area. There is hoarding of plastic wastes on both sides of the roads in the area, making it difficult to walk and also making the area very grimy. Wrappers are usually melted in a big pot using an open clay oven. The molten black colored output was then sent to other units to make new products, mainly sandals, from it. In some units burning of plastic wrappers was also observed.

Few companies also sold their nylon waste products (like rope, cement bags etc.) to these units, which shredded and converted these into new plastic items. Most of the units located at Killkhana are involved in segregation of plastic wastes. Only around 20% of the units, in addition to segregation, are also involved in shredding & melting operations. The segregated & shredded material is usually sold to other units situated in adjacent Pangladanga area for further process, however much information was not available about Pangladanga units.

The overall situation of this area is almost similar to Topsia, except level of plastic dust in the air seemed less probably due to presence of lesser number of shredding units. Some of the shredding units were also seen openly heating a net like material which they use in shredding operations, to melt the plastics that stick on it. Black smoke released from such operation was observed during the visit. The waste water is also discharged into local canal through local municipal drains.

Tiny non-ventilated rooms with heaps of waste plastics, shredded plastics and full of plastic dust are the regular work place here. Small segregation & melting units are generally made up of bamboo with asbes-



tos roof, while shredding units are bit larger, with shredding machines. In one of the units, inside a big dark room, workers were found involving in the shredding operations. Each of these units employs 4–5 workers on an average. Women are generally involved in segregating units whereas shredding units employ mainly the male workers. Children were also found in segregation operations. Workers are paid around Rs 3000/- per month for this work. Most workers reside in the same campus or adjacent to the units.

“We suffer from breathing problems, headache and we know this is due to our profession, but we have no other options” shared the workers. They neither use any PPE nor aware of PPE’s requirement to protect them from the hazards of these operations. Owners don’t feel of these operations without any protective measures, causing any health or environmental hazards. They do not provide any monetary support to the workers for any kind of health problem.

Mixed response was received from the local residents, some of them complained about pollution due to the operations of these units whereas other moved away just saying “We do not face any problem due to these units”. The area comes under KMC, but it’s still far from municipal development. As most the workers are local residents of that area, they were not willing to share about their problems. Though, according to local sources, the number of such units was much higher a few years back, interference of local councilor led to some units on one side of the canal being closed down. But the units on other side are still in operation. “Political influence also helps these units to carry out their operations without any fear” – one resident informed.

Waste plastic reprocessing within the city is completely illegal, however how these units are still doing this business, is a big question.



Risks

- Illegal units: not recognized as industrial area, come under “Orange Category Industry” according to WBPCB’s policy and can be permitted in all municipal areas other than Kolkata Municipal Corporation (KMC) and Howrah Municipal Corporation (HMC) areas [except added areas of HMC] or within Industrial Estates in case of KMC & HMC area with adequate pollution control measures
- Units operating in residential area and hence risk of exposure to the residents
- Unclean roads with heaps of plastic wastes
- Burning of plastic materials, like wrappers releases toxic materials into environment
- Emission of plastic dusts due to plastic shredding without taking any protective measures
- Occupational exposure to the workers for not using PPEs
- Waste water disposed off into the local canal

Hazra-Ritchie Road Crossing

Hazra-Ritchie Road, a residential area in South Kolkata, is among one of the prime e-waste markets of Kolkata. More than 60 shops dealing mainly with discarded electronic & electrical items are located here. Most of these shops are registered under a local association named Lohapatti Babsayee Samiti¹⁶. All types of e-waste & iron scraps are handled by these units, particularly television, refrigerator, microwave and washing machines are the most common items. The shops in the area are almost 60-70 years old, run by families over generations. The owners and the workers are mainly migrants from the nearby states of Uttar Pradesh and Bihar.

The shop owners buy e-waste from different sources such as the Kabadiwala or informal waste pickers, from electronic brands (which they get from customers during exchange offers) and sometimes from Government offices or private companies by participating in auctions. Some shops are only involved in collection, while others are engaged in dismantling as well. Parts like cables, plastic cases, condensers and batteries, are manually removed and segregated. These are then sold to recyclers or metal dealers within the state and also from outside. Repairable items are also separated and sold to vendors. Since these are primarily manual dismantling units, open burning or melting operations for metal recovery are not seen commonly.

Small, single roomed units flooded with e-waste & iron scraps is a common scene in all the units, each of these employing around 5-6 male workers, aged between 30 – 35 years. Shortage of space, inside the shops, leads to dumping & dismantling of scrap materials on the roadside and on the pavement. At quite a few shops, the workers were seen to be dismantling scrap materials sitting on the roadside or on the pavement. In small rooms, workers continuously dismantled different electronic and electrical equipment manually, using hammers and other tools. Blow torches or other heating methods are used to separate components, thereby heating the lead soldering in these equipments. The workers in the unit do not follow any environmental and health guidelines. No precaution was taken during the dismantling process to control or restrict emissions and release of toxins into environment. A whole bouquet of heavy metals, base metals and other chemical compounds lurk inside the electrical & electronic products. Hence such inappropriate handling of e-waste could lead to release of toxins such as lead, mercury, arsenic, cadmium, beryllium, barium, chromium etc.

The workers are engaged in this work for around 8 hours a day and earn wages ranging from Rs. 2000 to 3000 per month. No precautionary measures taken by workers or unit owners to prevent occupational exposures or control toxic emissions or discharges were observed during the visits. There was no use of



16 Rough translation- 'Iron Business Association'

any kind of PPE by the workers in these units, who were not at all concerned about harmful effects of such operations on their health. "I am working here for last few years and do not have any serious health problem. So I don't perceive any kind of health hazard related with our job. Regular cuts and injuries are part and parcel and we are not bothered about those" a 35 years old man said. "During handling of glass wool (Glass wool is found in refrigerator's cover. Care should be taken during dismantling of refrigerator so that this material cannot be dispersed. Otherwise it can cause skin irritation.), we feel some skin irritation, but that's not a big issue for us" another worker added. Most workers, though, are unaware of the health risks that they are exposing themselves to. Owners also responded similarly and said that they do not perceive any health and environmental concerns. They do provide monetary support to workers for medical treatment, mainly for workplace injuries.

Toxic emission not only affects those who recycle e-waste manually but also people in the neighbourhood & the environment. The soil in the area has turned blackish, as all the dismantling activities are carried out on the ground. Though the air quality in Kolkata is generally considered to be bad, this area was worse. The difference was very evident, as even at a distance of less than half kilometer from this place, the air quality appeared to be much better. Due to breaking of iron scraps & e-waste in large quantity all the time, the noise levels in the area is also quite high. Day long hammering operations make the local residents very uncomfortable. The locals complain of respiratory, hearing and headache problems etc. and attribute this to release of toxic materials in air and high levels of noise. They have to close their windows to get some relief and despite several attempts, have not been able to stop this operation in their locality. "I have children and aged people in my house, but there is no option to protect them from this nuisance" lamented one lady. "Local people made several complaints for noise & other pollution problems but we are not concerned" informed a unit owner.

However, the unit owners are aware that they are dealing with something illegal and are not forthcoming in showing their work to outsiders or being photographed. The workers have also been instructed for the same.

Though the owners have trade licenses, as per "E-waste (Management & Handling) Rules, 2011",¹⁷ e-waste handling (collection/dismantling/recycling) requires authorization from Pollution Control Board which none of these units have and hence it is surprising that they are operating without any hindrance.



Risks

- Illegal units: Units operating in residential area.
- The area is not recognized as industrial area and without obtaining authorization from Pollution Control Board collection/dismantling/recycling of e-waste is illegal. According to WBPCB's policy e-waste dismantling/recycling units cannot be established inside the city.
- Risk of physical injuries & chemical exposures due to e-waste & iron scraps dumping & dismantling on the roadside for workers, residents as well as for bypassers.
- Storage of raw material over permeable soil
- Rainwater run-off over raw material yard
- Air pollution due to release of heavy toxic metals during e-waste dismantling without pollution control measures
- Occupational exposure to the workers as there is no use of PPEs
- Risk of exposure to the residents
- High level of noise pollution due to continuous dismantling operations

17 http://www.moef.nic.in/downloads/rules-and-regulations/1035e_eng.pdf, <http://www.cpcb.nic.in/ImplimentationE-Waste.pdf>

Raja Bazaar

Another prime e-waste market of the city is Raja Bazaar, which is partly commercial and partly residential and located in North-Central Kolkata. It is one of the most densely populated areas in Kolkata. Large amount of e-waste is regularly dumped and dismantled in around 35 shops in the locality. Nearly 150 informal workers are involved in this business at this area. The shops source e-wastes from Kabadiwala or informal waste pickers and sometimes from Government Departments or other private companies. Mostly discarded television, refrigerator, microwave and washing machines are collected and dismantled in these units. There are numerous roadside operations as well, who mainly dismantle electric fan, motors of electronic & electrical items etc. These operations in the area are more than 50 years old.

The overall situation is almost similar to that Hazra-Ritchie Road. The working conditions, worker's pay scales and work hours, environment & health hazards are similar to the Hazra. Open burning or melting operations for metal recovery was not observed here as well. The units have the trade licenses but no authorization from Pollution Control Board to deal with electronic waste. Workers mainly come from Bihar & rural districts of West Bengal. This is a sort of family business for the owners who have been running it through multiple generations.

As per information received from local people and shop keepers, in last 1-2 years the quantity of materials coming to this market has increased. However, currently, a shift has been noticed in terms of the kind of material received. "More number of electric fan, CRT monitor (both TV & computer), CPU are coming to this market than refrigerator, microwave etc. This may be due to exchange offers provided by the brands" informed a local shopkeeper. Unit owners & workers were not ready to share this information. Local residents complained about noise and air pollution. According to them, they

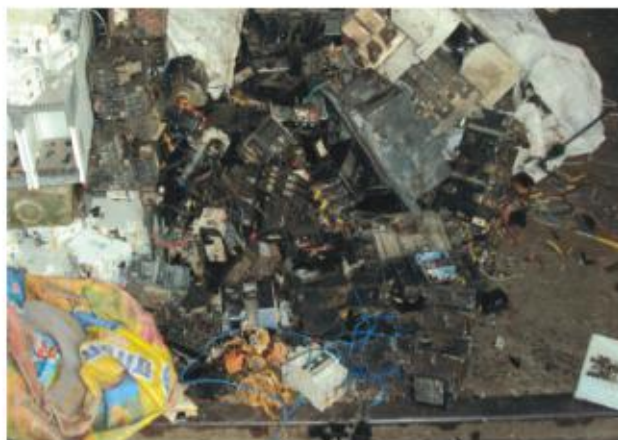


Risks

- Illegal units: not recognized as industrial area, without obtaining authorization from Pollution Control Board collection/dismantling/recycling of e-waste is illegal. According to WBPCB's policy e-waste dismantling/recycling units cannot be established inside the city.
- E-waste & iron scraps dumping & dismantling on the roadside
- Storage of raw material over permeable soil
- Rainwater run-off over raw material yard
- Occupational exposure to the workers for not using PPEs
- Units operating in residential area and hence risk of exposure to the residents
- High level of noise pollution due to continuous dismantling operations
- Air pollution due to release of heavy toxic metals during e-waste dismantling without pollution control measures

have been suffering from respiratory diseases, headache etc. due to these activities and related pollution. Even here residents have been forced to keep their windows closed as it becomes difficult because of dust and noise. The owners of these units & workers seemed not too bothered about environment & health aspects.

The big question is how these units continue to flourish without having authorization from SPCB/CPCB.



Khidderpore-Garden Reach-Metiabruz

Located in the central-west part of the city, Khidderpore-Garden Reach-Metiabruz area is one of the oldest parts of Kolkata. The Hooghly River flows in the western part of this area. It is a key industrial location, with more than 200 small, medium & large scale industries including Thermal Power Station (coal), water pumping station, shipyard, soap manufactures etc. Metiabruz is also the largest producer of non-branded garments in India and is also famous for being the largest kite manufacturing area in the world¹⁸. While Metiabruz is home to textile manufacturers, Khidderpore is one of the oldest docks in India and is probably one of the oldest river ports in the world. Entry to the Khidderpore docks canal is off the river Hooghly (Ganga). Khidderpore Industrial Estate has been set up here by West Bengal Small Industries Development Corporation Limited (WBSIDC) under the Directorate of Micro & Small Scale Enterprises.

The major problem of this area is river and air pollution. The ships at Khidderpore dock discharge their waste into the River Hooghly. The industrial & municipal wastes from this region also are dumped into the river water through underground drains. Oil spillage from the ships is another cause of river pollution. River sedimentation due to industrial waste discharge into river has resulted in ships not being harbored at the nearby Netaji Subhas Dock for last 7 years.

Everyday a thousands of trucks carrying dock supplies run through this area to meet industrial requirements, making the area very dusty. The high level of dust in the air throughout the area is easily noticed



18 Source: <https://en.wikipedia.org/wiki/Metiabruz>, <http://www.innspub.net/wp-content/uploads/file/JBES-V3No1-p1-6%281%29.pdf>

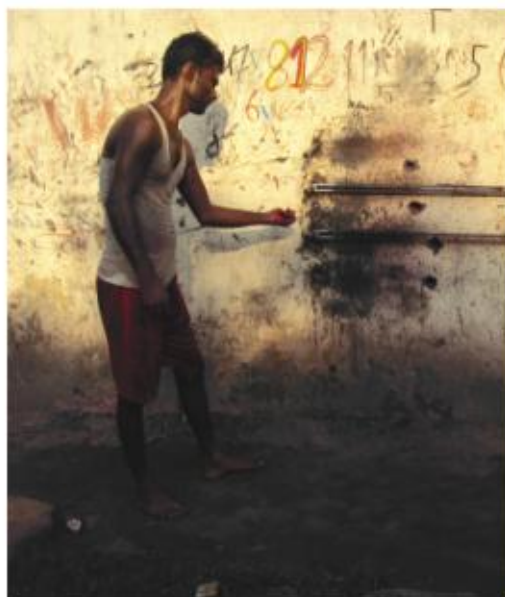
and was visible during visit to the area. People living there or working there suffer from respiratory problem due to this high level of dust.

One of the residents of the area, who works in a bank close to dock area shared "Wastes generated from the dock area, ships like, oil, grease, mobile etc., wastes from around 200 industries situated at this area & waste water from local municipal drains are everyday mixing with the river water and everyday huge number of loaded trucks are running through this area, due to which we suffer from respiratory problem." Few of his colleagues informed "When we work inside we do not face any problem, but as soon as we go outside we start feeling respiratory problem".

Besides, residents who take bath in river water have suffered from skin irritation, local people informed.

In the kite manufacturing units in Metiabruz, it was seen that leaded paint was being used to make the glue for strengthening the string. They do this in bare hand and on the ground in open air, dropping the paint drops on soil. During field visit, it was noted that the soil in the area has become blackish.

The industries of this area are mainly authorized ones, but the observations and feedback received from the local people during the visits clearly showed us that the norms are routinely flouted and the area is heavily polluted. Since there was no scope for sample testing, it was difficult to understand the extent of environmental damage.



Risks

- Recognized industrial area, but no proper monitoring on pollution control
- River pollution: Oil spillage, waste discharge of ships harbored at dock into river; also Industrial waste discharge
- Rainwater run-off over raw material yard
- Air pollution due to presence of industries and running of excessive number of large vehicles
- Soil pollution due to mixing of leaded paint
- Residential colony close to this area and hence risk of exposure to the residents
- Occupational exposure to the workers involved in kite manufacturing trade for using leaded paints in bare hand

Cossipore-Chitpur

Cossipore is one of the old neighbourhood in north Kolkata and spreads over two municipal wards under Kolkata Municipal Corporation and also covers some parts (mainly Chitpur) of another ward. Ward no. 1 of the KMC, Cossipore, has Chitpur on the south and the Hooghly River on the west. From British period Cossipore had a number of industrial units. These include Government Gun & Shell factories, sugar mills, as well as Thermal Power Station, waste plastic processing units, cement storage unit etc. The first thermal generating station of Calcutta Electric Supply Corporation (CESC Ltd.) was erected in Cossipore in the year 1912 and is functional since 1949. Previously, the thermal power plant was considered as the main source industrial pollution of this area due to lack of pollution control devices.¹⁹ However, nearly a decade back CESC adopted necessary pollution control corrective measures after getting stricture orders from WBPCB

¹⁹ <http://timesofindia.indiatimes.com/city/kolkata/Industrial-pollution-down-in-Kolkata/articleshow/36796556.cms>



and according to residents in the area, it reduced the pollution. Though no information is available on whether Cossipore is a designated Industrial Estate or not, but like Khidderpore-Garden Reach-Metiabruz, this is also a key industrial location of the city, with more than 500 factories

Chitpur is closer to the river and famous for waste plastic processing units. More than 5000 people, both male and female work in the factories of Cossipore. According to WBPCB's mandate, accumulation, dumping and processing of plastic carry bags are prohibited within 50 meters area of both sides of the banks of the River Ganga. In addition, burning of plastic waste is also banned.²⁰ But the ground situation of the area slams all these bans and guidelines. In Chitpur area, on the bank of Hooghly River, more than 30 plastic processing units can be spotted. The area is completely unhygienic and looks dirty with heaps of plastic on the road on the river bank. Though the units didn't allow study team to enter, information available from local residents as well as the smell of plastic melting in air, gives a clear indication of the kind of work in the area. Some children were also seen to be involved in waste segregation at these waste processing units.

Discarded plastic medicine bottles were also found to be handled by these waste processors. The leftover medicines from the bottles are usually emptied in containers and separated glass & metal parts are sold for further processing. At the end of each day, collected medicines are disposed off into local drains which discharges waste into the river

Like Khidderpore everyday thousands of trucks run through this area for industrial purposes. Besides, loading and unloading of cement in a godown here makes the area completely dusty. Residents complained about respiratory problem due to this high level of dust in air. Due to the presence of so many factories, plants of different kinds, waste plastic processing units & related industrial activities the entire area has become polluted.

There is a Sewage Treatment Plant at the river bank, but whether it is working properly or is in use could not be determined. According to the information received from the local residents, the wastes from factories of Cossipore area are being discharged through underground municipal drains into the river.

Though it was not possible for the study team to enter factories/units of this area and to monitor their pollution control as well as health & safety mechanisms, but thorough observation and feedback received from local people indicated that the area was highly polluted.

20 Source: <http://www.wbpcb.gov.in/html/pressrelease/plastic.shtml>



Risks

- Recognized industrial area, but no proper monitoring on pollution control
- River pollution: Oil spillage, waste discharge of ships harbored at dock into river; also Industrial waste discharge
- Rainwater run-off over raw material yard
- Air pollution due to presence of industries and running of excessive number of large vehicles
- Soil pollution due to mixing of leaded paint
- Residential colony close to this area and hence risk of exposure to the residents
- Occupational exposure to the workers involved in kite manufacturing trade for using leaded paints in bare hand

Bowbazar (Nabin Chand Baral Lane)

Bowbazar, an area in Central Kolkata under the KMC is Kolkata's jewelry district well known for its gold and silver shops and jewelry business since the British period. Since last 50-60 years these smelters are operating at this place. There have been earlier reports on this area, some dated back to almost 20 years back, highlighting the concerns related to the smelting operations in the locality²¹. The PCB's internal reports and spot checks had back then found the situation alarming. The nature of the complaints forced the PCB to urge the municipal chairperson of the ward to convene a meeting of goldsmiths on August 29, 1995. The goldsmiths admitted that "large amounts of nitric and sulfuric acids were being used to smelt gold". Some guidelines were spelt out to protect the environment, but the goldsmiths' organisations refused to obtain any clearance from the state PCB.

²¹ <http://www.downtoearth.org.in/news/all-gold-and-hellish-litter-25233>

The study team made a visit at this area and was surprised to find that the gold & silver smelting units in the Bowbazaar area are still operational. The State pollution control board directions on operation of gold smelting units in the area have done little to stop the practice that is not only harmful for the environment, but also a health hazard for the workers. Though these processes are not being carried out openly, around 50 smelting units are still operational in the area. It is difficult to spot or locate these units easily as the smelting operations are done mostly in kitchens or at terrace, hidden and not visible from the road. According to the locals, the units receive a huge quantity of old jewelry mainly from jewelry showrooms/shops of different parts of Kolkata. Secondary research also indicates that large amounts of gold jewelry are being smuggled in everyday and smelted in Bowbazaar and some of Calcutta's other congested areas, like Shobhabazar (Songachhi).

And here comes the hazard. If the gold is brought in as jewelry, it has to be smelted, using a highly concentrated mixture of nitric and hydrochloric acids, and would then be purified. Only after that can the gold be reused to make jewelry. The acid fumes are a major source of air-pollution in the area. The corrosive fluid wastes flow out into municipal drains outside. While the toxic metal, cadmium, is used unabated in soldering jewelry, mercury is also used to separate gold dust from other impurities with bare hands. Besides whether the limit of using less than 1 liter of Sulphuric Acid/Nitric Acid per month set by the Pollution control board is adhered to is a big question. 17 ml acid is used for per 10 gm of gold, a worker informed.

In the tiny one-room unit 4-5 male workers aged between 25-50 years are seen to be engaged in this work without any protection. Though the workers didn't spell out clearly their health problems due to this work, residents complained about considerable environment pollution due to release of acid fume into air and in liquid form through local drains. Due to the acidic smell in air they suffer from respiratory problem, cough etc. They have complained to unit owners several times, but to no avail. "The local political leaders back them, what can we do?" uttered one resident.

Workers don't feel these activities are hazardous for their health. When asked about use of cadmium & mercury with bare hands, a worker said, "We have become habituated with this work, we do not have any health problem. We hold cadmium with forceps, so there is no direct skin contact. But we know it is hazardous and due to presence of this, sometimes the users have skin irritations, though they are not able identify the reason. It's due to presence of cadmium in gold jewelry."

The study team was not allowed to enter the main smelting areas; however it was clearly evident that this area has serious risks and might be endangering lives of people, especially living in the neighborhoods.

Risks

- Gold and Silver smithy (purification with acid, smelting operation and sulfuric acid polishing operation) (using more than 1 litre of Sulphuric Acid / Nitric Acid per month) comes under "Ordinary Red category industries" as per industrial policy set by WBPCB²² that means such units cannot be permitted in Municipal areas falling under Kolkata Metropolitan Area (KMA). These can however be set up beyond the Municipal areas of KMA with adequate pollution abatement system subject to site clearance by local bodies.
- Acid fume makes the air polluted and spent acid released in the drain is a concern
- Health hazards to workers because of using toxics metals like cadmium, mercury and concentrated acids without any protection
- Risk of exposure to the residents

22 <http://www.wbpcb.gov.in/pages/view/38/52-list-of-industries-under-special-red-category>

Mullick Bazar and Jadubabur Bazar (J D Nath Road)

Vanishing pavements are the bane for people living on Justice Dwarakanath Road (J D Nath Road) near Jadubabur Bazar in south Kolkata. All the pavements in the locality, starting from Sambhunath Pandit Hospital to Puddapukur Road via Jagubabur Bazaar, have disappeared as automobile workshops flourishing in the area have encroached on the sidewalks and parts of the carriageway.

Automobile workshops mushroomed here along with Mullick Bazar in central Kolkata which is the hub of such operations in the city. A cacophony of horns, revving of engines, pounding of metal sheets and sounds of welding greets visitors on both these places. This has become a part of the daily lives of residents here. Flouting all pollution norms and without any clearance from the Pollution Control Board (PCB), the workshops continue to thrive and multiply in these predominantly residential & commercial zones (Mullickbazar is both residential & commercial, JD Nath is completely residential) of the city. Mullick Bazar has a large number of such workshops with close to 250-300 units operating out of the streets. Everyday more than 500 cars come here mainly for repairing purpose. Though the exact number of such workshops on J D Nath Road could not be assessed, but according to the information available from local people, it is more than 30. These units repair cars, its parts as well as sell and buy old parts of the same.

In both the places such workshops and operations are going on since last 50 years. On an average 4-5 male workers aged between 20-50 years' work at these workshops without any protection. Repairing process involves painting, oil change, and parts refurbishing which can be hazardous if carry out in open place. The vehicles which come at these workshops for repairing & maintenance purposes were seen parked on the roadsides and the operations were being carried out on road.

Blow torches are being used extensively at these workshops for various purposes, including welding, cutting, repairing body cracks, heating to shrink, expand and shape metals and to solder. This could result in lead fumes and lead dust, a known health hazard. Once the repairing work is done, discarded parts are thrown at the road sides. Discarded body parts, like, door, seat, mirror, tyre's rubber, metal scraps were found lying on the pavement during the visit.



Wastes generated in such automobile maintenance workshops include:

- Solvents (paints and paint thinners)
- Antifreeze
- Brake fluid and brake lining
- Batteries and other auto parts, like tyre, seat
- Motor oils, including waste oil
- Scrap metal
- Fuels (gasoline, diesel, kerosene)
- Lubricating grease
- Rubber, foam (come from tyre, seat)



Automotive maintenance workshops produce significant loads of hydrocarbons, trace metals, and other pollutants. Fluid spills and improper disposal of materials result in pollutants, like petroleum hydrocarbons, refrigerants etc., heavy metals including lead, and toxic materials, like chlorinated solvents, acid solutions etc. entering ground and surface water supplies, creating public health and environmental risks. Maintenance shops generate waste when they clean auto parts, change vehicle fluids, and repair and replace equipment.

"They spray paint, change oil openly at this residential colony and then paint, oil etc. are being disposed of on the road and mix with local drain water," said the Principal of Ramrick Institution, a secondary school on J D Nath Road. "We understand that this creates considerable harm to the environment as well as to our health. But we are helpless," he added.

Local residents of both the areas complained about considerable air & noise pollution due to these workshops. They suffer from respiratory problems, can't open their windows. The work continues during the night as well that makes the situation worse. "Despite a lot of complaints made to several people, the civic body has not taken any action against the workshops," informed one resident of Mullick Bazar.

Automobile workshops in residential areas are illegal. Automobile servicing, repairing and painting (excluding only fuel dispensing) comes under "Orange Category Industries" as per the industrial policy set by WBPCB (guidelines for such industries have already mentioned in earlier parts). Therefore how these workshops are still continuing their work without any clearance from pollution control board is raise the same question like other hazardous parts of the city, how and why no actions are taken to stop these activities? How long the citizens need to wait for getting a clean & safe environment to live in?

Risks

- Orange Category Industries, still operational in residential areas within the heart of the city
- Considerable air pollution due to dust and other hazardous materials used in repairing process
- Considerable noise pollution due to repairing works
- Health hazards to workers working without any protection
- Within the residential colonies, risk of exposure to the residents

Maniktala-Phool Bagan

Poisonous fumes and constant hammering on metal have made life difficult for the residents in the neighbourhood of Phool Bagan More, thanks to Moti Market. Also known as AK Steel, Moti Market is situated at the 98 Maniktala Main Road address at the Phoolbagan More and is, spread over 40 bighas. It houses 300-350 small units dealing in scrap metal (mainly iron) and waste plastic processing units. Some smelting units are also operating here.

From dawn to dusk, trucks trundle in and out of the slushy narrow lanes crisscrossing the market. The units, lining both sides of the lanes, are stocked with broken iron sheets, pipes and beams. E-waste, plastic wastes, car batteries are also dumped as raw materials. E-waste and lead acid battery dismantling using hammer, screw drivers, metal smelting including lead, aluminium, iron in smelting units, waste plastic processing are the main operations in these units. Nearly 3000-4000 people, of varied ages, are involved in these units, among which around 10% are females. Women are mainly involved in collection and segregation of waste materials. They earn Rs 140 -150 per day whereas male workers are paid a little more for their work. They collect all kinds of waste materials and segregate & sell those to relevant units of this place. Workers engaged in iron scrap metal processing units are paid more.

Only one lead smelting unit allowed the study team to make entry and informed that they have authorization from WBPCB. Pollution control mechanisms were observed at this unit, but the workers were found working without any protection. It is also doubtful whether they use the pollution control equipment properly or not as during the visit the equipment seemed lying in unused conditions.

The area has borne the brunt of the kind of activities going on for years. The ground is clogged with black colored effluents. Rain water mixed with effluents spilling on to the main road is yet another hazard during monsoon. Air inside the area was felt polluted due to presence of high level of dusts & other toxic materials. Air full with melted plastic's smell indicates burning of plastics in some units as part of processing work. Bio-medical wastes, mainly plastic saline bottles are also found to be dumped in couple of units. Also the units make a deafening racket — the noise of trucks unloading goods and the constant hammering of iron products.





All the units inside the factory have trade licenses and clearance certificates from the Pollution Control Board (PCB), informed the unit owners. Some units were found to have pollution control equipment. Operations carried at this place are either not at all permitted within the areas of Kolkata Municipal Corporation or only be permitted within designated industrial estates as per WBPCB's industrial policy. Though it is called A.K. Steel Industrial Area, but no official information has been available regarding if it is a Govt. registered industrial estate. Therefore, how these units obtained clearance certificates from the Pollution Control Board is still a question.

Workers were found working without any proper personal protection equipment and likely to be exposed to hazardous substances, like lead, BFR, plasticizers etc. However, they claim that they do not feel any difficulty in working at this environment. Employers and the association take the responsibility of worker's treatment.

Besides A K Steel complex, there is another industrial area called Maniktala Industrial Estate. This industrial estate has been set up by the West Bengal Small Industries Development Corporation Limited (WBSIDC) under the Directorate of Micro & Small Scale Enterprises. The units here are mainly involved in packaging, printing, engineering etc. works. The canal just beside this industrial area is found to be completely polluted due to mixing of industrial & municipal wastes. Presence of high level of dust makes the air polluted. The residential colonies, markets are very close this area, hence lack of monitoring not only pose threat to environment, but also a serious concern for the health of local residents.



Risks

- Red & Orange Category Industries, operational in residential area without proper monitoring
- No information available on recognition of A K Steel Complex as an industrial area. The units have trade licenses.
- Considerable air pollution due to plastic dust and other hazardous materials, like lead, aluminium etc.
- Mixing of effluents creating soil pollution & water pollution
- Considerable noise pollution due to hammering of metal scraps and loading-unloading activities
- Health hazards to workers working without any proper health protection
- Proximity to residential colonies, risk of exposure to the residents

Taratola Industrial Estate

Taratola Industrial Estate is a designated industrial area where many large scale industries are operating since last 16-17 years maintaining proper environmental & health guidelines. Renowned national & multinational companies, like Britannia Industries, Diamond Beverages, ESAB India Ltd, Eternit Everest Store India Ltd etc. along with some automobile companies have their factories at this area. There is a canal just beside these factories. On the opposite side of the canal, residential colony is situated.

Though the factories situated here follow all the guidelines related to environment & health hazards on paper, however a closer look tells a different story. Careful observation and comprehensive discussion with local residents raise many questions.

"Smoke, waste materials discharged from these factories makes our environment polluted," says a resident of the immediate neighborhood complained. "Slowly this place is becoming unsafe to live in. Black fumes released from these factories make us unwell. We have developed respiratory problems due to this," says another person. They cannot sleep in night due to high level of noise. Besides very night the situation becomes unbearable due to bad smell coming out of the factories. Local people informed that, factory workers burn something in the night which gives this bad smell, however the material is not known to anybody. To keep it behind everyone's sight this burning operation is carried out only during night - they added. The emission due to such activity, they feel, is hazardous to their health.

Effluents discharged from these factories pass through an outside drain and were also seen to be spilled on to the main road. Besides, waste materials of these factories, including used gloves, masks, automobile parts etc. were found to be dumped and burnt on the road side just outside the units. Open burning of such materials may lead to harmful emissions.

The adjoining residential area is mainly inhabited by lower income group people who face problems due to unregulated operations of these factories. They have made several complaints but no action has been taken till date.

The factories situated at this area are the authorized ones, so study team was not allowed to enter the units; however the outside situation suggests proper monitoring and immediate action from the concerned authority's end.



Risks

- Recognized Industrial Estate, however lacks proper monitoring from the concerned authorities
- Effluents coming out of the factories mixing with soil & municipal drain water
- Dumping & open burning of waste materials on road side, releases toxic gases into air
- Close to residential colonies, risk of exposure to the residents

Kolkata Landfill Sites

Solid Waste Management has become one of the major challenges in the state of West Bengal. With high annual growth in urban population and rapid pace of urbanization the situation is becoming more and more critical with the passage of time.

A study conducted by South Asian Forum for Environment (SAFE), revealed that an average person in the city generated 1.4kg of MSW per day, leading to around 5,372 tonnes of MSW generation for the entire city in 2013. Besides according to National Physical Laboratory report 2013, garbage pressure in Kolkata, at 16.5 tonnes per square kilometer, is the highest in the country.²³

Kolkata city now generate three times more MSW than they did in 1981 because of increasing urbanization and changing life styles. The rate of increase of MSW generated per capita is estimated at 0.75 to 1.25% annually. If the growth of population and the growth of percentage increase in per capita waste generation rate will be increase proportionally. The result shows that the expected municipal solid waste generation by Kolkata metropolitan city in 2035 is 32 lakh metric tonne per year.²⁴

But the city of joy seems to be turning a blind eye to the importance of recycling waste. SAFE's study has revealed that over a tenth of the waste is recycled in the city and the rest goes into the open landfill.

Turning trash to cash... it's all about attitude, but sadly, that appears to be lacking in Kolkata. Of the 5,372 tonnes generated, only 700 tonnes is collected and recycled though the recyclable waste is around 1,900 tonnes. The remaining waste is dumped at landfill. While 37% of MSW is generated from commercial and market areas, institutions and households generate 7% and 35% respectively. The rest - 21% - is from the streets.

In the city area, street cleaning and collection involves collection of MSW from the streets (road sweeping) and households in handcarts. Thereafter, the waste is dumped at one of the collection points/VAT (primary collection). MSW is then loaded into transportation vehicles (trucks) (secondary collection), which transport the waste (transfer) to disposal sites. Solid wastes stored in waste bins are collected and transported to the open dump area by vehicles belonging to the municipality of Kolkata. In Kolkata province and its towns, open dumping is the only option that is presently used for the management of the MSW. The solid waste collection method used in Kolkata is primary collection and secondary collection method. Kolkata's municipal solid waste generally consists of waste generated from residential, commercial and institutional areas, parks and streets, and is not sorted at the source, but stored in the same waste containers.

23 Source: <http://timesofindia.indiatimes.com/city/kolkata/Only-one-tenth-of-waste-recycled-in-Kolkata-Study/articleshow/22876645.cms>

24 Source: www.atlantis-press.com/php/download_paper.php?id=14482

Dhapa Landfill

Dhapa is a locality on the eastern fringes of Kolkata. Nearly 90% of the MSW generated in Kolkata city goes to this landfill which is an open waste dumping ground belonging to Kolkata Municipal Corporation (KMC). A three-year study by a non-government action group, South Asian Forum for Environment (SAFE) has revealed that only over a tenth of the waste is recycled in the city and the rest goes into this landfill.²⁵ The Dhapa Dumping Area lies within Ward Nos. 57 and 58 of the KMC administrative boundaries. Almost the entire area is part of a large protected wetland area called the East Kolkata Wetland (listed as a Ramsar site in 2002). The entire raw sewage from the city flows through drainage channels into the wetlands and is eventually discharged into the river Vidyadhari.

Waste has been dumped in Dhapa for almost 30 years and in absence of proper treatment facilities, it looks like a green mountain (the distant view is green due to the presence of weeds grown naturally on the mount of untreated wastes) while passing through the nearby roads. A closer look makes it clear that it's a mountain definitely; however, a mountain of wastes. Dhapa has been used for waste dumping since 1981²⁶. With the gradual development of the city towards the east, the garbage dumping has moved away further eastwards and the old dumping areas nearer to the main city are now used for farming (locally referred to as garbage farming). The current "dumping area" is spread over about 35 hectares. It consists of two unlined dumpsites, spaced ~ 500m apart – one closed dump of area ~ 12.14 ha and one active dump of area ~ 23 ha. The closed dump site commenced operations in 1987 and was closed in 2009. The active dumpsite also commenced operations in 1987 and is expected to be operated for another two to three years.

In addition to the two dumpsites, the Dhapa Dumping Area includes an administrative office of the KMC, reception facilities for MSW, weighbridge, garage, and a crematorium for unclaimed dead bodies, a privately operated compost plant and a private bone processing area.

Four or five villages are located in the near vicinity of the dumping area. Although all these settlements are within the Kolkata Municipal Area, they are still referred to as "villages".

Dhapa waste dumping ground receives bulk municipal solid waste for Kolkata metropolitan city without suitable protective liner system. Since there is no practice of waste segregation at source in the city, used batteries, glass, ceramics, plastic, metal scrap etc. also get dumped alongside. Heavy metals like zinc,



25 <http://timesofindia.indiatimes.com/city/kolkata/Only-one-tenth-of-waste-recycled-in-Kolkata-Study/articleshow/22876645.cms>

26 https://www.globalmethane.org/data/1128_dhapa.assessment.report.4-27-10.pdf

nickel, lead, arsenic etc. contained in some of these wastes might be leaching out to contaminate the soil and ground water. The site is not facilitated with any appropriate landfill leachate treatment system also. All the leachate, as emanated from the sites, finds its way to surrounding soils and water environment. The experiment conducted by Sanjay Matling, S. N. Mukherjee & Amit Dutta in 2013 on leachate characteristics of Dhapa landfill exhibits that leachate contains very high amount of organic matter (BOD and COD), ammonical nitrogen, TDS, chlorides and chromium. Presence of some other heavy metals such as lead, copper, nickel, zinc was as observed to be marginally high. Overall characterization of leachate entails that it possesses significant pollution potential to soil and surrounding water environment.



CHARACTERISTICS OF MSW LANDFILL LEACHATE AT DHAPA

Sr. No.	Parameters	Values	
		Maximum	Minimum
01	pH	09	7.9
02	TDS	16660	4666
03	BOD5	14150	2597
04	COD	21120	3000
05	TKN	11284	12111
06	NH3-N	848	725
07	Total Iron	12.6	2.6
08	Copper	1.5	0.27
09	Nickel	4.12	0.29
10	Zinc	7.46	0.4
11	Lead	15.57	0.62
12	Total Cr	24.7	0.82
13	Mercury	NDL	XDL
14	Arsenic	0.22	0.08
15	Phenol	038	0.12
16	Chlorides	6035	2847
17	Cyanide	0.06	<0.005
18	TCB	138000	106000

Source: Study on Leachate Characteristics of Municipal Solid Waste Landfill Site in Kolkata by Sanjay Matling, S. N. Mukherjee & Amit Dutta, 2013

- Dhapa Dumpsite Environmental and Social Assessment Report of WBPCB, 2014 provides the following information:
- The closed Dhapa dumpsite has an impact on the levels of contamination in topsoil, upper groundwater, surface water and surface water sediments
- In all compartments (topsoil, upper groundwater, surface water and surface water sediments) testing values are exceeded
- The sub soil and groundwater from the primary aquifer are not affected by the dumpsite
- Flora and fauna are of little interest on the dumpsite and only agricultural crops downstream the dumpsite is directly affected by the dumpsite



1500-2000 rag pickers from nearby areas scavenge through the waste daily. They collect recyclable wastes from this dump site and sell those to respective dealers. This is their only source of income. Mainly women are involved in this work, however at the landfill site men and children were also found to be involved in waste collection process. Without any health protection these people come here every day and collect recyclable materials from the heaps of waste. It was also observed that rag pickers openly burnt plastic wastes, like plastic carry bags, plastic coating of electric wires etc. at the dumping ground. Plastic carry bags <20 microns, waste plastic generated after stripping operations, are of no use for the rag pickers. So they burn these materials at the dump site. Black fume due to such burning can also be seen from outside during passing through the roads close to this area. One cannot stand there even for a few seconds, due to extremely bad odour and polluted environment; the effects on rag pickers for their everyday work can easily be understood. They do share that they have health problems, however as this is their only livelihood they continue. People who come here for the first time for waste collection suffer from headache, vomit and feel unwell. But overtime they claim that they get used to it.

"Once we finish our work, we have to take some pegs of liquor to overcome the difficulties we have had during our work. There is no other option. Our families are dependent on us and this is our only livelihood," a male rag picker said.

The people engaged in this work are mainly from a small colony in the neighbouring area, where the entire colony is involved in rag picking. Bordering the dumping ground, numerous settlements inhabited by scavenger families have cropped up over the past 30 years. These are mainly slums, some are registered, some not. Mathpukur, another nearby area has almost 55% of its resident working here. Rag pickers segregate & sell the collected waste materials mainly at the shops situated in Mathpukur area.

There are few units outside the Dhapa Dumping Ground where leather shavings and trimmings are processed. Furnace operation is carried out here on open ground to burn leather shavings and trimmings to prepare fertilizer, food for fish, chicken etc. These open furnace activities also harm the environment as the ingredients contain different chemicals, like Chromium, sulphur, oils and can also release noxious gases like methane, ammonia, hydrogen sulphide when burnt). These chemicals also enter the food chain affecting the human health. While walking through Dhapa one cannot fail to observe the well maintained fields growing all kinds of vegetables such as cauliflower, spinach and radish to name a few. More than 40 per cent of the green vegetables in the Kolkata markets come from these lands as a result of this "garbage farming" – utilizing the rich compost from the landfills.

However, several reports have indicated that the sewage-fed vegetables of the Dhapa area, near the city of Calcutta, contain a very high amount of heavy metals.²⁷ A study conducted by CPCB and the Department

²⁷ <http://www.ncbi.nlm.nih.gov/pubmed/11259852>

of Agriculture, Calcutta University, which was reported in *The Telegraph* long back in 1997, shows that vegetables grown at Dhapa area, contain toxic metals. Dhapa-grown cauliflower contains 44.1mg of lead and 3.3mg of cadmium in every kilogram of produce, the study reported.²⁸

The water of Bagjola, Bhangar, Tiljala canals mix with water from Dhapa dump, through leaching, making aquatic pollution around East Calcutta Wetlands as these canals discharge at East Calcutta Wetlands. Heavy metals released from effluents after reaching Wetland water are transferred to vegetables and fishes and finally to human beings through food chain.

However the Dhapa landfill is said to have reached its saturation point. What remains to be seen is how the government handles Dhapa's environmental hazards and organizational hiccups. For the time being for the dwellers there, garbage is gold – but for everything you gain, there's always something lost.

When Savior Becomes Polluter: A Case Study

For decades, idols of Durga, Kali, Laxmi, Saraswati, Bishakarma and many more, worshipped and revered by millions during several festivals of West Bengal round the year, have been a curious juxtaposition of the pious and the pollutant. At the end of the festivities, when idols are immersed in the Hooghly River (Ganga), the toxicity of the 'holy' water spirals up. Immersing idols, which contain large amounts of non-biodegradable material, is bound to affect the water and the aquatic life of the river.

Immersion of idols with all the accompanying synthetic decorations has increased pollution levels in the Hooghly river manifold and has endangered the rare river dolphins and fish found in the water here. A study by the Central Pollution Control Board (CPCB) in 1993-95 - "Impacts of Dussehra Festival on the River Hooghly: A case study" revealed high levels of lead, chromium and mercury in post-immersion water.²⁹ Bright paints that bring the clay idols to life have been instrumental in doing the damage. The immersion of thousands of idols of Durga and other deities around the year has added thousands of litres of paint, hundreds of kilograms of Plaster of Paris as well as toxic synthetic material into the river.

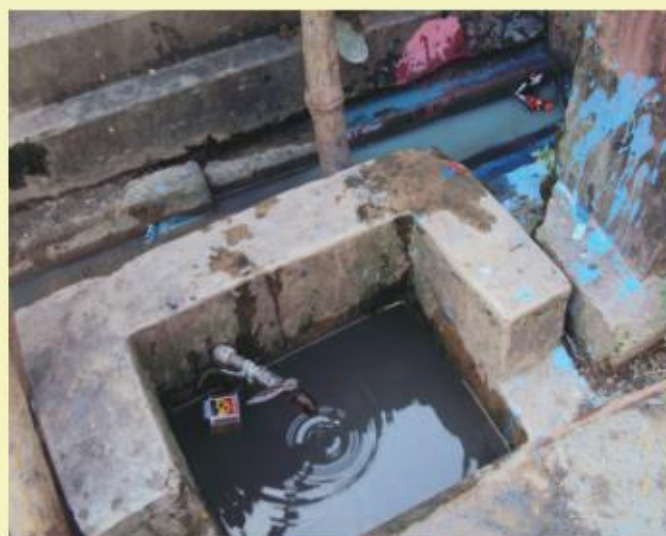
Artisans living in Kumartuli, the iconic clay-modelers colony in northern Kolkata, and other clusters across the State tend to use paints manufactured by relatively small companies that are available at cheaper rates.



28 <http://www.indiaenvironmentportal.org.in/content/30304/poison-in-every-bite/>

29 <http://www.downtoearth.org.in/news/idol-immersions-after-durga-puja-leave-rivers-polluted-yet-again-42509>

Traditionally, the artisans use a low grade chemical powder manufactured by local firms to paint the clay idols. These paints may be pocket friendly but contain toxic metals including lead and chromium. While use of good quality paint is deemed unviable for bulk of the idols that sell for Rs 15,000-25,000, the non-toxic strainers to colour silt (khari mati) is applied to small idols & statues. With high raw material, labour and decoration costs, very little is earned by way of profit. Use of non-toxic paint means an additional expenditure for them that erode the margin further.



In a bid to bring down the levels of pollution in rivers and water bodies, the West Bengal Pollution Control Board tried to encourage the artisans in the area to use lead-free paints few years back. WB-PCB also distributed free colours worth Rs 1 lakh to the artisans urging them to test the colours during Manasa puja, one of the smaller festivals. The artisans supposedly tried it on some clay idols but were reluctant to use it on idols meant for the larger festivals like Durga Puja. Despite many campaigns by the WBPCB to promote lead-free colours among idol-makers and even after many Puja committees have ordered for idols painted with such colours, the artisans are still apprehensive about using them.

There are about 450 such workshops in Kumartuli and two associations of artisan's working here. Secretary of Kumartuli's one artisan association pointed out the problems related to use of lead free paints. He said, - "We know the hazards of leaded paints, but we have to use it to save our livelihood. Each & everyone looks for a bright & beautiful idol and other colors cannot make it possible. It's true PCB tried to stop us to use leaded paints through different campaigns and distributing lead free paints free of cost among the artisans, but only 25% people used those paints, rest were in vein. He added that the artisans are scared to use lead-free colors especially on Durga idols since if anything goes wrong even with one idol, the artisan who has made it will incur great loss. "One of the biggest hurdles in the switch from toxic to eco-friendly paints is the price difference. The conventional powder colours used by artisans cost half of that of 'green' paints. Besides, every person wants their idol to give a bright look. However, lead free paints cannot produce such type of glaze on the idol. The puja committees also look for brightness on the idol", he added.

More than 50000 idols are made every year at this potter's hub of Kolkata and send to different parts of the country as well as abroad. A visit to this place just few days ahead of Durga Puja festival would definitely give an aesthetic pleasure, but also unfold some issues that cannot be ignored. The waste generated through idol making process- paint cans, traces of paint can be seen strewn around. Traces of paint used on idols flow through local drains, rain water to the river. Besides, the workers clean themselves as well as their clothes, used tools etc. containing traces of paints, which ends up in local municipal drains.

However, most of workers didn't speak out regarding use of leaded paints, some whispered like "the color contains lead which gives this glaze", when asked about what materials they use which make the idols so bright & beautiful. Some of them shared that they suffer from skin irritation due to use of leaded colors especially those who are involved in coloring the idol have skin irritation.

4.2 Probable Hotspots in North 24 Parganas

North 24 Parganas is another adjacent district of Kolkata. We are presenting here the hazardous places of this district, as these are very close to the city. Mollar-Bheri-Landfill was the site selected for the study:

Mollar Bheri – Landfill

Mollar Bheri is the waste dumping ground for Bidhannagar Municipality of North 24 Parganas district.

All the municipal wastes generated by the 25 wards of the municipality are sent here. Bidhan Nagar Municipality which includes SaltLake region generates around 200 metric tons of solid waste every day³⁰.

Mollar Bheri was initially part of the wetlands but in 2007 Bidhannagar Municipality sought and received permission from East Calcutta Wetlands Management Authority to turn it into a dumping ground. Waste is being dumped in Mollar bheri since the 1960s.

FIG 4.2: MAP OF NORTH 24 PARGANAS DISTRICTS



Secondary research shows that after the East Kolkata Wetlands (Conservation and Management) Act came into force in 2006, the newly formed EKWMA issued a no objection certificate (NOC), valid for a year on 1 August, 2007 on the condition that a boundary wall should be built around the dumping ground to check spillage and plastic should be segregated outside this area. The NOC was to be renewed every year after submitting a detailed report to the pollution control board and the EKWMA. After that the NOC issued by the EKWMA was never renewed. Neither was the boundary wall constructed, nor was the segregation made effective. As per the reports published in 2011, the officials of the EKWMA sent a notice to the

30 Source: Journal: Estimation of Municipal Solid Waste Generation and Future Trends in Greater Metropolitan Regions of Kolkata, India, 2014, by Swapan Das & Bidyut Kr. Bhattacharyya, Bengal Engineering & Science University



municipality in 2009 seeking the current status of the dump site, but the notice was ignored. In 2011 as well, Bidhannagar Municipality were again told categorically by EKWMA that the unauthorised dumping of waste at Mollar Bheri would be stopped by issuing a notice. However, the situation hasn't yet changed. The municipality continues to dump their waste at this place till date without renewal of NOC received from the East Kolkata Wetland Management Authority (EKWMA). Trucks collect garbage from the vats in and around the municipality and each truck makes two to three trips to the ground every day to dispose off the same.

Today the entire area of Mollar Bheri is a pigsty. An unmarked gate and dirt track leads to a ground strewn with plastic bottles, bags, chairs, vegetable peels, thermocol, used syringes, saline bottles, construction rubble, branches of trees and what not. And, of course, the ground one stands on itself is formed of layers of garbage, brought to a level by bulldozers. Pigs, sheep, cows and goats forage for whatever edibles they can find while rag-pickers too lookout for valuables. "The trucks start plying from early morning and keep coming here till five in the evening. A lot of waste is dumped here," said a local villager. In the midst of this is a corner marked for the under-construction burial ground for pets. But the most alarming sight is that of garbage at the bank of the water body.

East Kolkata Wetlands (EKW) is a Ramsar³¹ site that provides a natural sewer channel for the city and is also fodder to the wetland population who make a living from the fish and vegetables grown in these sewer-fed ponds (locally called bheries). It spans 125- sq km and consists of natural water bodies as well as man-made ones. The nutrients in the wastewater help in pisciculture. The wetland ecosystem comprises different plant species and mammals like Small Indian Civet and Palm Civet which depend on the wetlands for survival. There is a distinct difference between sewer and solid waste. The sewer water from the canals of Kolkata & its adjacent districts flows into the EKW. In fact, that is the uniqueness of EKW. But dumping solid waste is a different thing altogether. If done without precaution it may lead to filling up the wetlands.

The garbage at the bank leaves the wetlands under threat. First, the waste is not segregated and so many non-biodegradable items and toxic chemicals get dumped on the ground. And the waste has reached so close to the water that they can get blown in by the wind. The chemicals seep into the soil and harm the plants, fish, birds and every other life form that depends on the water.

The Wetlands (Conservation and Management) Rules, 2010, framed by the Union ministry of environment and forests under clause (iv) of Rule 4 prohibits such dumping of solid waste. The clause also specifies that

31 **Ramsar sites (related to wetland) in India** comprises Indian wetlands deemed to be of "international importance" under the Ramsar Convention.

The **Ramsar Convention** (formally, the **Convention on Wetlands of International Importance, especially as Waterfowl Habitat**) is an international treaty for the conservation and sustainable utilization of wetlands, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific, and recreational value. It is named after the city of Ramsar in Iran, where the Convention was signed in 1971.



if such practice existed before the rules came into force, it has to be phased out within six months from the commencement of the rules. And yet the dumping continues.

In 2011, it was reported that the structure for a vermin-compost plant had been made at this ground, but when we visited the site, nothing of the sort was found. Everyday more than 30 trucks of Bidhannagar Municipality dump the waste materials at this dumping ground. Local residents from a village beside the dumping ground, collect reusable products from the waste for their own use. The area is also easily accessible to village children who roam around to collect useful materials from the waste. The villagers complain bad odour due to heap of untreated waste and claim that they suffer from respiratory problem, headache etc. due to this.

4.3 Probable Hotspots in South 24 Parganas

South 24 Parganas is an adjacent district of Kolkata. It is situated on the south of Kolkata. Study team identified few environmentally hazardous places of this district that are very close to Kolkata. Chowbaga was one of the study sites here:

Chowbaga

Chowbaga a site very close to Topsia area, is situated within the protected East Calcutta Wetland area and is known for waste plastic processing works. Though it falls under the South 24 Parganas jurisdiction, it is situated at a stone's throw from Kolkata city. Like Topsia, waste plastic segregation, plastic burning, Shredding are the main operations here, being done for almost 40 years.

There are nearly 1000 waste plastic processing units. They have the same association of waste

FIG 4.3: MAP OF SOUTH 24 PARGANAS DISTRICT





plastic processing traders as Topsia. The waste plastic processing units situated on the road side starts at Topsia and ends at Chowbaga, with Topsia under KMC and Chowbaga under South 24 Parganas. The area also has few Aluminium smelting units.

The working condition, environmental & health hazards of these waste plastic processing units is similar to Topsia. Workers and owners are aware about hazards of this operation, but continue working in the same environment for the sake of their livelihood. Workers involved in the processing units shared that they currently had health problems like respiratory diseases mainly due to shredding & burning, skin irritation/infection for using canal water. This is the same canal which runs through Topsia. The owners appeared to be a little scared as there have been some raids by Government earlier. Though few units were shut down after raids, after few days they began their operations. When study team visited the site, the owners felt it might be another raid and were a little cautious.

Bio-medical wastes, mainly plastic products like syringes were also found being treated in couple of units in Chowbaga. According to people in the areas, some hospitals of Kolkata including Government illegally channelize their BMW to this unit. **One of the unit owners revealed that "Few hospitals of Kolkata including Government call us to dispose off their plastic hospital wastes such as syringes, medicine bottles, saline bottles etc."** There were four such units who dealt with plastic hospital wastes. **Plastic waste from hospitals like cannula, syringes, medicine bottles, saline bottles** were found lying in considerable amount near and inside these units. The shredding operation carried out here is similar to Topsia. Wrappers of food items, nylon bags are also being melted in some units of Chowbaga, like those are found in Killkhana area. Open burning of plastic was also observed. During the visit, the area was covered with black toxic fume & there was pungent smell in the air, probably due to recent burning. However, it was not possible to gather more information about such operations as people involved in the process refused to share details.

An Aluminium smelting unit with proper pollution control mechanisms was also observed at the roadside just beside the canal. However, during the visit the pollution control equipment were found nonfunctional. Black smoke was coming out of the unit. Workers of that particular smelting unit were found carrying out the smelting operation without any protective gear. However, they were reluctant to share details of their health problems. Besides, there are few units where leather shavings and trimmings are processed.

Furnace operation is carried out here on open ground to burn leather shavings and trimmings. According to local residents these operations have been continuously carried for last 8-10 years. Leather waste comes from nearby Calcutta Leather Complex, located at Bantala. Residential colonies are very close to these leather waste processing units and such operations are carried out in the same agricultural field.



Chowbaga is mix of suburban and village area. Waste plastic processing units are situated on one side of the canal and other side has a residential colony. Aluminium smelting units are situated in the residential area. Residents complained about respiratory problem, water pollution due to all these operations. They especially mentioned that the breathing problems increase when the units are carrying out melting operations. Though Chowbaga is a village, however all these illegal activities make the whole area highly polluted, especially the land closer to the city. It is surprising to see that the units are smoothly continuing their illegal business right under the nose of administrative. Growing urbanization coupled with human greed is rapidly taking away the fresh and green environment of our villages too.





5 Conclusion and Recommendations

It is critical to have in place proper, well planned interventions that would either stop the manifestations of high risks or limit the same. This section highlights conclusions drawn from secondary research and primary research as well as future scope in terms of recommendations.

5.1 Conclusion

Kolkata, the capital city of West Bengal, is a hub of various activities, especially for the eastern & north-eastern parts of the country. It attracts people not only from different parts of the state but also from other eastern & north-eastern states who come here in search of a livelihood. Being a metropolitan city as well as centre for trade of these regions, the city has seen thousands of small- and medium-scale manufacturing and recycling enterprises come up, including several units in the unorganised sector. It is important to understand the impact of such widespread activity, since many of them flout environmental and occupational safety norms and end up creating Hotspots. *This study has made an attempt to identify such areas of potential risk in Kolkata.*

Though most areas visited during the study had issues related to environmental safeguards, some clusters have been identified as potential Hotspots because of the prevailing risks and severe conditions related to the environment and health. The areas are hotbeds of hazardous activity with most dealing with toxic chemicals and risky processes. There are innumerable hazards in almost all these workplaces caused by obviously unsafe working conditions such as unguarded machinery, slippery floors, inadequate fire precautions or poor ventilation. Almost all units had issues related to storage, use and disposal of chemicals or hazardous materials, high temperature processes with no controls on emissions and, last but not the least, waste disposal.

Most units, especially those working on plastic processing, leather tanning, e-waste or lead acid battery recycling, had very poor ventilation and the work areas were full of dust, waste materials, toxic chemicals, making it uncomfortable for the workers. None of the workers were wearing appropriate protective gear and none of the units had any OH&S instructions in their unit for workers safety. The workplace environment was also very unhygienic. Many units, especially of plastic processing and the landfills, had children, young boys and women workers. Sometimes women carried their small children along with them to the workplace exposing them to the precarious conditions and hazards.

There are several recognized industrial estates, situated within the city and some of these estates were also found creating pollution. They neither allowed the study team to enter their premises nor provided them with any information. However close observation and feedback received from the local residents indicate that these estates may also have potential harm on the environment, mainly due to poor pollution control mechanisms or negligence.

Most of the recognized as well as unorganized industrial units are close to or within residential area and unauthorized units have grown under the coverage of Kolkata Municipal Corporation which is illegal as per Industrial Siting Policy laid down by WBPCB. Toxic smoke and dust from the units, open dumping, burning and spilling of chemicals affects the health and safety of workers and residents. Though this study is limited in nature, it is evident that these critical areas in Kolkata need immediate attention.

5.2 Recommendations

Hotspots represent a serious problem for the environment since they have ramifications in terms of degradation of the environment as well as adverse high risk impacts on health of individuals and other flora and fauna too. Therefore it is critical to firstly have a detailed analysis of the extent of risks and harm possible in a hotspot, secondly it is of utmost importance to identify remedial options, thirdly to ensure that remedial measures are in place, properly planned implementation mechanisms need to be designed and operationalized. Finally, to ensure sustainability and positive impacts of the implementation of remedial measures, long-term monitoring mechanisms need to be in place. These are areas that require intervention in immediate future to avoid and reduce existing negative impacts and risks on the environment and health.

It is therefore suggested that more extensive studies to understand the issue of contamination in the unauthorised industrial areas in Kolkata need to be conducted in lines of the points mentioned above (critical areas for intervention). Additionally, there is also a need to do a technical study on the issue with proper sampling of air, water and soil to understand the extent of risk and damage.

Every site has its own unique challenges and issues that may initially appear complex and daunting. These issues need to be correctly addressed within a framework of local, state and central legislative requirements. Intervention has to be need-based and well planned suiting the need for addressing the particular risks of any particular hotspot. Customized solutions need to be developed depending on various factors that prevail in a particular region. Case studies of various countries need to be undertaken for best practices so that these can be replicated in India.

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Toxics Link
for a toxics-free world

Delhi

H2 (Ground Floor),
Jungpura Extension,
New Delhi - 110014
India
Tel: 91-11-24328006, 24320711
Fax: 91-11-24321747

Kolkata

52D/12/1A,
Babubagan Lane,
Kolkata - 700031
India
Tel: 91-33-40673018



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