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GLOBAL GEOSPATIAL  
INFORMATION MANAGEMENT



# POST - PLUS-CODE OFFERING SPATIAL TAGS

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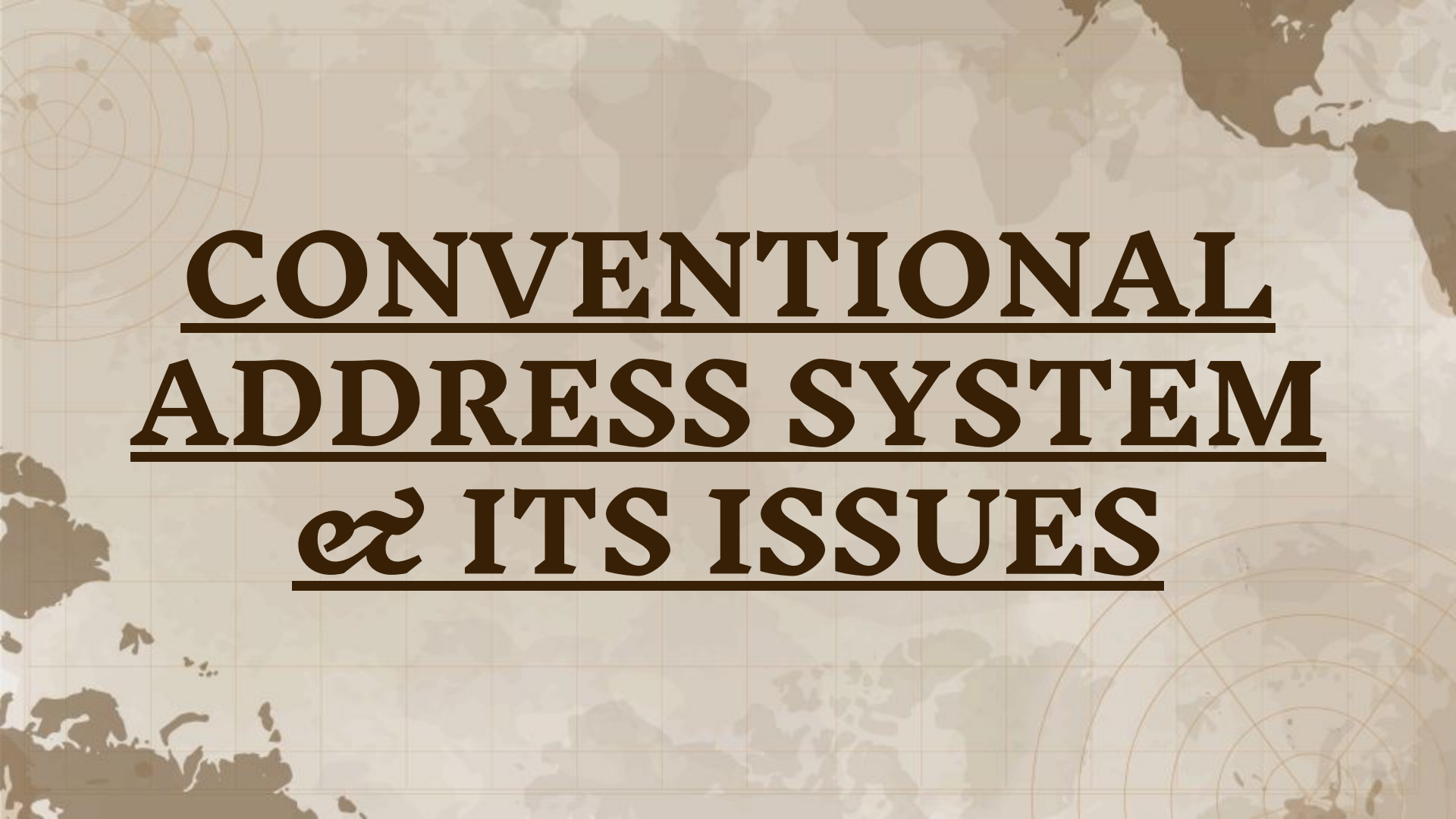
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**BENEFITS OF  
PLUS CODES**

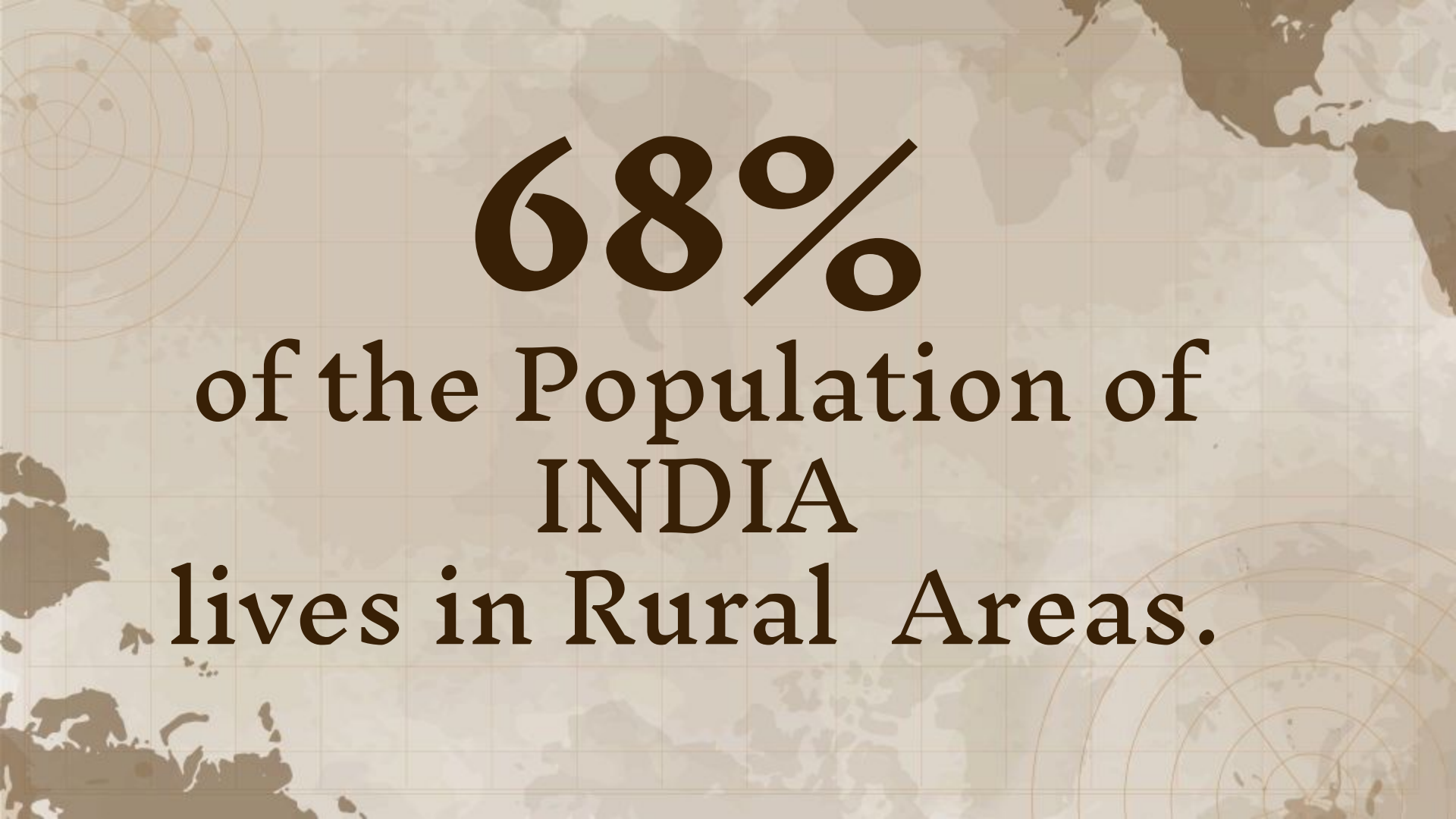
**V**

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**CONCLUSION**

The background of the slide features a light beige world map with a faint grid overlay. In the top-left and bottom-right corners, there are circular radar-like patterns with concentric circles and radial lines.

# **CONVENTIONAL** **ADDRESS SYSTEM** **& ITS ISSUES**

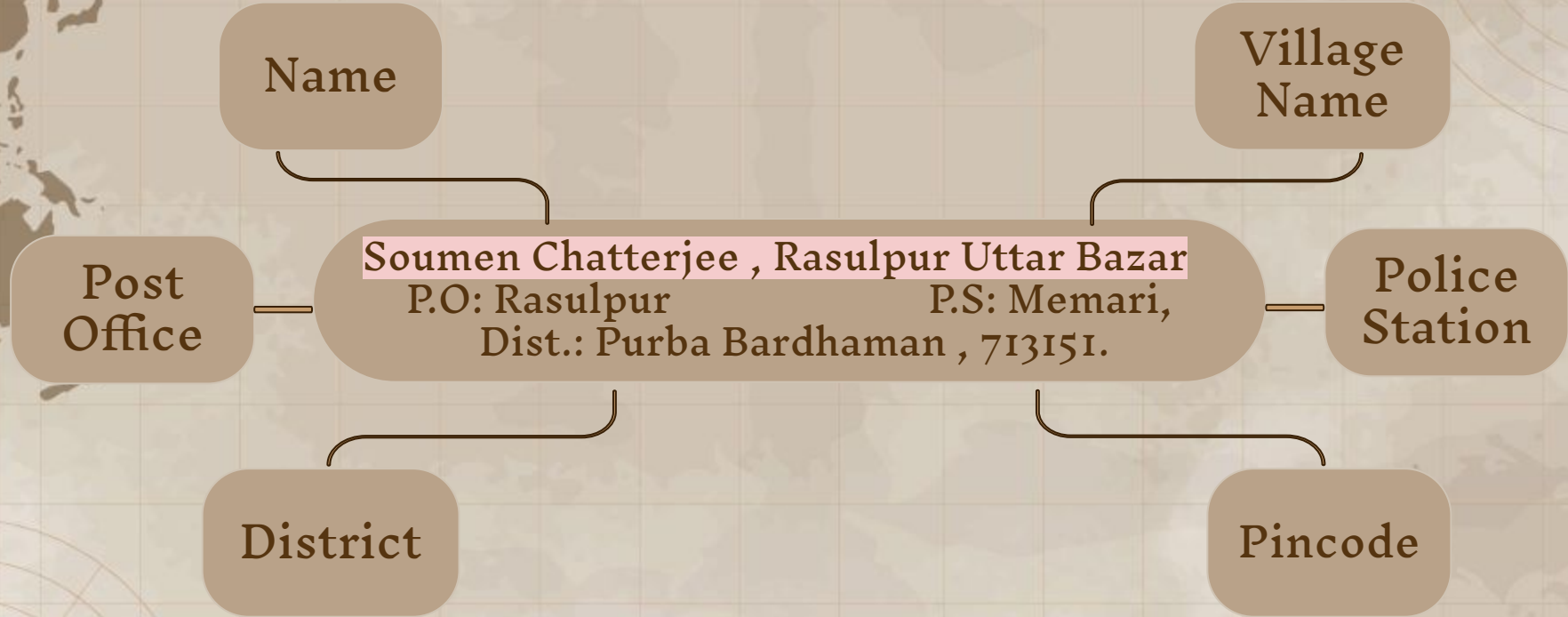
The background of the image is a light beige color with a faint, stylized map of India. Overlaid on the map are several concentric circles, resembling a radar or target pattern, in a slightly darker beige tone. The text is centered and reads:

**68%**

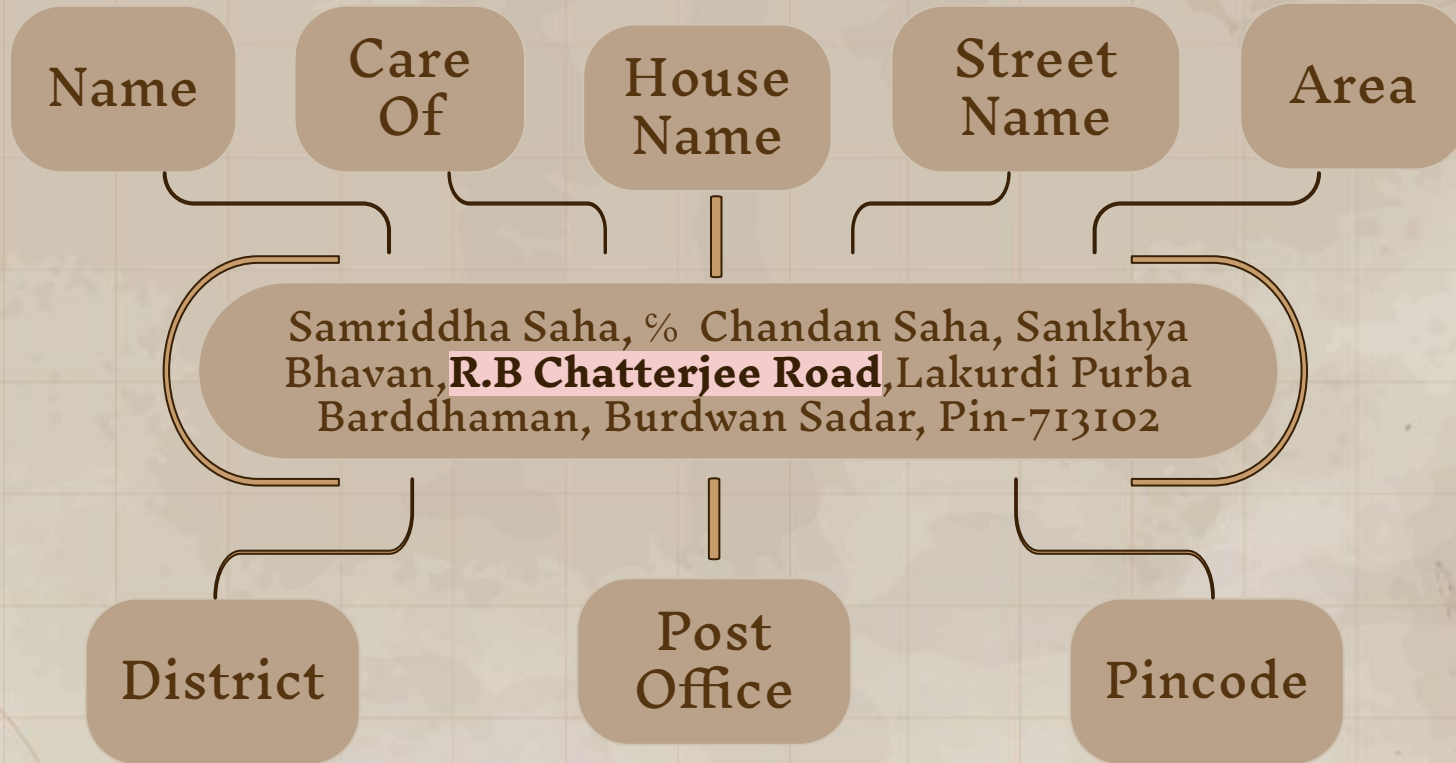
**of the Population of  
INDIA  
lives in Rural Areas.**



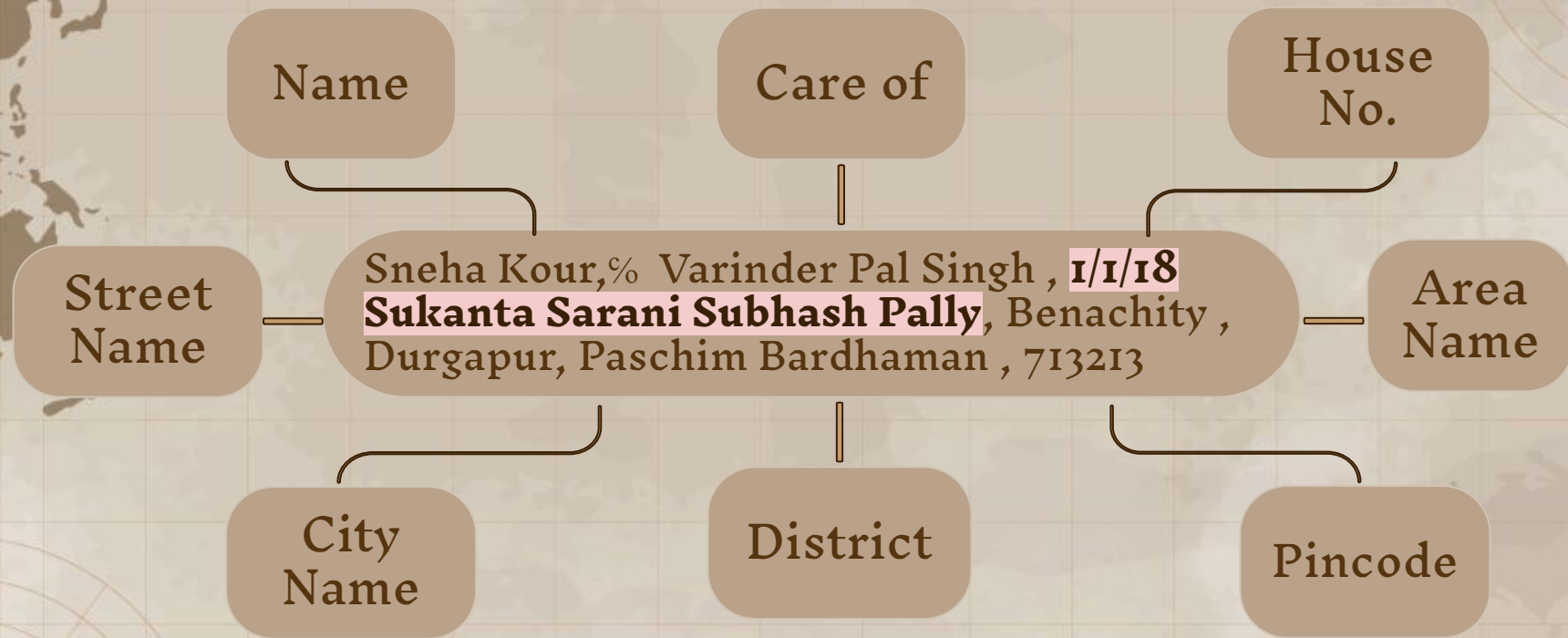
# Rural Address



# Semi-Urban Address



# Urban Address





# 30%

**of deaths happen due to delayed ambulance services.**

# 50%

**of heart attack cases reach the hospital late.**

The background is a light beige map of the world with a faint grid. Four location pins are placed on the map: one in the top left, one in the top right, one in the bottom left, and one in the bottom right. The word "OBJECTIVE" is centered at the top in a bold, brown, serif font, underlined.

# OBJECTIVE

**CONVERTING POLYGONAL  
ADDRESSES (PIN)  
TO  
POINT FEATURE**





# INTRODUCTION TO PLUS CODES



# WHAT IS PLUS CODE ?

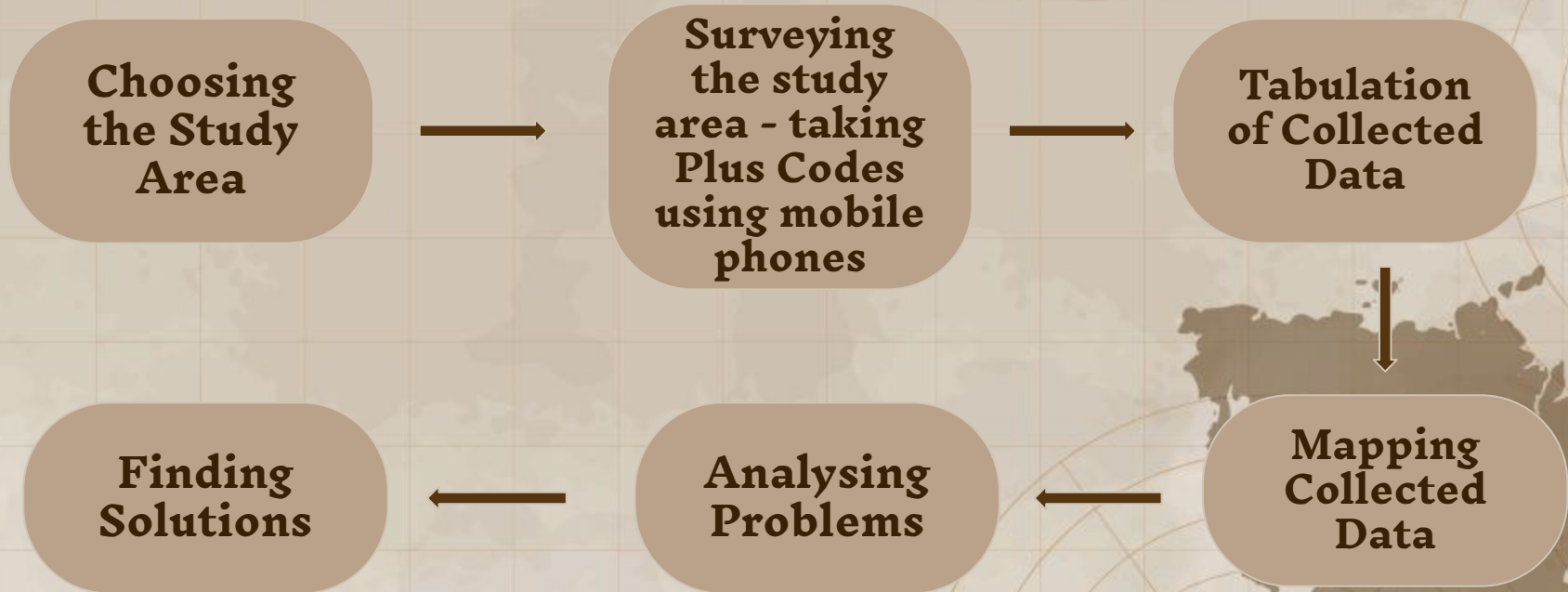
- **Plus Codes are free, open-sourced, digital addresses that provide accurate addresses for locations, including for places that don't have accurate formal addresses. It is a geocoded system for identifying any geographical area/point on Earth, even when address does not exist.**
- **Plus Codes are like street addresses for people or places that don't have any proper address. So instead of having addresses with street names and numbers, Plus Codes are based on latitude and longitude and displayed as a alpha-numeric system.**

**7J9W F9FF+47**

**Area code**

**Local code**

# METHODOLOGY





A top-down view of a dark wooden surface. In the upper left, a pair of silver and black binoculars lies diagonally. To their right is a vintage map with a compass rose and a brass compass. Further right is an open, aged notebook with blank, yellowed pages. The background is a dark wood grain with some faint, circular, golden lines in the corners.

# CASE STUDY

In this section ,We would show the efficiency of Plus Codes in two different study areas-

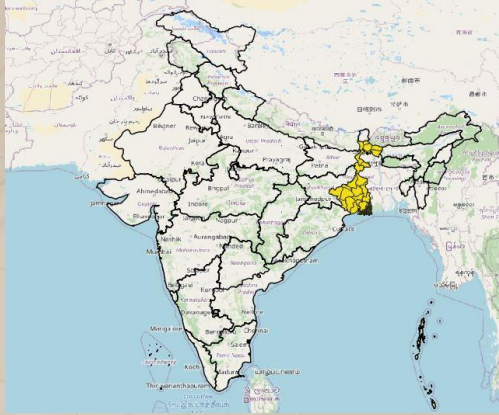
- i.Trading Town
- ii. Industrial Town

# STUDY AREA -I





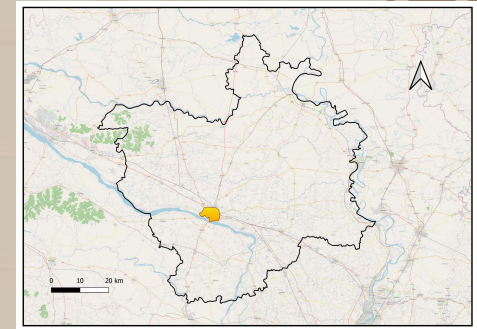
# Ward No- 26, Burdwan Municipality, Purba Bardhaman, West Bengal, India.



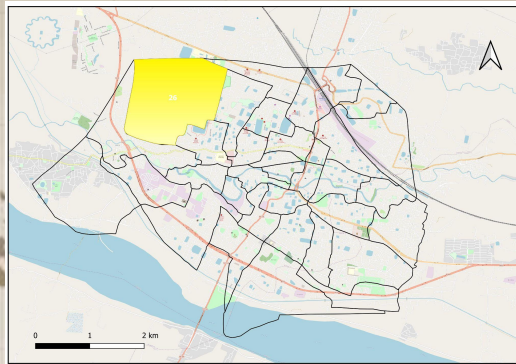
I



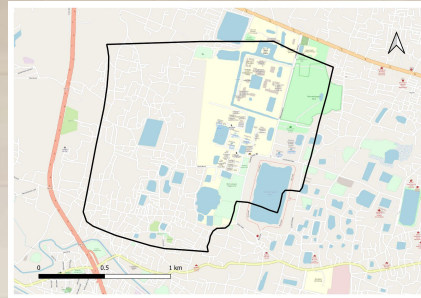
II



III



IV



V

I. India

II. West Bengal

III. Purba Bardhaman

IV. Burdwan Municipality

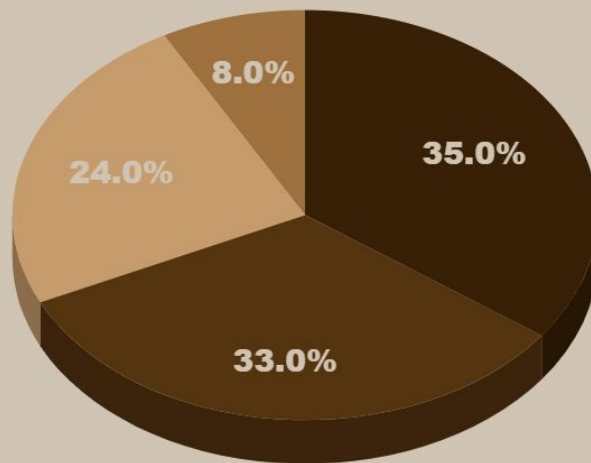
v. Ward no 26(2.47 Sq Km)

## **—Major Findings of the survey—**

- **There are many people having same name bearing the same pin codes, so delivery executives become confused and the services are disturbed**
- **There are many unnamed streets in the Burdwan town, so proper landmark can not be recognised**
- **There are various unnamed houses also in this municipality**
- **Most of the people are not aware about this Undressing Issue**

# —Study Area Analysis—

## Ward No-26, Burdwan Municipality



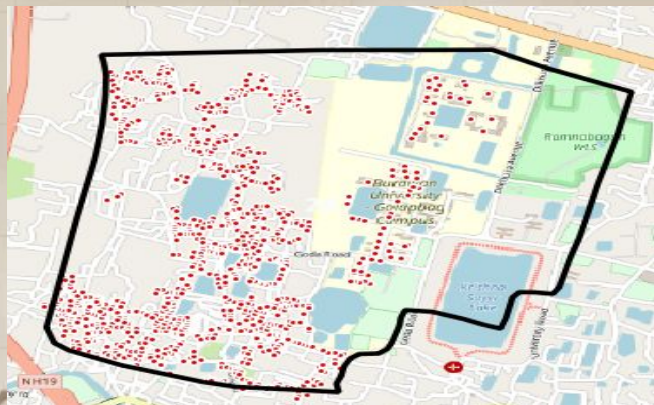
● Rajgaunj, Purba Bardhaman    ● Lakurdi, Karmakar Para, Bardhaman  
● Goda, Lakurdi, Purba Bardhaman    ● Others



# AREAL ADDRESS(Municipal Ward) Vs PLUS CODES



A	B	C	D	E
Name	address	Pin_code	coordinates	plus code
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2447866, 87.8344555	6RVM+VQ6 Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2447327, 87.8344173	6RVM+VQV Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2447943, 87.8345655	6RVM+VR8 Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2447148, 87.8346684	6RVM+VVM Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2446264, 87.8347623	6RVM+VW2 Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2446159, 87.8346838	6RVM+RVV Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2444810, 87.8347033	6RVM+QVW Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2445179, 87.8345652	6RVM+RR4 Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2446741, 87.8349185	6RVM+VX7 Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2445555, 87.8348853	6RVM+RXC Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2443993, 87.8348324	6RVM+QV4 Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2444363, 87.8348699	6RVM+QVH Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2443611, 87.8348022	6RVM+PVV Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2442795, 87.8345507	6RVM+PR7 Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2442287, 87.8346352	6RVM+MVR Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2441840, 87.8348310	6RVM+MWG Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2440780, 87.8346802	6RVM+JVM Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2440672, 87.8347905	6RVM+JVF Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2439822, 87.8346594	6RVM+HVV Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2437610, 87.8346121	6RVM+GR5 Burdwan, West Bengal
Bamoon Para, Lakurdi, Purba Bardhaman		713102	23.2439915, 87.8349098	6RVM+HXV Burdwan, West Bengal

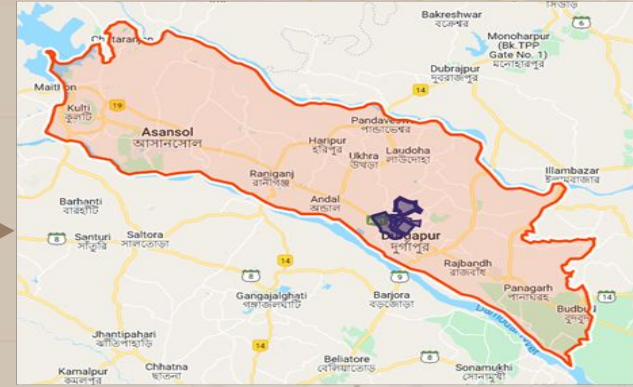
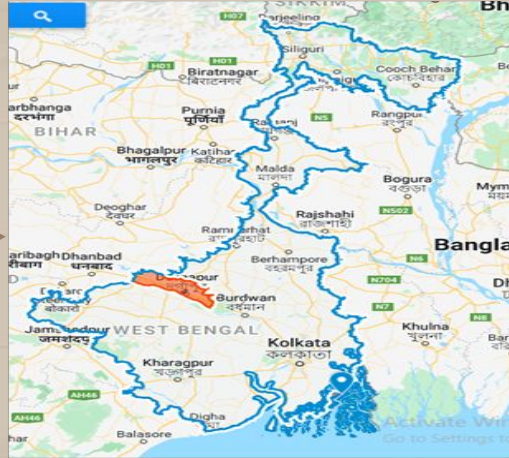


# STUDY AREA- II

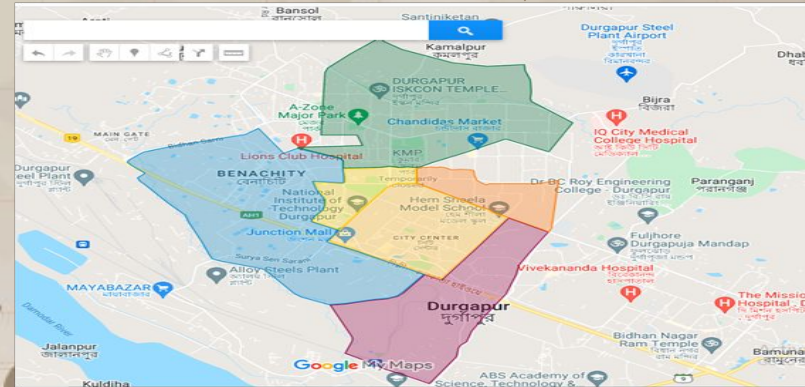




# Durgapur (6 pin codes-40.69 Sq Km) , Paschim Bardhaman, West Bengal, India.



The second study area we chose a city (Durgapur) which has many pin codes within a small area due to the high population density. The main problem which we found out was that the addresses used by the households or other non-residential establishments were based on either the name of the road or the nearest well known landmark.



## **—Major Findings of the survey—**

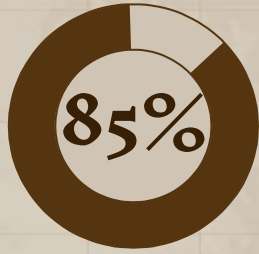
- Houses on the same road use the same address which is a big issue and is confusing as well .
- Due to industrialization and population growth in the area the pin code area of 713205 was splitted into 2 parts, smaller of which was given the pin code 713214 but we observed that the addresses written in front of the houses still had the previous pin code. To validate this we asked the residents about their pin code. All the responses were 713205. The residents were oblivious to the fact that their pin code had been changed.
- Many places in the industrial area (southern part of the pin code area of 713210) had no particular address.
- The pin code area boundaries are not very well defined due to which the border between two pin codes are puzzling and difficult to perceive.



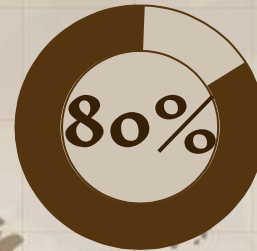
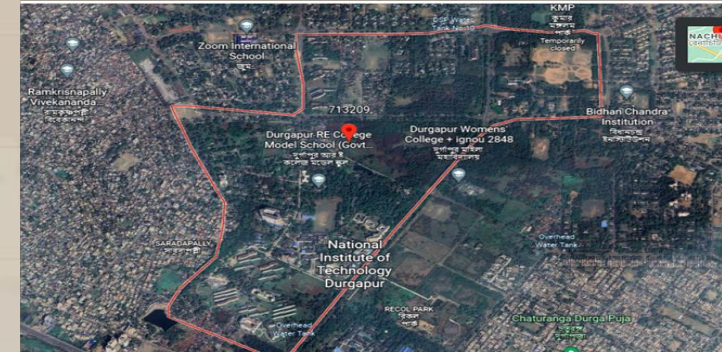
# —Study Area Analysis—

**Pin Code- 713216**

**50% of the addresses given by the residents in the area are same.**



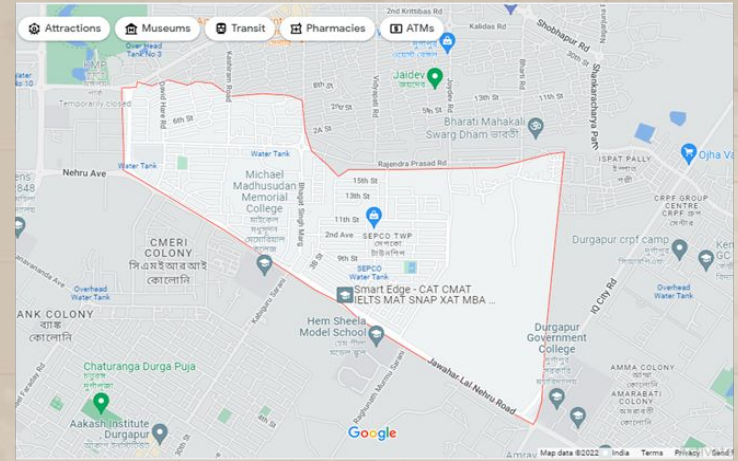
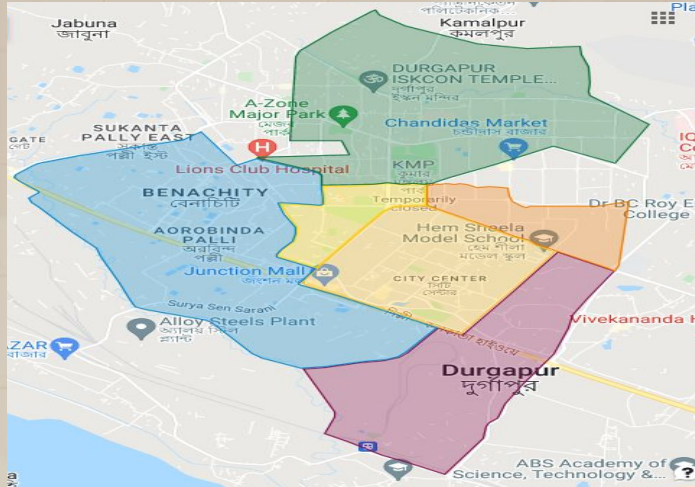
**Pincode- 713209**  
**85% of the area is NIT Durgapur**



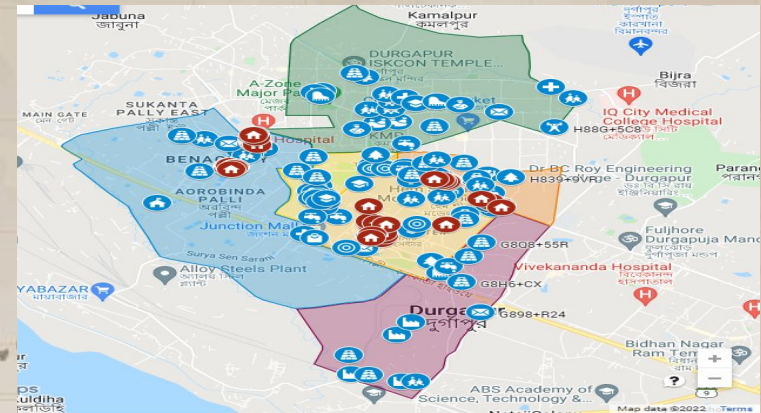
**Pin Code-713210**  
**80% of the area is covered by Heavy Industries.**



# AREAL ADDRESS(Pincode) vs PLUS CODE



Sl no.	Name	Address	PLUS Code	Latitude	Longitude
1		1A/47 NEHRU AVENUE , C-ZONE, DURGAPUR 713214	H836+25F	23.55276902	87.31037898
2		1A/2 NEHRU AVENUE , C-ZONE, DURGAPUR 713214	H826+X54	23.55260386	87.31048528
3		1A/13 NEHRU AVENUE , C-ZONE, DURGAPUR 713214	H826+W49	23.5525727	87.31039158
4		1A/ 37 NEHRU AVENUE , C-ZONE, DURGAPUR 713214	H826+X4F	23.55267353	87.3102969
5		1A/21 NEHRU AVENUE , C-ZONE, DURGAPUR 713214	H825+XVP	23.55273787	87.30960018
6		34,Gautam Buddha Marg,C-Zone, Durgapur 713214	H835+5RC	23.55310468	87.30944405
7		14,Gautam Buddha Marg,C-Zone, Durgapur 713214	H835+69H	23.55330836	87.30844148
8		2/14 Sepco Twp, Durgapur 713214	G8W9+P82	23.54692931	87.31826805
9		2/41 Sepco Twp, Durgapur 713214	G8W9+Q5W	23.54711044	87.31793164
10		2/33 Sepco Twp, Durgapur 713214	G8W9+V2J	23.54733052	87.31745123
11		2/19 Sepco Twp, Durgapur 713214	G8X8+2QC	23.54769527	87.31685305
12		2/13 Sepco Twp, Durgapur 713214	G8X8+4J6	23.5479006	87.31651023
13		1/6 Sepco Twp, Durgapur 713214	G8X8+C44	23.54863052	87.31530664
14		1A/47 NEHRU AVENUE , C-ZONE, DURGAPUR 713215	H836+25F	23.54651604	87.31827698
15		4/15 Central Park, doctors colony , City centre , durgapur 713216	G7QX+RX8	23.53959404	87.2995041
16		4/9 Central Park, doctors colony , City centre , durgapur 713216	G7QX+VRH	23.53974652	87.2996094
17		N-3 Doctor's Colony, City Center, Durgapur 713216	G8Q2+H8V	23.53902736	87.30079487
18		C-1 ram kinnar be sarani, City Centre, Durgapur 713216	G8Q2+RCQ	23.53981371	87.30105575
19		B-26 Nandalal Bithi. Non-Comman House Estate. City Center, Durgapur 713216	G8R2+2CR	23.54036822	87.30099414





# —Data Analysis—

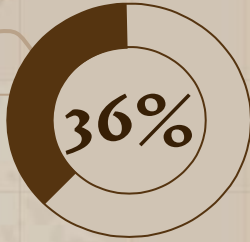
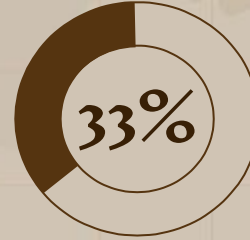
## Follow up Questionnaire Survey

- To learn about the problems in a more detailed manner a questionnaire was designed. We surveyed residents and essential services such as The Police, Fire Brigade, Ambulance service and Delivery Services of the two cities.
- The residential questionnaire contained questions regarding the problems faced due to address, awareness about online location sharing and whether they want to use Plus Codes in the future.
- The non residential questionnaire contained questions regarding problems faced by the emergency services due to inaccurate addresses and whether they had ever used location sharing services in their field of work.



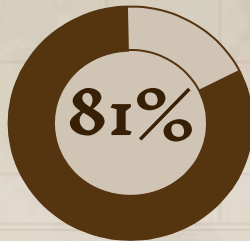
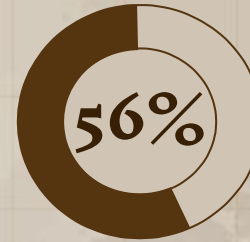
# Survey Results(Study Area 1)

Usage of Location Sharing.



Problems Incurred while calling Emergency Services.

Problems Incurred During Deliveries due to addresses.

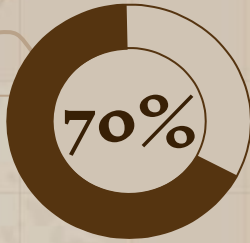
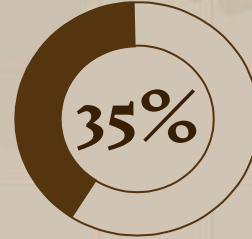


Addition of Plus Codes to Addresses.



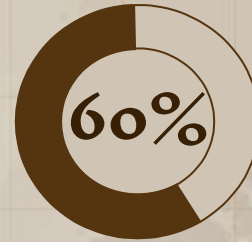
# Survey Results(Study Area 1)

Usage of Location Sharing.



Problems Incurred During finding an address.

Loss of life due to Late Arrival because of Address Confusion .

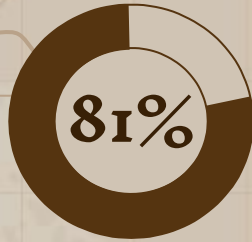
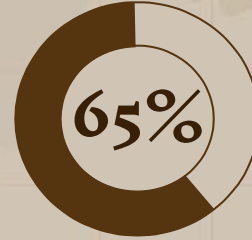


Would they use Plus Code in their Line of Work.



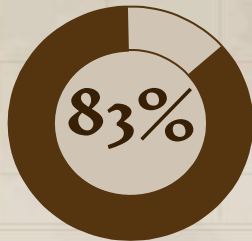
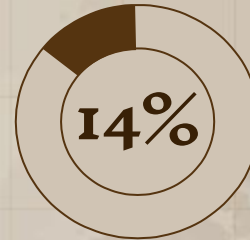
# Survey Results(Study Area II)

Usage of Location Sharing.



Problems Incurred while calling Emergency Services.

Problems Incurred During Deliveries due to addresses.

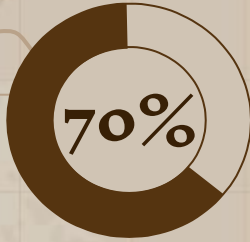
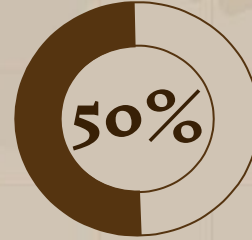


Addition of Plus Codes to Addresses.



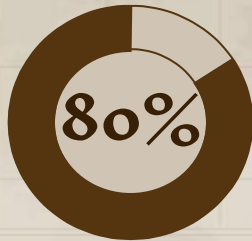
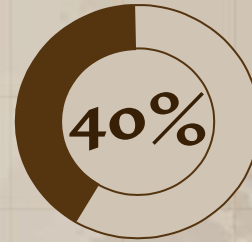
# Survey Results(Study Area II)

Usage of Location Sharing.



Problems Incurred During finding an address.

Loss of life due to late arrival because of Address Confusion.



Would they use Plus Code in their Line of Work.





# —Benefits of using PlusCodes—

- **Open source and easy to use-** Plus Codes technology is open source and free to create and use. They are much shorter than traditional global coordinates, so they're easy to share.
- **Accessible offline-** Plus Codes work whether you're online or offline—you don't need an internet connection.
- **User Friendly-** Plus Codes can be accessed through Google lens also. So instead of typing the code one can easily use the code through his phone camera only which also give the users the accurate location .
- **Accuracy-** It can promptly locate one's location, no matter how dense of a cluster it might be in, and they are shorter in length, compared to global coordinates, which makes them easy to share too.
- **Language independent-** Plus Codes are based on a set of 20 alphanumeric characters. They do not include easily confused characters, are not case-sensitive, and they exclude vowels.
- **Versatile -** Plus Codes represent an area. The resolution of the area can be changed by adding or removing characters after the “+” sign.



# CONCLUSION

# **Addressing the unaddressed**

**I. Developing countries like India have billions of people living in crowded and underserved urban areas. We can solve the un-addressing problem for the population and also build an example, using a digital addressing solution that is open source, free, and scalable.**

**II. The Plus Codes can be also used for cases like Dharavi (Asia's largest slum) Mapping the slums and providing their residents with a proper address could be done.**

# Emergency Services

Plus Codes can be especially helpful for people and organizations in emergency and crisis response scenarios. With Plus Codes, not only can people share their location quickly even without an address, but they can now do so by simply opening up Google Maps and tapping on the blue dot to view, copy and share their Plus Code location. A Plus Code can then be entered into Google Maps to help locate and navigate to that location.

## Example:

1. Ahead of Cyclone Yaas (2021), Kolkata Police had urged people to download Google's Plus Codes feature on their smartphones so that they can share their location even without an internet connection, in case they get trapped during the storm.



Rescue services during Yass cyclone



**II. Plus Codes can be especially helpful for people and organizations in emergency and crisis response scenarios.**

**Emergency services like ambulance, fire trucks and police aid can promptly be obtainable.**



## **Delivery services**

Plus Codes can also be integrated in Delivery services for authenticating the correct address that the package is to be delivered. Easy accessibility of services such as water, sanitation, healthcare, electricity, opening bank accounts, postal services, etc further saving time and guiding service providers to reach individual doorsteps.

## **Property Disputes**

We think the Plus Codes can help with keeping digital address records and in digitizing the properties and create a spatial database of properties and the addresses using Plus Codes or similar Geocoding Services.

Government of India has recently launched a program called **Digital India Land Records Modernization Programme**. The Plus Codes can help in the initiative.

# OUR FUTURE PLAN

For Forthcoming Work we have thought about developing an app with the grid based geocoding system for summoning Emergency services, and For generating addresses.



# Our Research Team Members

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East Bardhaman  
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LAKURDI  
লকুর্দি

2022-05-16(Mon) 11:04(am)

	Decimal	DMS
Latitude	23.246317	23°14'46" N
Longitude	87.833551	87°50'0" E

40°C  
104°F

Ekspina Institute of Nursing





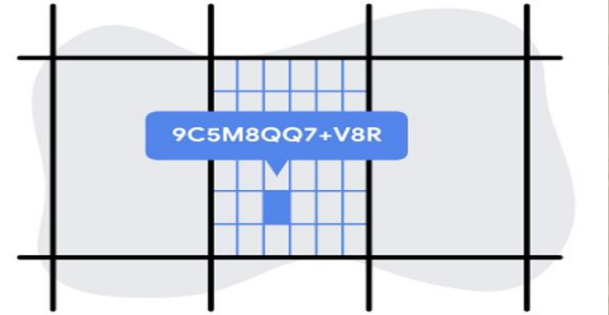
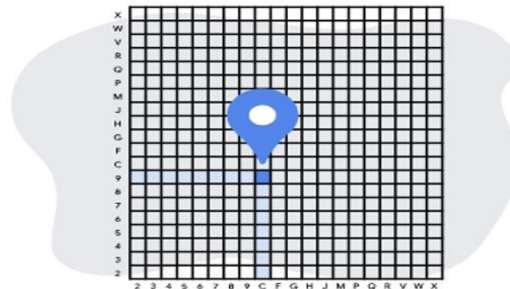
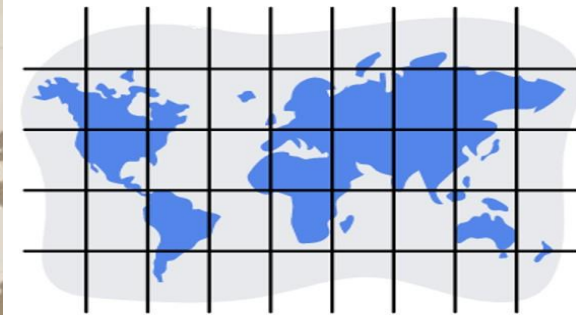
**THANK  
YOU**

# How do Plus Codes work?

Plus Codes are alphanumeric codes that represent latitude and longitude of the very same place. This code is based on a division of the globe using a square grid system based on latitude/longitude WGS84. The final portion of the Plus Code reflects a unique address within this grid, and the preceding portion of the code identifies the cell this location is in.

Google Maps Plus Codes work by converting location coordinates (latitude and longitude) to alphanumeric codes that use a standardised format. They use an alphanumeric grid (like a chess board with a grid of A - H and 1 - 8) to divide the world.

That first grid forms the first 2 numbers of the code. That square is then further subdivided, forming the next portion of the Plus Code. The result is an extremely easy-to-use code that represents a unique address in the world.

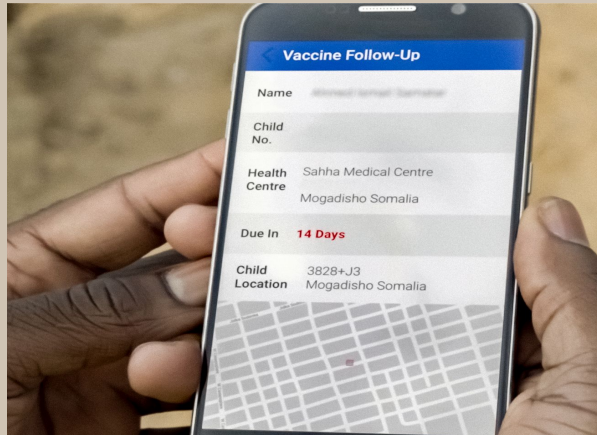




In Somalia, where severe drought exacerbates already poor living conditions, people migrate towards Mogadishu, the country's capital, which has one of the highest urban population densities in the world. About 6,00,000 displaced people live in the city's informal settlements.. The International Rescue Committee (IRC) mapped locations of clients for an immunization and family planning project, ensuring that women and children received timely follow-up care.

<https://youtu.be/HhwyxmZTlvs>

<https://www.rescue.org/country/somalia>





**The Rural Utah Project (RUP) empowers underrepresented voters in rural Utah through training, education, and issue advocacy. RUP's Navajo Nation voter registration program provides addresses to Navajo Nation residents to aid in voter registration, emergency services, and mail delivery.**

**<https://ruralutahproject.org/>**

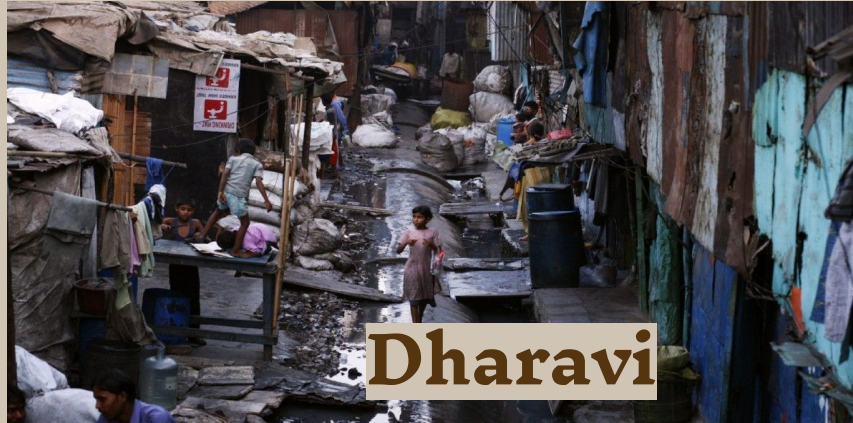


**Rural Utah Project**



**Voter Registration in rural Utah**

# Kolkata Slums



**Dharavi**

# Conventional addresses can be classified into two categories

## Relative Addresses

Refers to the addresses that are defined as a consequence of landmarks/points of interest near them.

Example: “Across the street from Lions’ Club, Purba Bardhaman, West Bengal”

## Absolute Addresses

Refers to addresses that are identified by their own location/name.

Example: Karmakar Para, Lakurdi, Purba Bardhaman, West Bengal, Pin code-713102







231, 261, Karmakar Para Rd, Lakurdi, Raiganj, Burdwan, West Bengal 713101, India

	Decimal	DMS
Latitude	23.246618	23°14'47" N
Longitude	87.83394	87°50'2" E

2022-05-16(Mon) 11:29(am)

40°C  
104°F



237, 237, Karmakar Para Rd, Lakurdi, Raiganj, Burdwan, West Bengal 713101, India

	Decimal	DMS
Latitude	23.246317	23°14'46" N
Longitude	87.833551	87°50'0" E

2022-05-16(Mon) 11:04(am)

40°C  
104°F





