Integrating Urban Datasets: The Path to Effective Socio-Economic Planning in Urban Pakistan

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The Importance of Cities & Urban Policy in Pakistan

Approximately 40% of Pakistan's population resides in urban areas around the country, and urban population contributes an estimated 75% of the country's GDP. The importance of cities to the socio-economic growth of the country is only set to rise in the foreseeable future as increasing numbers of Pakistan's youth migrate from rural areas to cities in search of employment opportunities. Pakistan's urban population is set to equal its rural population in the year 2030. This calls for effective urban planning tools to ensure universal delivery of basic municipal services, control of the spread of slums, the minimization of pollution and the control of crime and political violence.

Understanding the Bottlenecks to Effective Urban Planning in Pakistan

Missing: An Integrated View of Urban Datasets

Efficient urban policy making depends on access to an integrated picture of socio-economic datasets at the micro-level for urban areas. For instance, a health department official deciding where to locate the next health centre should have simultaneous access to information pertaining to the locations of existing health centers, population figures, access to electricity and access to water and sanitation amongst other socio-economic variables. It is precisely this, however, which is missing. Various socio-economic datasets for urban areas cannot be cross-linked as a common spatial identifier does not exist across and between these. Consequently, there is very little coordination between and data sharing across different urban government departments. This results in poorly targeted and short-sighted policies in the urban centers of the country.

Missing: A Common Spatial Identifier

Effective urban policy making and implementation in Pakistan is impeded by the problem of integrating data containing incompatible spatial references. There is great heterogeneity across spatial units being used by different urban government departments for data collection and reporting in Pakistan. Each individual agency/ department has imagined and generated its own divisions of the city as suits its own individual needs. For instance, Lahore Electric Supply Corporation (LESCO) has divided the city of Lahore into 4 circles and a further 163 *sub-divisions* in order to facilitate its operations. The Excise and Taxation Department has divided the city into two zones and 160 *tax circles* for tax collection purposes. The Population Census Organization (PCO) has divided Lahore into approximately 5000 *census blocks* to aid in the collection of census data. Each of these departments has, therefore, indexed its data by a different spatial unit (see Table 1 below).

The problem is aggravated by the fact that the boundaries of these department specific spatial units are far from stable and prone to constant revision. Moreover, there is no common denominator across these: LESCO's sub-divisions, the Excise and Taxation's tax circles and the PCO's census blocks do not arise from, and are not reducible to, the same building blocks. This is commonly known as the 'Spatial Hierarchy Problem' where the administrative boundaries of each department do not align with one another and therefore do not allow for cross analysis. This limits the scope for data sharing between departments and increases the likelihood of duplication of efforts in data collection, wastage of resources and poorly targeted policies.

Type of Boundary	Department	Spatial Unit	No. of Units	Average Size (pop)
Administrative	City District Government Lahore (CDGL)	Town	10	1 million
Administrative	Police	Police Station	74	135,000
Political	Secretary Punjab Local Government	Union Council	150	66,000
Electoral	Election Commission Pakistan	National Assembly Constituencies	13	700,000
Electoral	Election Commission Pakistan	Provincial Assembly Constituencies	25	400,000
Statistical	Population Census Organization (PCO)	Census Charges Census Circles Census Blocks	178 869 4931	50,000 10,000 2000
Service	Post Office	Postcodes	43	200,000
Service	Excise and Taxation	Zones Tax Circles	2 160	5 million 60,000
Service	Lahore Electric Supply Company (LESCO)	Circles Sub-divisions	4 163	2.5 million 60,000

Table 1. Diversity of Type and Size of Spatial Units in Use by Urban Government Departments: Lahore

Recommendations

Establishing the *Mohalla* as the Common Spatial Identifier in Urban Pakistan

As established earlier, if policy makers and planners are to tackle urban management problems holistically, they must have access to an integrated view of socio-economic datasets which in turn is only possible where a common spatial identifier exists across datasets as collected, reported and utilized by various urban government departments. In the rural parts of Pakistan, it is the *mauza* or revenue village which serves as the unifying thread between datasets (population, education, health and other datasets are indexed by the revenue village). The *mauza* is a meaningful geographic level at which to aggregate and visualize data as it is (i) small in size (ii) ubiquitously used across government departments (iii) easily referred to by citizens and (iv) hierarchical in nature (primary building block of other administrative divisions). A *mauza*-equivalent, possessing these four characteristics, is missing in urban Pakistan. It is imperative for policy makers to introduce a **basic common zoning scheme** for the urban areas of Pakistan that is used in a standardized manner by urban government departments.

Why is the neighbourhood a good spatial unit for the urban areas of Pakistan to be mapped at?

The neighbourhood is ideal because it is:

1. Small in Size: There is great potential for improved governance and service delivery as neighbourhoods are small in nature thereby supplying a more detailed picture of intra-district inequalities in socio economic development, facilitating the formulation of targeted socio-economic policies and efficient use of resources. Neighbourhood divisions will comprise of 5-10,000 people making it a good unit of analysis. The neighbourhood is very small in comparison with the district, town or union council (see table 1). For instance, while there are only 10 towns in the city of Lahore and 150 Union Councils, the number of neighbourhoods will stand at more than 1000.

2. Easily Referred to by Citizens: Individuals in urban areas are typically well aware of which neighbourhood they belong to. There is a great familiarity with the *mohalla;* even more than which Union Council individuals are residing in. The citizen experiences governance i.e. service delivery at the level of the neighbourhood and so policymakers and planners will be better able to identify inadequacies in the delivery of municipal services and respond to these.

Spatial units currently in use by urban government departments are inadequate as they do not meet the criteria outlined above (see table 1 above). It is the recommendation of this research team that the hitherto unused ***mohalla* or neighbourhood serve as the common spatial identifier between and across urban government departments.** If adopted, such a strategy will mean that all administrative and other divisions will either be reducible to the neighbourhood or aggregate to form a neighbourhood. All urban datasets will resultantly be indexed by neighbourhood making possible an integrated view of data at the micro-level and improved policy making.

This is precisely what occurred in Barcelona, Spain where the city administration was reorganized around the neighbourhood in 2008. The city was divided into 73 neighbourhoods to improve municipal service delivery by providing a more detailed picture of the data at this meaningful geographical level. Boundaries of other units have subsequently taken neighbourhood boundaries into account; For instance, Barcelona's districts are reducible to the neighbourhood, while census tracts aggregate to form a

neighbourhood. The neighbourhood, therefore, acts as a common spatial identifier across datasets and at present a variety of data is aggregated and represented at the neighbourhood level to aid city managers in decision making.

This IGC funded country project titled "Integrating Urban Datasets: The path to effective socio-economic planning in urban Pakistan" has culminated in the development and testing of a comprehensive methodology specific to dividing and mapping urban Pakistan at the level of the neighbourhood. This strategy has been piloted in the second largest city of the country: Lahore.

Implementation: Process & Issues

A time efficient and cost effective methodology has been developed for identifying and/or creating neighbourhood divisions in the urban areas of Pakistan. This process (see Text box 2) is guided by the following five principles:

1. *Neighbourhoods will respect Union Council boundaries*
   UC boundaries are currently used widely across government departments. It is an important administrative boundary set, therefore, that neighbourhoods will not cut across.

2. *Neighbourhoods will be categorized according to Land Use/ Land Cover types*
   Neighbourhood units will be categorized according to residential, industrial and commercial use. For example, where possible a neighbourhood unit will not comprise of both residential and industrial areas.

3. *Neighbourhoods will align with major features on the ground*
   Neighbourhoods will not cut across natural barriers such as a streams/ rivers or man-made barriers such as a canals/ major roads and railway lines.

4. *Neighbourhoods will be small and of roughly equal size*
   The neighbourhood units will be small and of roughly equal size. Improved urban policy making and better urban management will only be possible where policy makers are able to visualize data at the micro-level. The UC is inadequate precisely because it is too large (with an

Process of Mapping Urban Area at the Level of the Neighbourhood

Step 1:

Overlay Union Council boundary on Google Maps (see Fig. 1)

Step 2:

Categorize area falling within UC boundary according to land use/ cover type: residential, industrial, commercial, green spaces (see Fig. 2)

Step 3:

Mark major roads visible on Google Earth satellite imagery within UC boundary (see Fig.3)

Step 4:

Using available population figures for the UC in question arrive at appropriate number of neighbourhood units for UC area (e.g. if UC population is 50,000, divide area into 5-10 neighbourhood units of 5,000-10, 000 persons each). Mark neighbourhood units on satellite imagery while honouring UC boundary, land use/cover type and major road markings (see Fig.4)

Step 5:

Verify that neighbourhood units are in line with citizens and residents perceptions of neighbourhood boundaries. Re-adjust neighbourhood boundaries where they undermine the historical identity of the area (see Fig.5)

average population of 60,000). In comparing the socio-economic development of one UC with another, therefore, it is likely that resources will be misdirected as intra-inequalities within a UC will be masked to a great extent. Our intuition is that the city be divided into neighbourhoods of approximately 10,000 persons each.

5. *Neighbourhoods will account for citizens' perceptions of space*
The neighbourhood based zoning of the city will take into consideration the historical identity of different quarters of the city, though this can be difficult to capture. This stage requires fieldwork and consulting with locals in order to understand where one neighbourhood ends and another begins. In practice, this is a difficult criterion to meet as a certain level of consensus amongst residents as to the constitution of neighbourhood boundaries is required. While some overlap is likely, it is possible that perceptions of neighbourhood boundaries vary with gender, age and race amongst other factors. However, empirically, we have found that if most of the divisions are base d on prominent features, such as major roads or water bodies, then they rarely cut across neighborhoods. Hence, in Step 3, it is important to divide UCs along major features.

Fig. 1 Bhatti Gate UC area highlighted in red

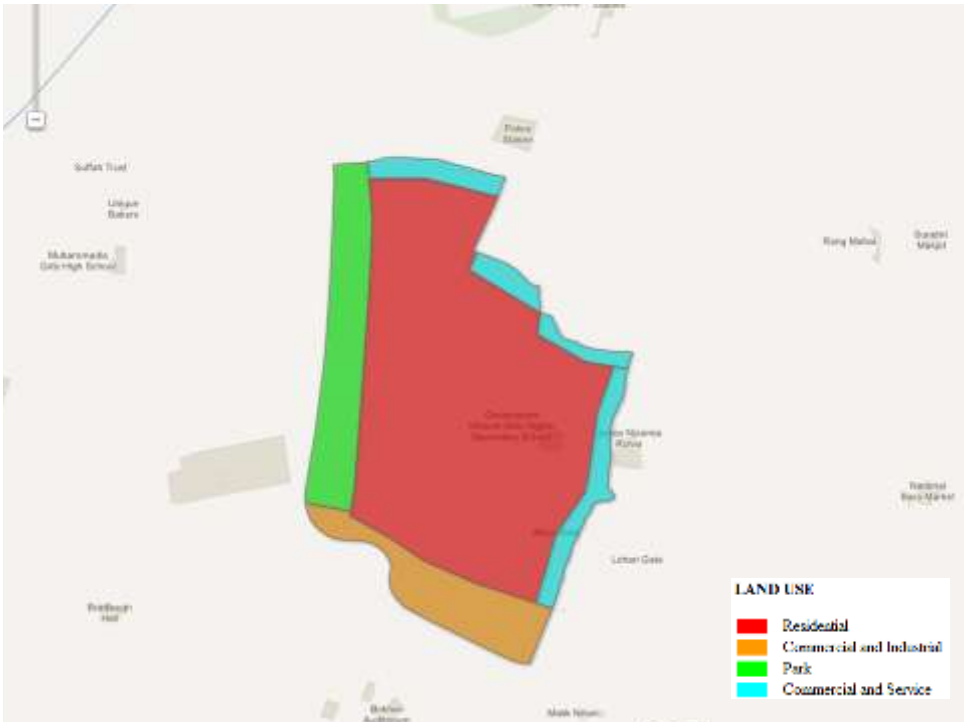

Fig.2 Bhatti Gate UC area is categorized according to land use

Fig.3 Major Roads falling within Bhatti Gate UC are marked in red

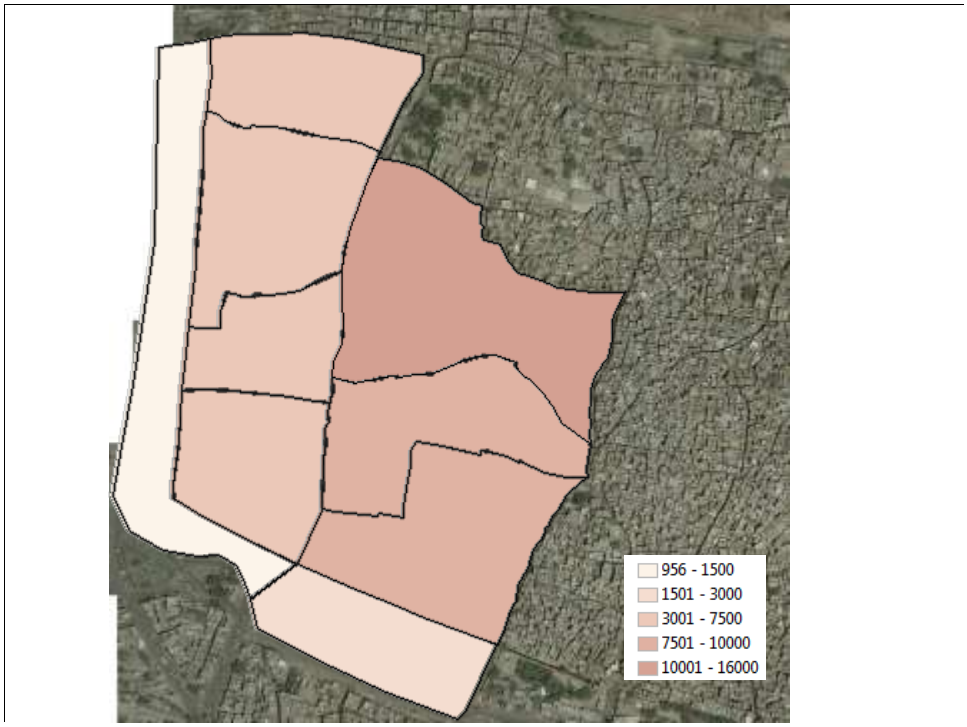

Fig. 4 Bhatti Gate UC is divided into 9 neighbourhood units

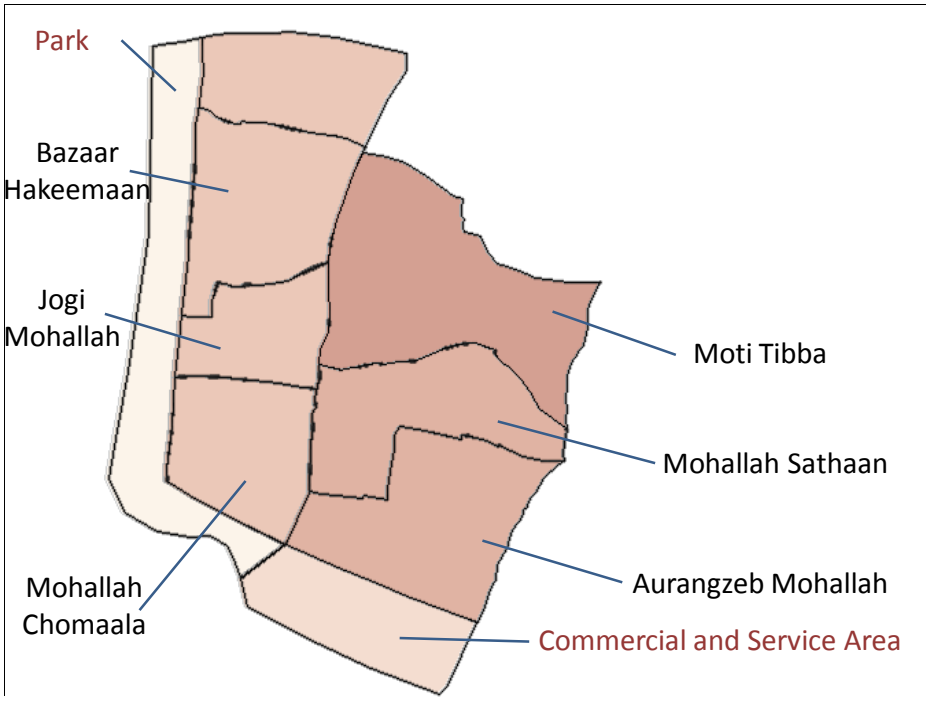

Fig.5 Neighbourhood units are assigned names based on discussions with locals during field visits

Step Forward

The methodology outlined above has been tested in the second largest urban centre of Pakistan: Lahore. More than 130 Union Councils of Lahore were divided into more than 1100 sub-units using this methodology (see Figure below). The results have been presented to officials at the Urban Unit, Government of Punjab who have fully the merits of the *mohalla* or neighbourhood as the common spatial identifier between and across urban government departments and are eager to undertake the mapping of another important urban centre of the country: Sialkot in the same manner. Once the necessary field visits are conducted and the methodology verified, findings will be disseminated to policy makers, urban planners and urban government department officials to push for the adoption of the neighbourhood as the universal building block of other administrative divisions of the urban areas of Pakistan. Urban mapping at the level of the neighbourhood and the integration of urban datasets using this spatial unit holds great promise for improving future urban policy making and implementation.

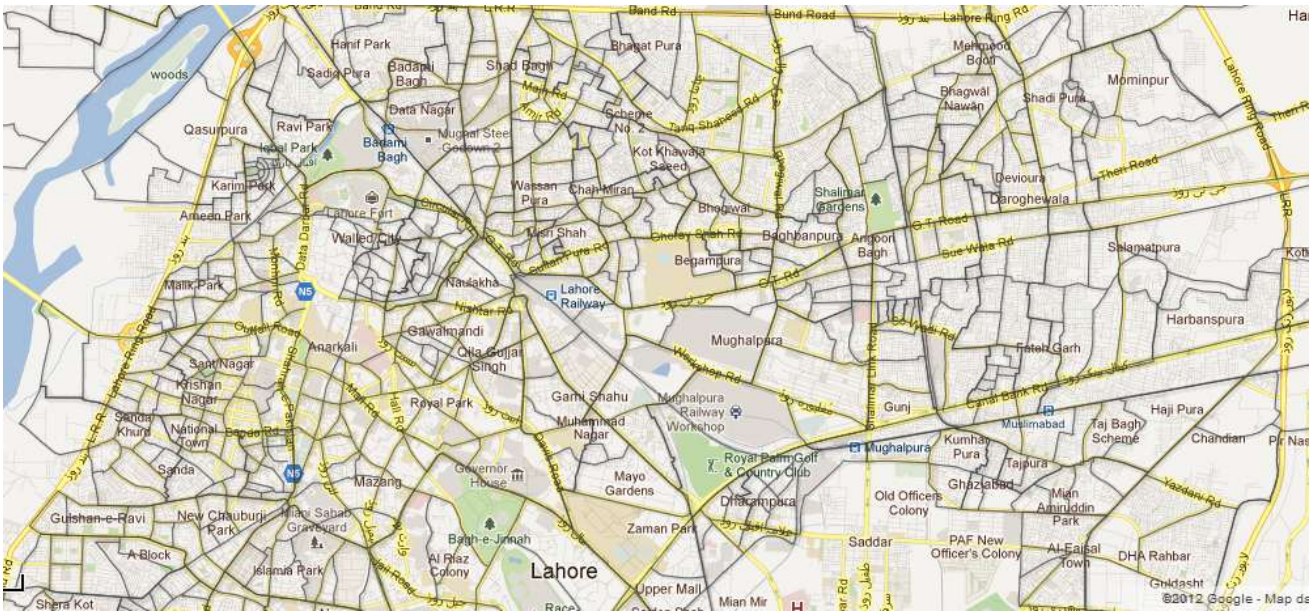

Figure 6: Administrative divisions generated by our study for North Lahore. Each dvision is a distinct Land Use type, with up to 10,000 people.

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