

Gokhale Memorial Girls' College

To whom it may concern

Date: 17/04/2023

Subject: Completion of Group Projects by GEOA students of Semester VI in 2021-22

The undersigned certifies that the students mentioned in the table have completed their Group Projects for the University of Calcutta B.A./B.Sc. Semester-VI Examination, 2022 in CC-14 course of Geography Honours. These students are mentioned in the modified template of Metric 1.3.2 (DVV completed) as GEOA (SEM VI- Gr. A to Gr. D) with pdf link of the four projects stated alongside the groups of students.

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7	013-1212-0185-19	19/BSCH/0154	Sukanya Mallick	GEOA
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4	013-1211-0196-19	19/BSCH/0158	Adrija Dawn	GEOA
5	013-1211-0216-19	19/BSCH/0186	Pinanki Das	GEOA
6	013-1211-0221-19	19/BSCH/0145	Renita Nath	GEOA
7	013-1211-0188-19	19/BSCH/0209	Yashaswi Raman	GEOA
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An Analysis Of Fire Hazards In Slums Of Kolkata

With Special Reference To Tangra And Basanti Slums



ACKNOWLEDGEMENT

In the accomplishment of the project successfully, many people have best owned upon me their blessings and the heart Pledge support. This time I am utilizing to thanks all the people who have been concerned with this project.

I am highly indebted to my teacher Dr. Krishnakali Roy for her suggestive guidance and constant supervision as well as for providing necessary information regarding the study area and also for their support in completing the Project. I convey my deep gratitude to our teacher. Dpt. of Geography, Gokhale Memorial Girls' College.

Last but not the least, I would like to express my gratitude towards my friends for their kind Co-operation who helped me a lot in finalizing the project within the limited time frame.

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Introduction

Hazard is a potentially damaging physical event, natural phenomena or human activity that may adversely affect human life, property or cause social and economic disruption or environmental damage.

According to Myers and Bedford (1981), disasters are social phenomena which stem from the interaction between hazards and vulnerabilities.

Urban fire is one of the most common and dangerous man-made hazards often causing massive damages to life and properties; however, be manageable by taking preventive measures. It occurs frequently, particularly if the urban layouts are unplanned and congested.

Slums are one of the very common features of cities whether it is metro or small town. Over the years the issues related to slum has challenging the government authorities as well as the organisations working on poverty and human rights. In 1947 after Partition Kolkata City faces huge influx of population which contributed a lot towards the growth of several slums and refugee colonies in the city. Over the years growth of population due to natural causes and migration from the nearby towns and states has led the situation out of control.

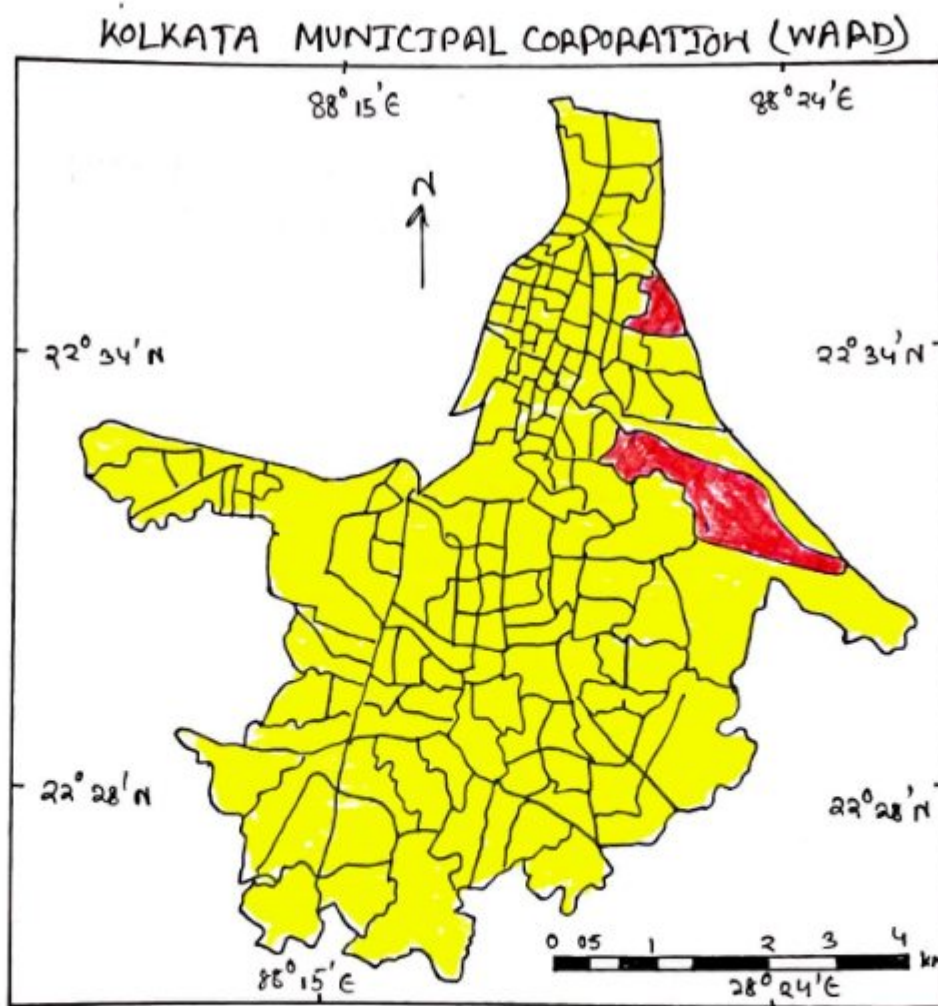
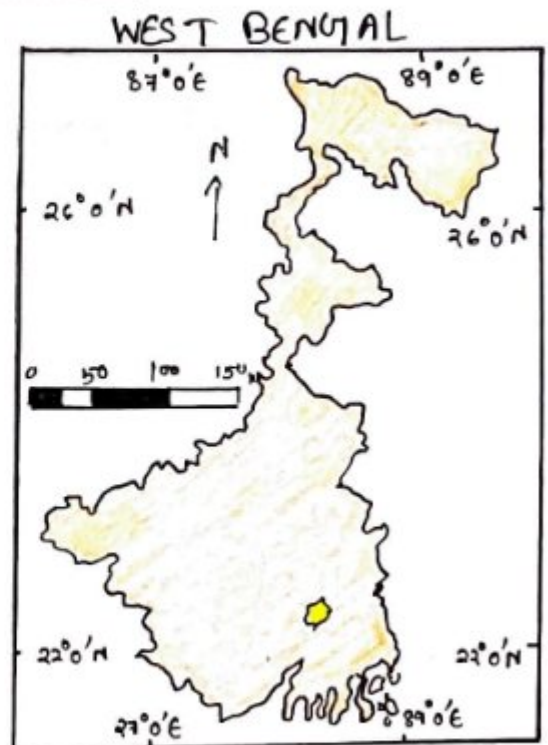
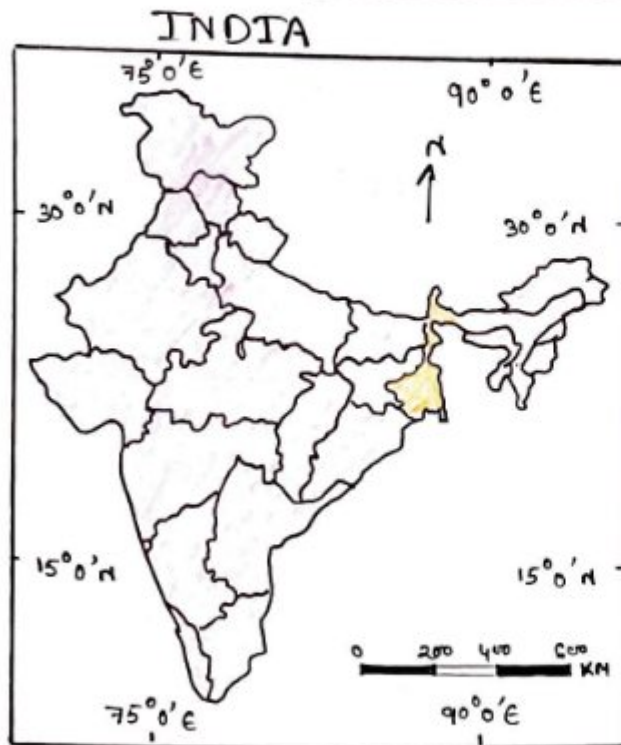
The slums of Kolkata can be divided into groups, the older slums located in the heart of the city some as old as 150 years and the more recent slums mostly located in the outskirts of the city. Few slums exist on the western, eastern and north-eastern side of the bypass which are located on raised land that was previously low-lying wetlands (Bheri Region). Slums of Kolkata are considered the most vulnerable areas in the city where fire frequently breaks out.

Every year, slum fires are reported in the city, rendering hundreds homeless. The shanties are constructed with bamboos, plastic, wood, old worn out bed sheets and bed covers, all of which are highly combustible substances. On top of that the residents cook their meals in their shanties and most of them store kerosene. Illegal hooking from electric posts is also rampant in these slums. All these add to their vulnerability to catch fires.

The state Government fire and emergency services department had decided to involve slum dwellers to arrange a workshop to train them in fire fighting and to spread awareness. But it is difficult to educate the slum dwellers on preventing fire as their economic condition forces them to use combustible materials to build their shanties.

The present study was undertaken with objectives to identify the causes of fire hazard in slum areas of Kolkata concerned mainly with two major slums namely Basanti Colony slum in Ultadanga and Tangra slum, to examine the consequences of fire disaster on slum dwellers in study areas.

LOCATION MAP



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SOURCES -

1. Report of Borough VII and III, Kolkata Municipal Corporation.
2. Ward office date of 14 no. & 58 No. ward, Kolkata Municipal Corporation.

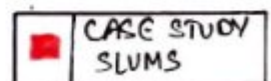


TABLE: SOME MAJOR FIRE ACCIDENTS IN KOLKATA SLUMS

PLACE	DATE	TIME	INCIDENT	MAJOR CAUSE	INJURED	CASUALTY
Basanti Colony	12th January 2010	12:30 am	A dangerous fire accident engulfed one life and rendered around 2500 dwellers homeless.	Burst of Gas Cylinders	15	1
Tangra	27th May 2008	5:50 am	Two girls were killed after a fire broke out in the Tangra. Two others were sustained industry burn injuries are being treated.	Fire in leather industry	2	2
Tangra	19th March 2008	12:55 pm	A fire broke out at a leather factory, where huge quantities of plastic and industry inflammable materials were stocked in Tangra.	Fire in leather industry	1	—

Objectives—

The major objectives of this study are to :

- 1) To analyze the fire accidents in various slum areas of Kolkata.
- 2) To examine the causes and consequences of fire accidents in slums area of Kolkata with special references to Basanti Colony and Tangra slum.
- 3) To formulate mitigation strategies to ignore fire accidents in Kolkata slum in future.
- 4) Protect life, property and other identified resources in Kolkata.
- 5) Restore and maintain fire-dependent early successional communities that existed historically.
- 6) Educate the public regarding the role of fire as a natural disturbance mechanism that regulates vegetation composition and structure in Kolkata.

Methodology -

As stated in the syllabus the report has been prepared on secondary data.

The study is an attempt to focus on the various fire accidents in the slums of Kolkata with special reference to Basanti Colony and Tangra slum with a necessary preparedness plan.

For the fulfilment of the objective of the study secondary data has been used to procure necessary information and data required for the analysis.

Secondary information such as statistical data, report, maps, journals, articles has been collected from various Government and Non-government organisations such as Kolkata Municipal Corporation, Borough offices, 32 and 58 no. Ward offices, archives of various newspaper reports.

An Overview of Conditions in Kolkata Municipal Corporation

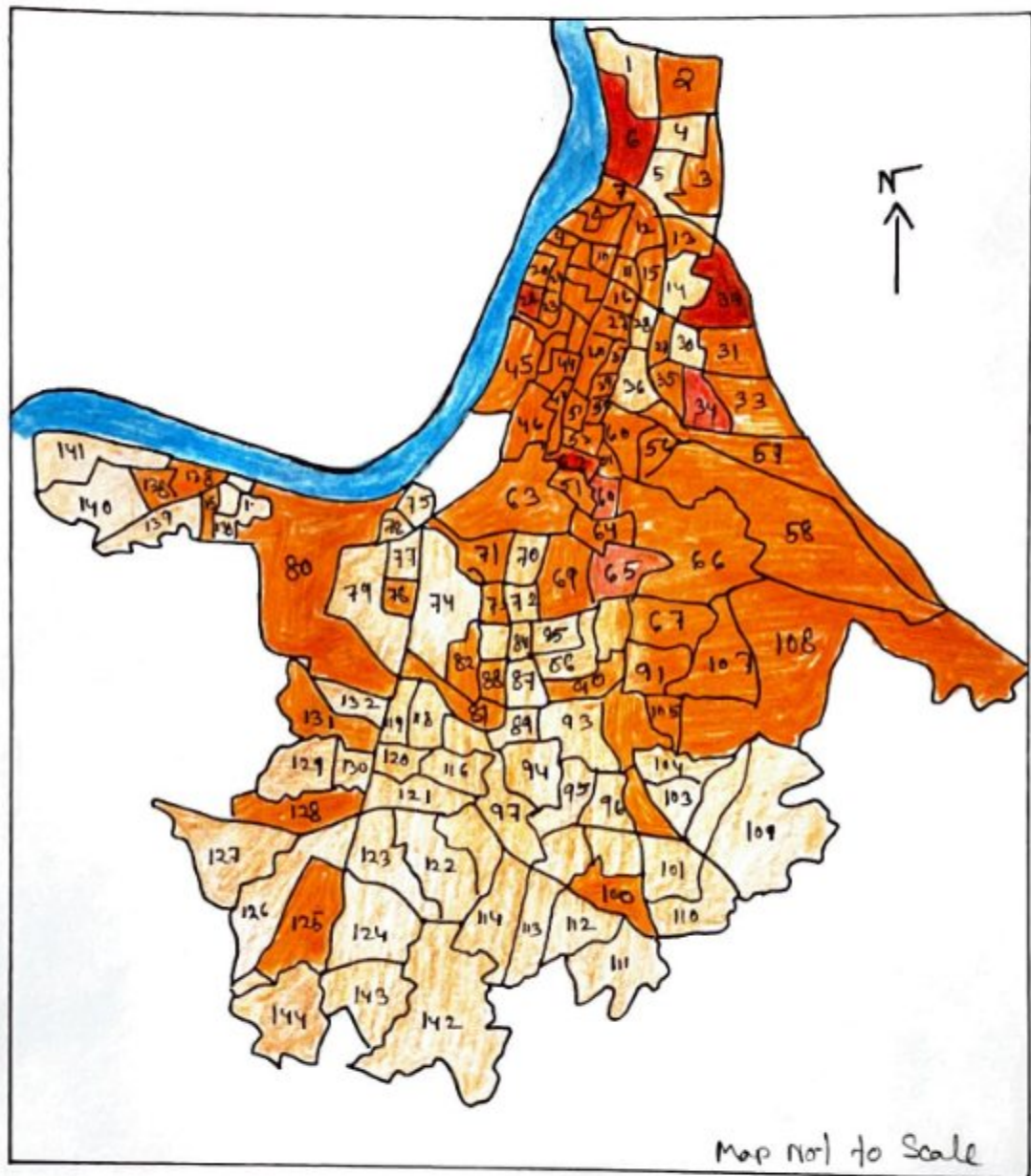
Kolkata Municipal Corporation (KMC) is the local government of the Indian City of Kolkata. The state capital of West Bengal. The civic administrative body administers an area of 206.08 square kilometres. It is located at $22^{\circ} 82' N$ of latitudes and $88^{\circ} 20' E$ of longitudes in Kolkata, West Bengal.

The city is divided into 144 administrative wards that are grouped into 16 boroughs. It is one of the oldest urban centres developed by the British.

The city was not developed in a planned way, so it has a complex city character which has resulted in a number of human and environmental problems including fire hazards.

Faulty Electronics, Flammable and Combustible materials, Human Error, Lack of awareness among people etc leading to the fire accidents in KMC. The KMC consists of 144 wards, so we have chosen Basanti Colony and Tangra as the case study area because of the difficulty in conducting a case study on fire accident in such a large area.

FIRE ZONE MAP OF KMC AREA



Source -

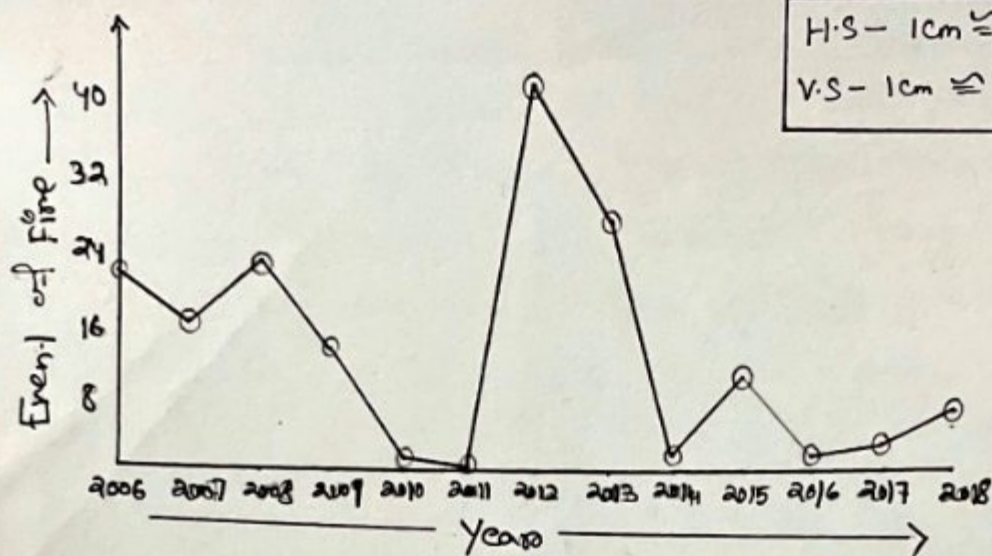
1. Report of Borough - VII and III Kolkata Municipal Corporation.

2. Ward office data of 14 no & 56 no ward, Kolkata Municipal Corporation.

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LEGEND	
	< 1
	1 - 4
	5 - 9
	10 - 13

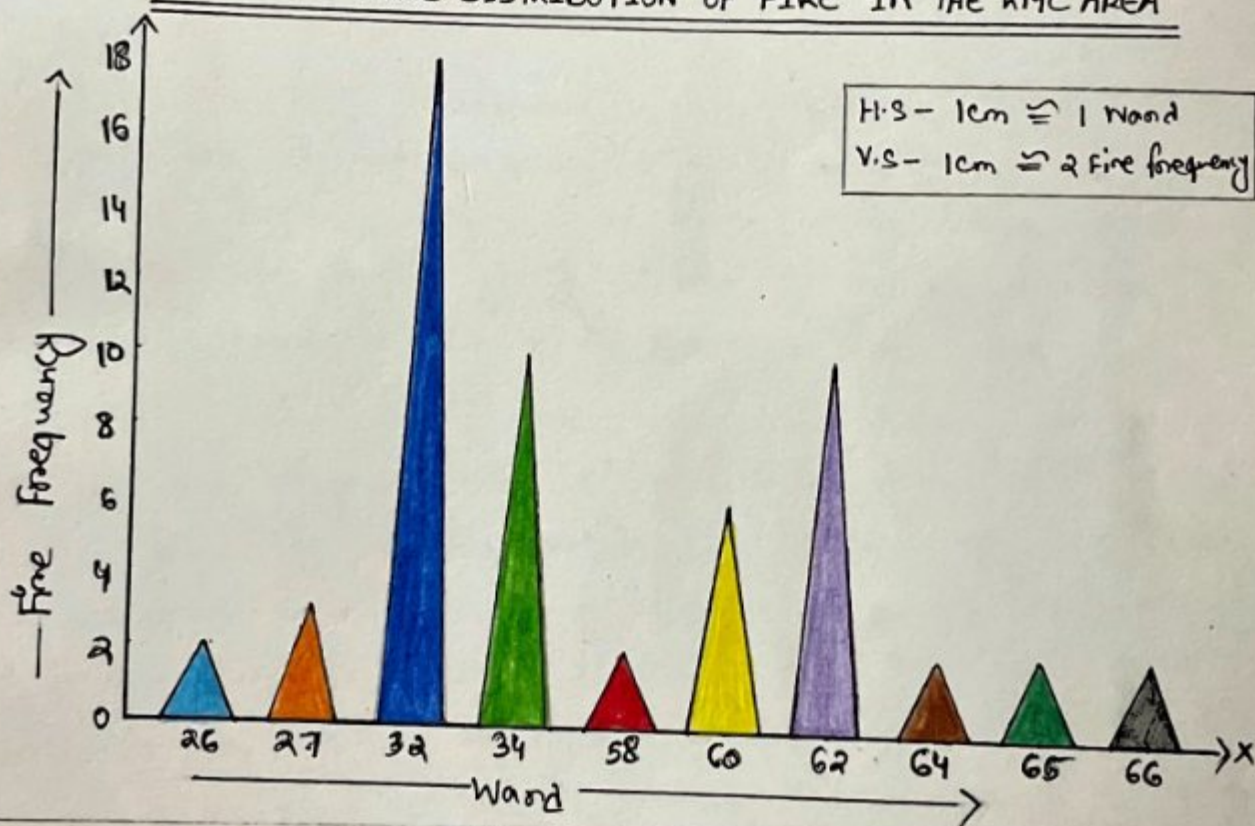
FIRE EVENTS IN THE KMC AREA (2006 TO 2018)



H.S - 1cm $\cong$ 1 Year

V.S - 1cm $\cong$ 8 event of fire

WARD-WISE FIRE DISTRIBUTION OF FIRE IN THE KMC AREA



H.S - 1cm $\cong$ 1 Ward

V.S - 1cm $\cong$ 2 Fire frequency

DIFFERENT TYPES OF FIRES IN KMC MARKET AND SHOPPING COMPLEX AREA



INDEX	
■	A Type Fire
■	B Type Fire
■	C Type Fire
■	D Type Fire
■	E Type Fire
■	K Type Fire

H.S - 2cm $\cong$ 1 type of fire

V.S - 1cm $\cong$ 20 Fire Events

Fire Events in KMC Area -

The fire events during the period of 2006-2018 shown by line graph. The maximum number of fires (41) occurred in the year 2012 and the minimum number of fires (1) took place in the previous year, 2011. The frequency trend shows two sets of occurrences first (2006-2011), the distribution trend is 22, 16, 23, 14, 3 and 1; and the second data set (2012-2018) shows the trends as 41, 27, 2, 11, 2, 3 and 6. In this series the maximum number of incidents fire was in 2012 and it was followed by the fire frequency of 27 in 2013. The fire events were not evenly distributed in the KMC area during this time period.

Ward-wise fire distribution in the KMC area shown by triangular bar. In this diagram 'x' axis shows ward and 'y' axis shows fire frequency. There were many wards which experienced only single fire event. It is clearly seen that the most vulnerable ward is 32 where has 18 fire cases.

Different types of fires in KMC market and shopping complex area shown by bar diagram. Here 'x' axis shows types of fire and 'y' axis shows no. of fire events. The A type of fires involves with ordinary combustibles, such as paper, some plastics, wood etc. The main character of such material are that they leave an ash after the fire. The B type is associated with flammable gas or liquids such as oil and gasoline. The C type of fire is involved with electric components, D type of fires concerned with metal, such as magnesium, sodium etc. And finally K type is involved with vegetable or animal cooking oil. The no. of A type fire was 79, B type fire were 31, C type fire were 55, D type fires were 3 and K type fire also 3, E type of fire was 0. It is clearly seen that in KMC market and shopping complex areas where A type of fire events is very high.

Case Study Area of Tangra Slum -

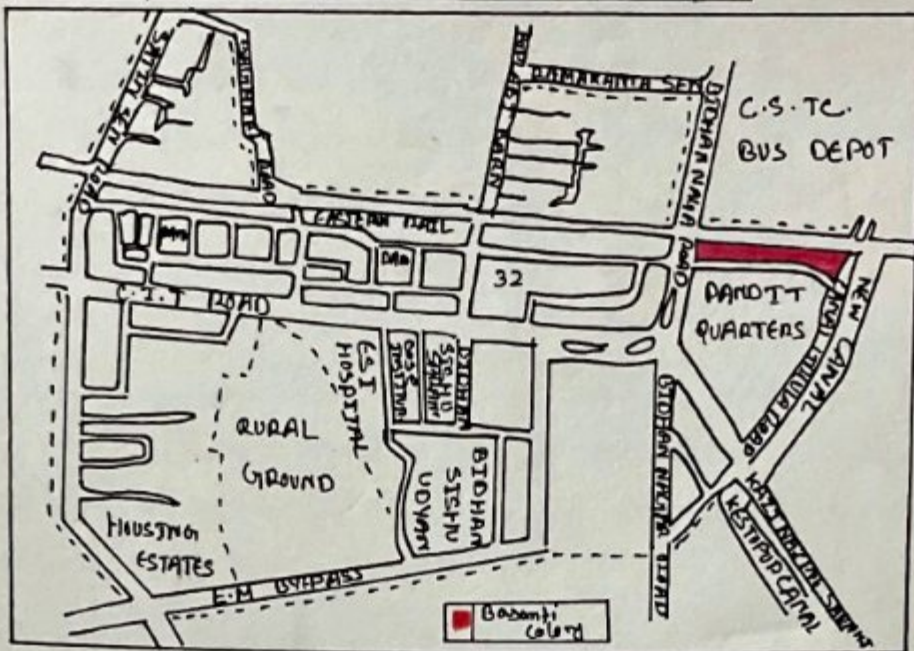
Kolkata is located in the eastern part of India at $22^{\circ} 28' N$ to $22^{\circ} 58' N$ and $88^{\circ} 10' E$ to $88^{\circ} 27' E$. spread roughly north south along the east bank of the Hooghly River.

Tangra slum is located in ward no. 58. The area lies in $22^{\circ} 30' 00'' N$ latitude to $88^{\circ} 23' 0'' E$ longitude and falls in the UTM grid of 45 8 64 2242 249365. The area is surrounded by Bebendoo Chandrao Dey Road in the north, Topsia road in South and Chingrighata Road and Maheswaritola Road in the west and eastern side respectively. Most of the standing structures have been built, over many years, by the industries Chinese, upon nearly and reclaimed low lying land. The Chinese specialized in the manufacturing of leather and they turned this part of the Kolkata city into an important destination for sourcing finished and semi-finished leather. Tangra is now the most popular destination for Chinese food in Kolkata.

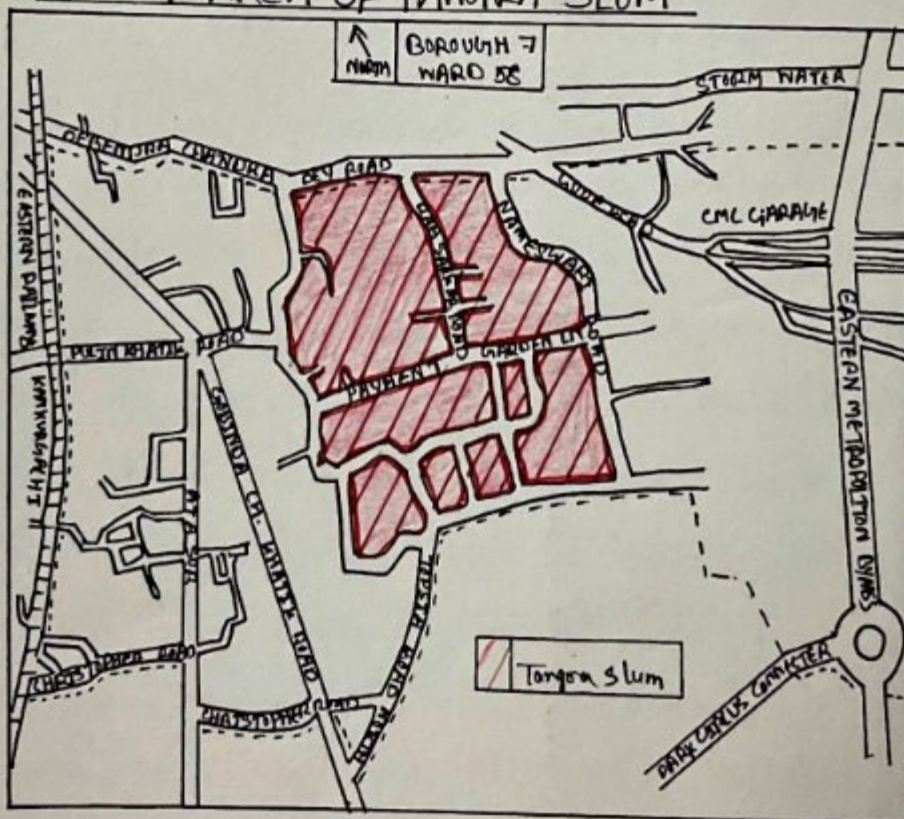
Case Study Area of Basanti Colony -

Basanti Colony is located in ward no 32. The area lies in $22^{\circ} 35' 40'' N$ latitudes $88^{\circ} 23' 32'' E$ longitude. The area is surrounded by Canal Circular road in the north. Ultadanga main road in the south and Bidhannagar Railway station and Bidhannagar Station road in western and eastern side respectively. Basanti Colony is also a special type of unauthorized slum which is developed along road side, canal side and Railway line side also by the poor people displaced from their place due to political instability, Unemployment and excessive increase in family size. The production of huts without basic infrastructure facilities eventually led to the growth of Basanti Colony. This growth continued and the vacant areas were rapidly filled up.

STUDY AREA OF BASANTI COLONY



STUDY AREA OF TANGRA SLUM



Source -

1. Report of Borough VII and VIII, Kolkata Municipal Corporation.
2. Ward office data of 14 and 58 no. Ward, Kolkata Municipal Corporation.

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A Case Study of Basanti Colony (12th January, 2010):

Basanti Colony is located in ward no. 32. The area lies in $22^{\circ}35'40''$ N latitude, $88^{\circ}43'32''$ longitude. The area is surrounded by coral circular road in the north, Uttadanga main road in the south and Bidhannagar Railway station and Bidhannagar station road in western and eastern side respectively.

A dangerous fire accident engulfed one life and rendered around 2,500 dwellers homeless on 12 Jan, 2010 Tuesday afternoon as it reduced a slum to rubble and severely damaged a market in Uttadanga.

Twenty-six fire tenders were called in to battle the blaze for two hours as the entire slum area in number 4 Basanti Colony - adjacent to platform number four of Bidhannagar Road station - comprising over 500 shanties. The flames, leaping up to 35 feet, were checked just before they spread to the P T Colony and Reserve Bank of India quarters nearby.

Shyamal Sarker a 25 year-old van rickshaw-puller, died in the blaze that was probably sparked by a short-circuit and then fuelled by the katatel and Country liquor hubs in the Uttadanga slum. The BC Roy Hawkers' Corner Market next to the slum was also gutted - according to residents, the fire broke out around 12:30 pm and spread rapidly to engulf the entire colony, spread over an area of 1,500 m x 500 m.

Thus, many people got injured. The flames spread faster because several LPG cylinders exploded. The place was being used to store and sell katatel and Country liquor. The highly inflammable articles fuelled the fire.

A Case study of Tangra Slum (27th May, 2008):

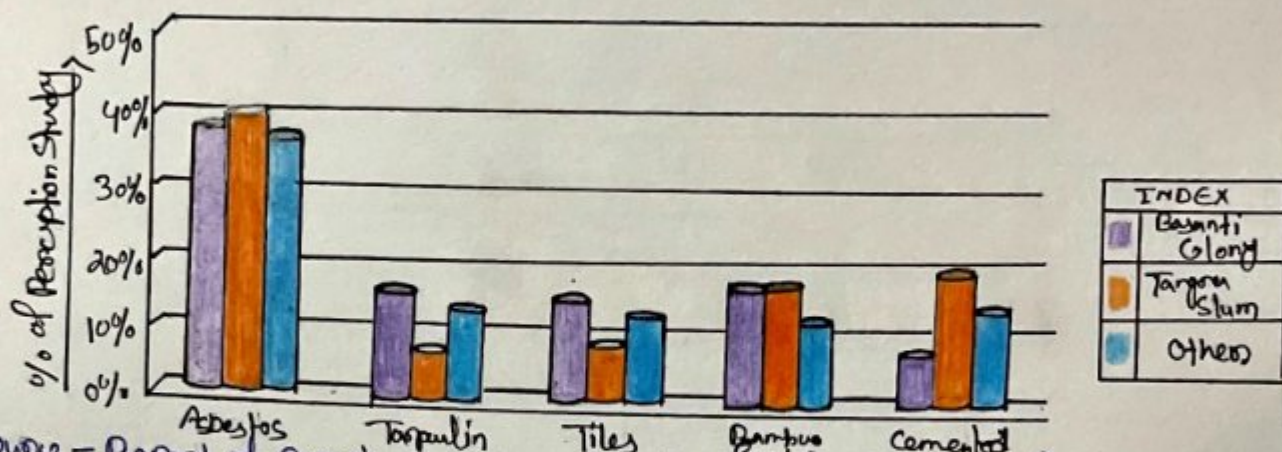
A five-years old and teenage girl were killed after a fire broke out their Tangra home on Monday afternoon. Two others, including a two-years old, sustained burn injuries and are being treated at NRS Medical College and Hospital. The fire spread fast because of serious fuel was stored in the room.

The fire broke out at Deepak Khatri's house at 69, D.C. Dey Road - situated in a slum - around 12:50 pm. Deepak an auto-rickshaw driver, was not home then his wife Lakshmi and three children - Amrit (5), Nayna (9) and Sugan (2) - were inside with two of their neighbours. Lakshmi managed to flee with Sugan but Amrit was trapped inside with neighbours Noorjahan Bini and Pinki Khatri.

A probe revealed that the fire had broken out from a kerosene stove. Lakshmi told Police that Noorjahan had come to her room with Pinki around 12:40 pm. Both live nearby. Noorjahan's husband, Israfil Islam alias Laden, is also an auto driver.

The duo sold spurious fuel for autos and a barrel of oil was stored inside Deepak's room. "Laden was waiting in his auto on the road and his wife and Pinki came to room to take the fuel. I was cooking on my kerosene stove and Sugan was playing near the door. Amrit was on the bed," said Lakshmi. "While Noorjahan was pouring fuel from a barrel, Pinki was playing with Amrit on the bed. Suddenly a spark of fire from the stove fell into the oil barrel," said Lakshmi.

Building Material Used



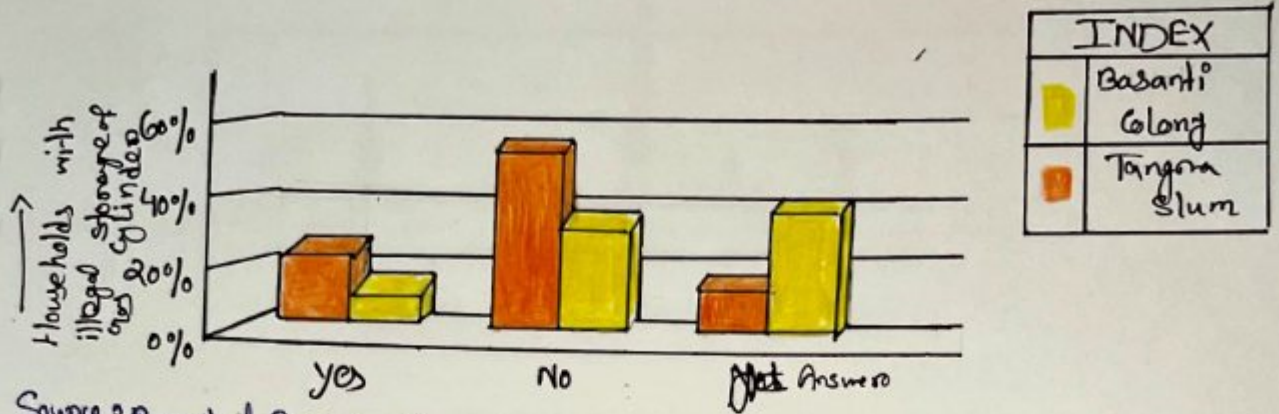
Source - Report of Borough VI and III Kolkata Municipal Corporation.

Materials used in Building houses:- Most of the slums of Kolkata are illegally developed along railway, canal side or by the road side. In Basanti Colony slum dwellers have illegally occupied by the railway side area & they do not pay any rent to the KMC & railway. A large no. of houses occupied by early settlers has been rented to the new comers. The rent obtained forms the major source of their income. In Tangra a large number of tanners and Chinese occupied these eastern fringe of Kolkata and resided there for a long time around > 70 years.

Most of slums of Kolkata are made by various flammable materials like bamboo, carpet, torpulin etc. which is one of the major reasons of fire accidents in slums. In 12th January, 2010 when a fire gutted Basanti Colony many officers of fire & Emergency Services reported that Basanti Colony was developed by various flammable materials illegally. Control of fire is too tough.

On the other hand, a different type of house pattern has been prevailed in Tangra. Roof is all cemented on asbestos type, wall is made by brick cement and floor is cemented.

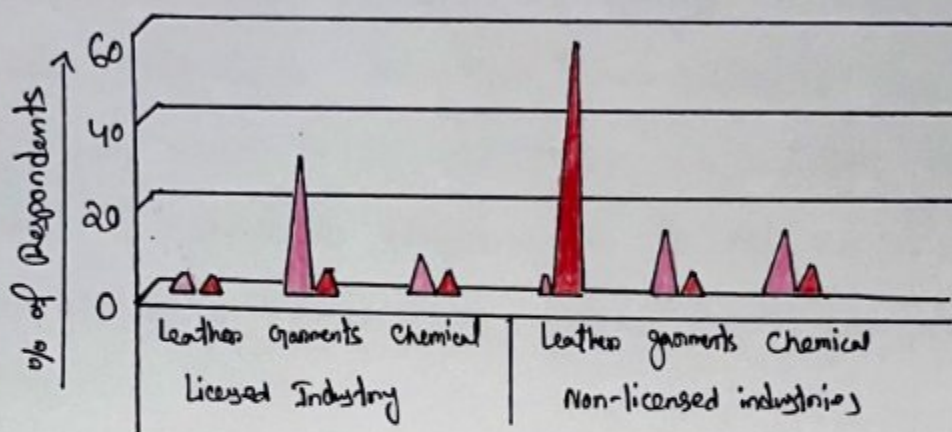
Illegal Storage of Gas Cylinders



Source: Report of Borough - VI and VII KMC, WARD OFFICE DATA OF 32. NO and 58 NO KMC

Storage of Gas Cylinders Illegally: Most of the slum dwellers of Kolkata do not afford LPG as fuel. Mostly they used kerosene, coal, or firewood. But the surprising fact in various slums that though they don't have LPG connection they used LPG illegally from various blacken. In Basanti colony 39% families are using kerosene, 27% families are using LPG and the remaining 34% used electric heater, firewood, kachhel etc. On the other hand in Tangra slum 70% families are using coal, 8% families are using firewood and 2% families are using cow dung cake. An important cause of frequent fire accident in these slums is illegal storage of gas cylinders and bursting of these gas cylinders. It is observed that many slum dwellers in these slums were attached with illegal LPG gas cylinder marketing business, for this they store many gas cylinders in a place from which many fire accidents taken place. In 20th December, 2015 fire accidents in Dum Dum Park, and January 2012 in Kalikapur and off course 12th January and 2010 fire accidents in Basanti Colony caused mainly due to illegal storages of gas cylinders and burst of cylinders.

Industrial Scenario



INDEX	
■	Basanti Colony
■	Tangra Slum

Source - Report of Borough VII and III, Kolkata Municipal Corporation.

Short Circuit due to illegal hooking - Electricity is due of the basic needs of everyday life. But in slums of Kolkata the scenario is different. From field survey it is observed that some dwellers have their own electric meter and the remaining part used electricity by hooking violating state electricity and CESC laws. Many fire accidents like 13th January, 2016 in brace bridge railway station etc. occurred due to short circuit. From which it is clear that to stop fire accidents in slums of Kolkata at first illegal hooking should be stopped at first.

Illegal Industries (Leather, garments, Chemical) - In various slums of Kolkata it is observed during field survey that illegal industries established here and there ignoring fire and emergency service license NERCB regulation and violating KMC rules. Especially in Tangra the illegal industries developed here and there. Though in 2000 West Bengal Government shifted them to Calcutta leather complex, Baulab. But overlooking this circular they run their illegal leather business in Tangra. Many firemen reported that illegal running of leather industries is the chief cause of fire accidents in Tangra Slum especially in fire accidents of 27th May, 19th March, 2008.

Storage of Illegal Country Liquors — Many slums of Kolkata reported a huge storage of illegal countries liquor which is also responsible for the fire accidents in Kolkata. In the study area it is observed. Many people store a huge amount of countries liquor which is a big reason of fire accidents in Basanti Colony & Tongra slum.

Causes of fire accidents in Basanti Colony and Tangra Slum

The possible reason for fire accident in Basanti Colony and Tangra slum are analyzed described below.

1. Materials used in Building houses — Most of the slums of Kolkata are illegally developed among railway, canal side or by the road side. In Basanti colony slum dwellers have illegally occupied by the railway a large no. of houses occupied by early settlers has been rented to the new comers. The rent obtained forms the major source of their income. Majority of the slum dwellers claim to be the owners of the houses ignoring the fact they are illegal occupiers of the land.

Most of the slums of Kolkata are made by various flammable materials like bamboo, carpet, tarpaulin etc. which is one of the major reasons of fire accidents in slums. In 12th January, 2010 when a fire galled Basanti Colony many officers of fire and emergency services report that as Basanti Colony was developed by various flammable materials illegally control of fire is too tough.

2. Storage of Gas Cylinders Illegally — Most of the slum dwellers of Kolkata do not afford LPG as a fuel. Mostly they used kerosene, coal or firewood. but the surprising fact in various slums that through they don't have LPG connection, they used LPG illegally from various blacken. Even they used electric heater as a fuel because they are used to frequent cooking so using electric heaters is common incident in Basanti Colony. Tangra slum and other slums of Kolkata.

In Basanti Colony, 39% families are using kerosene, 27% families using LPG and the remaining 34% used electric heater, firewood etc on other hand in Tangra slum,

70% families are using LPG, 12% families using kerosene, 8% families are using firewood and 9% are using coke. An important cause of frequent fire accidents in these slums is illegal storage of gas cylinders and burning of these gas cylinders.

3. Short Circuit due to Illegal hooking - Electricity is one of the basic needs of everyday life presently most of slum people have an access to electricity and others have a rented beside this some families are not able to get electricity as they are very poor and cannot pay for electricity. But in slum of Kolkata the scenarios are different from field survey is observed that some dwellers have their own electric meter and the remaining part used electricity by hooking violating state electricity and CSE laws. Many fire accidents like 13th January, 2016 in brace bridge railway station, 23rd January, 2014 in etc.

4. Storage of Illegal Country Liquor - Many slums of Kolkata reported a huge storage of illegal country liquor which is also responsible for the fire accidents in Kolkata. In the study area it is observed many people store a huge amount of country liquor which is a big reason of fire accidents in Basanti colony and Tangra Slum.

5. Overlooking the guidelines specified by Fire and Emergency department - West Bengal fire and emergency services announced guidelines to check fire accidents. violating these guidelines slums of Kolkata store gas cylinders illegally. use flammable goods in building houses. use electricity by hooking, violating national code etc. As a result, these slums turned ashes and some innocent people lost their lives.

Strategies and Mitigation -

1. Use non-combustible type building materials to build your houses.
2. Sufficient space around the perimeter of building for easy access and manoeuvrability of fire service vehicles shall be maintained.
3. Don't store LPG cylinders in basement or dwelling house.
4. Don't hook electric post.
5. There should be atleast 2m gap between two houses.
6. Don't practice illegal leather on other industries violating guidelines of WBPCB West Bengal Fire and Emergency Service etc.
7. Keep ready the fire extinguishing arrangement in the slum.
8. Keep ready atleast one ambulance in every slum.
9. Keep fire away from karpurin or other flammable goods.
10. Banned of storage of illegal country's liquor.
11. Make solar slum by installing solar domes.
12. Make focus on construction of Pucca houses for slum dwellers under various West Bengal housing scheme.

Conclusion —

Kolkata is located in the eastern part of India at $22^{\circ}28'N$ to $22^{\circ}58'N$ and $88^{\circ}10'E$ to $88^{\circ}27'E$. spread roughly north south along the east bank of the Hooghly River. Kolkata sits within the lower reaches Delta of eastern India.

The KEIP Slum Master Plan indicates that 1.92 million population in KMC is estimated to live in slums/bustees and other low income settlement zones and pockets. The slums residents are the most vulnerable group of urban area because they are low income group and the place where they live.

The study was about the fire hazard in the slum areas of Kolkata concerned mainly with two major slums namely Basanti Colony slum (ward No. 32, $22^{\circ}35'40''N$ latitude, $88^{\circ}23'32''E$ longitude) in Uttadanga and Tangra slum (ward No. 58, $22^{\circ}33'0''N$ latitude $88^{\circ}23'0''$ longitude).

From the above analysis, it can be interpreted that the fire accident in slums of Kolkata has become a regular incident due to many factors.

Though various programmes were taken by WBPCB, West Bengal Fire and emergency services, Government of West Bengal, but still slum dwellers practices various illegal activities.

West Bengal fire & emergency services announced guidelines to check fire accidents. Violating these guidelines slums of Kolkata store gas cylinders illegally, use combustible construction materials for building houses, illegal usage of electricity by hooking and tapping, violating national building code, negligible knowledge of firefighting mechanism are also responsible for fire hazards in slum area.

Government of West Bengal has installed 800 solar domes in Tangra, Topsia slum to make country's 2nd and state's 1st solar slum in Tangra. The principle solution for fire problems in the slum is to increase awareness on how to mitigate and deal with fire. Government and the fire brigade should raise awareness among the slum dwellers and improve infrastructure to manage the fire problems.

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Table: Frequency of Fire Events in the KMC Area (2006-2018)

Year	Fire Event
2006	22
2007	16
2008	23
2009	14
2010	3
2011	1
2012	41
2013	27
2014	2
2015	11
2016	2
2017	3
2018	6

Table: Ward wise Fire Distribution of Fires in KMC Area

Ward	Fire Frequency
26	2
27	3
32	18
34	10
58	2
60	6
62	10
64	2
65	2
66	2

Table: Different Types of Fire in KMC Market and Shopping Complex Area

Type of Fires	No. of Fire Events
A Type Fire	79
B Type Fire	31
C Type Fire	55
D Type Fire	3
E Type Fire	0
K Type Fire	3

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23/6/22



Fire Accidents (Basanti Colony)



Fire Accidents (Tangora)



Fire Accident
(Basanti Colony)



Fire Accidents
(Tangora)



Fire Accident
(Basanti Colony)