DATA-DRIVEN ANALYSIS OF PUBLIC SERVICE DISTRIBUTION IN PCMC (PUNE)

1.PROJECT OVERVIEW

This project analyses the distribution of municipal services—**hospitals, shelter homes, and food distribution centres**—within the Pimpri Chinchwad Municipal Corporation (PCMC) region of Pune, India. The aim is to identify underserved areas and support **data-driven planning** for NGOs and welfare organizations working in urban development and community support.

Insights were drawn from publicly available municipal datasets published on June 26, 2020, sourced from the Smart Cities Open Data Portal, with a focus on spatial accessibility and resource availability.

2.INTRODUCTION

The datasets analysed in this project are sourced from the Pimpri Chinchwad Municipal Corporation (PCMC), the civic body responsible for governing parts of Pune, India. While the data is primarily maintained by government agencies for planning and resource allocation, it is also highly relevant for **NGOs, researchers, and civil society organizations**. These groups can leverage this data to identify gaps in services like shelter and food access, enabling **evidence-based interventions** to support vulnerable populations.

3.DATASETS USED

- municipal_boundaries.csv

- food_distribution.csv

- hospital_locations.csv

- shelter_homes.csv

These datasets were cleaned and standardized before analysis.

4. METHODOLOGY

- Cleaned all datasets: removed nulls, standardized ward/zone data, added primary keys where necessary.

- Mapped food, shelter, and hospitals to the nearest zone using geospatial distance (latitude/longitude).

- Counted services per zone and per ward using aggregation queries.

- Combined summaries to identify regions with less coverage.

5. CHALLENGES

- Hospital data lacked zone/ward info, so spatial proximity had to be calculated.

- Inconsistent format of address fields and missing primary keys.

- Full outer joins are not supported in MySQL, had to use workarounds.

- Some hospitals of zones may need review due to inconsistent naming like "GOVERNMENT".

6. SUGGESTIONS FOR IMPROVEMENT

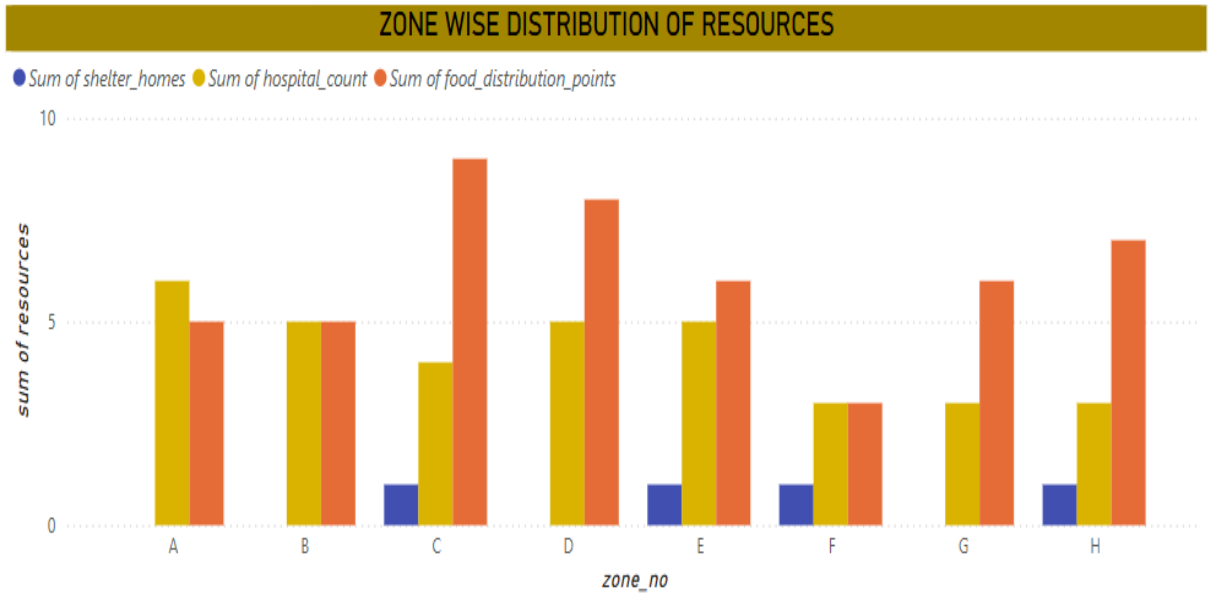
- Ensure all future datasets contain geographic zone/ward metadata.

- Use GIS tools for precise mapping.

- Add timestamps or service load metrics to improve priority analysis.

7. VISUALIZATIONS

DISTRIBUTION OF SERVICES BY ZONE



This bar chart presents the comparative distribution of three key resources—shelter homes, hospitals, and food distribution points—across various municipal zones (A to H).

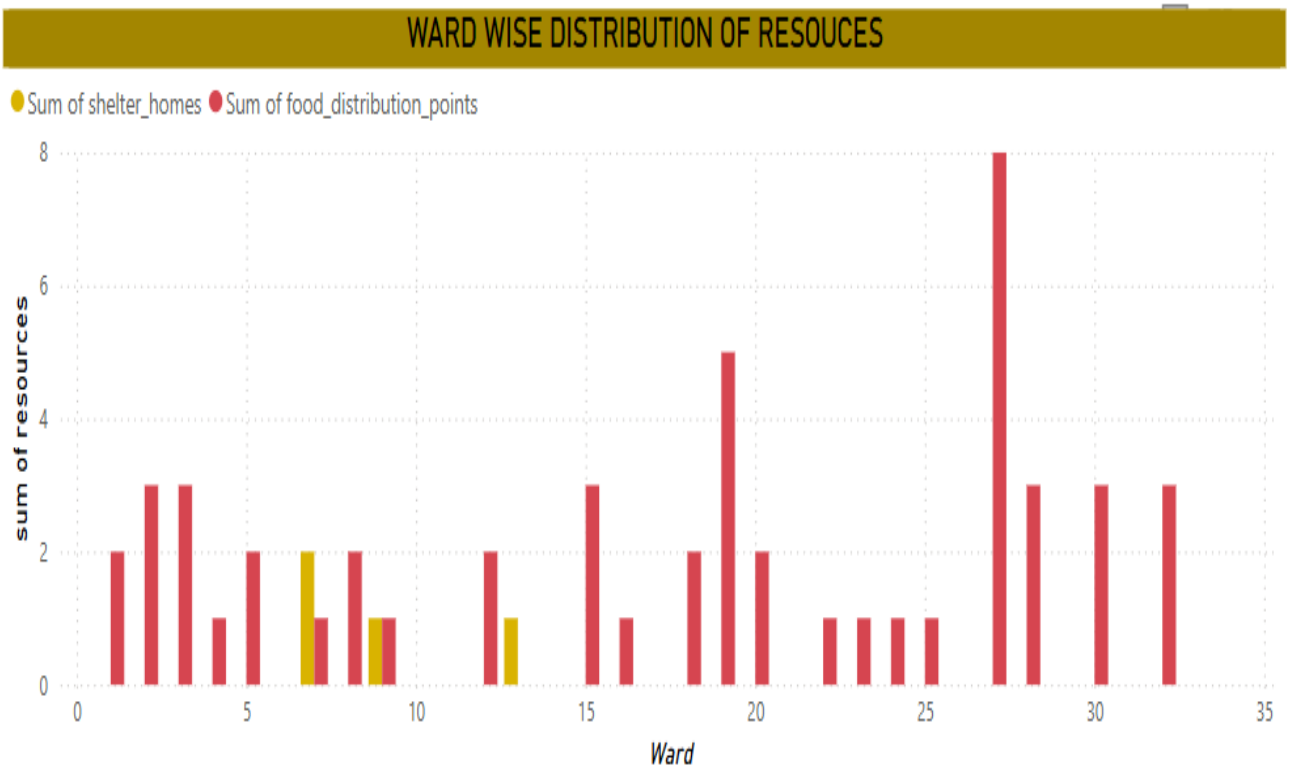
Key Observations:

- Zone C and Zone D have the highest concentration of food distribution points, indicating relatively better food service coverage in these areas.
- Zone A and Zone B show a balanced allocation of hospital facilities and food distribution points, though shelter homes are completely absent in these zones.
- Zone H and Zone G have above-average food distribution points, but low numbers of shelter homes, suggesting a potential area for improvement in housing services.
- Zone F appears to be underserved in all three categories, especially with limited hospital and shelter home presence.
- Zones like C, D, and E show moderate to strong infrastructure in at least two categories, potentially serving as hubs for surrounding underserved areas.

Recommendation:

- Resource allocation should be revisited for Zones A, F, and G, with particular focus on increasing shelter homes and healthcare access.
- A more equitable distribution could improve service accessibility and quality of life for residents in those zones.

WARD-LEVEL SERVICE DISPARITIES



This bar chart depicts the distribution of **shelter homes** and **food distribution points** across municipal wards. Hospitals are excluded here due to their zone-level planning and infrastructure requirements.

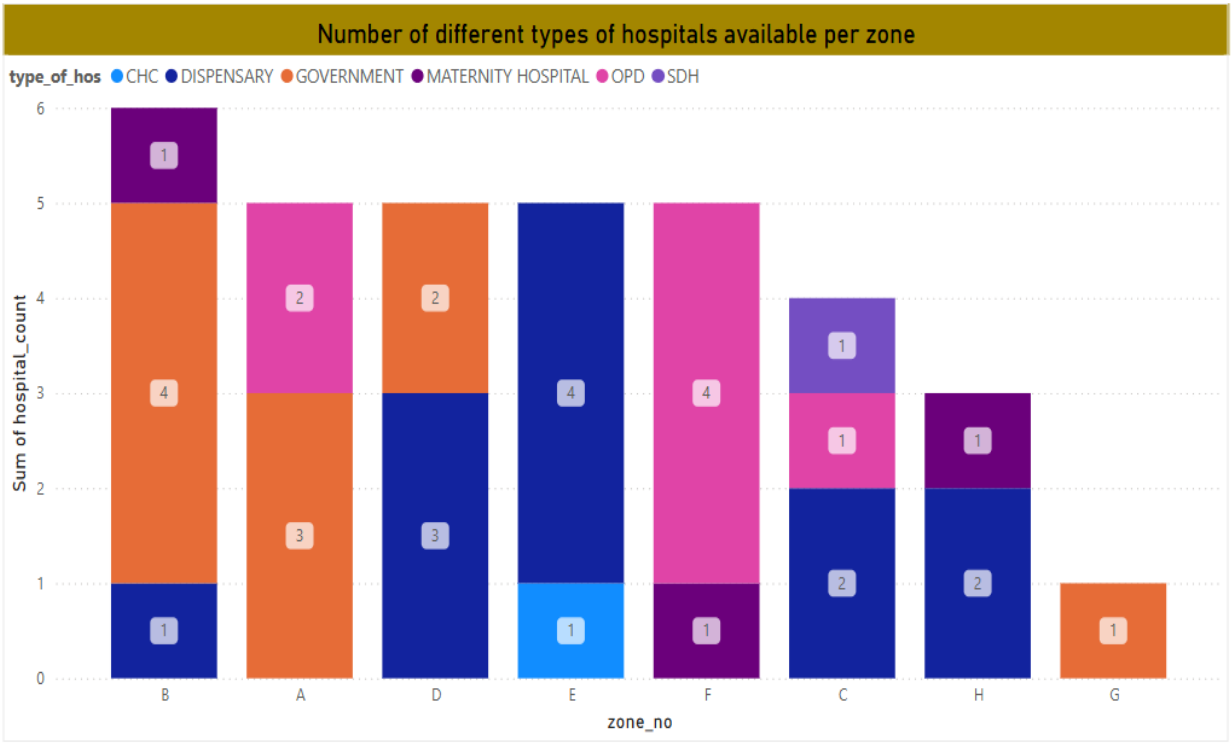
Key Observations:

- Food distribution centres are consistently present across most wards, reflecting a commendable effort to ensure food security at the local level.
- Shelter homes are extremely limited, with only four shelters spread across just three wards, indicating either:
    - Lower demand for shelters in those areas, or
    - A significant gap in housing services that warrants immediate attention.
- Several wards show zero resources—neither shelter homes nor food distribution points—highlighting areas that may require further investigation to assess:
    - Population density,
    - Vulnerability of residents,
    - Or administrative oversight.

Recommendation:

- Conduct a ground-level needs assessment in wards with no resource presence.
- Consider establishing at least one temporary or mobile shelter unit in underserved wards.
- Explore reasons behind the current distribution to ensure equitable access, especially in areas with vulnerable populations

HOSPITAL INFRASTRUCTURE DIVERSITY



This visualization displays the number and variety of hospital types available across each zone, including facilities like CHCs, dispensaries, government hospitals, maternity hospitals, SDHs, and OPDs.

- **Zones B, C, and E** show a relatively broader spectrum of hospital types, indicating a more diverse healthcare infrastructure in these areas.
- **Zone G**, however, stands out with only a single hospital type present. While this may be sufficient for a lower population or less demand, it warrants further analysis based on the **population size and vulnerability profile** of that zone.
- **Most other zones** (A, D, F, H) have 2 to 4 types of hospitals, which suggests a fairly balanced distribution catering to various medical needs.
- There is **inconsistent labelling** in the data, such as the generic use of the term **"Government"** as a hospital type. This should be reviewed and standardized for clarity in future reporting and analysis.

INSIGHT: While most zones have access to multiple hospital types, it's essential to validate if the quantity and type of services match the healthcare needs of the population—especially in zones with limited infrastructure like Zone G.

NOTE ON ADDITIONAL VISUALIZATIONS:

While this report presents the key visualizations that summarize the most meaningful insights, several other charts were created during the analysis — including individual visualizations for shelter homes and food distribution points per ward and per zone. These charts provided similar patterns and did not offer significantly new insights beyond what is already illustrated in the combined visualizations.
To avoid redundancy and maintain clarity, they are not included here. However, all visualizations are available in the accompanying Power BI file for reference.

LIMITATIONS:

Population-level comparisons were not included in this analysis due to the unavailability of accurate population data at the ward or zone level, making it difficult to align with existing demographic records. Without a clear understanding of the number of residents or vulnerable populations per zone, deriving per capita service ratios or assessing adequacy of resources would be unreliable. Future analysis can be enhanced by integrating official census data or local population estimates to better understand service coverage and accessibility.

8. CONCLUSION

This analysis aimed to map the distribution of key municipal services—hospitals, shelter homes, and food distribution centres—across different zones and wards within Pune. From the data, we observed that while food distribution centres are relatively well distributed, shelter homes are present in only a few wards, indicating a potential gap in emergency accommodation support. The types of hospitals varied across zones, with some zones offering more diverse healthcare services than others.

These insights can help city planners and NGOs better allocate resources to underserved areas. However, due to limitations in data recency, absence of population metrics, and potential inconsistencies in categorization, these results should be treated as indicative rather than definitive. Future studies can incorporate up-to-date demographic data for more targeted impact.

9. TOOLS & SKILLS USED

- **SQL (MySQL):** Data cleaning, joining, and aggregation queries
- **Power BI:** Visualizing ward- and zone-level resource distribution
- **Geospatial Logic:** Zone mapping using latitude-longitude distance calculations
- **Report Writing:** Structuring analytical insights for stakeholders, NGOs, and policymakers
- **Public Sector Data Interpretation:** Working with real municipal datasets (PCMC Open Data)
- **Urban Service Planning Awareness:** Understanding of food distribution, shelter needs, and hospital coverage in urban governance.

10. APPENDIX

Data Source:
All datasets were obtained from the Smart Cities Open Data Portal.
Link: https://smartcities.data.gov.in/catalog/municipal-boundary-hospital-food-shelter-pcmc

Publishing Date: 26th June 2020

Jurisdiction: Pimpri Chinchwad Municipal Corporation (PCMC), Maharashtra
Governs Pimpri, Akurdi, Chinchwad, Nigdi, and surrounding northwestern suburbs of Pune, Maharashtra.
PCMC governs a population of approximately **1.72 million** over an area of **181 km²**.