

Spatial distribution analysis of parking areas in Hyderabad City: A GIS Approach

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Introduction

Traffic congestion in the roads is a recurring problem which is faced worldwide. India is a fast growing economy and the problem is severely felt in almost all major cities. One of the Primary reasons is because infrastructure growth is slow compared to growth in number of vehicles, due to space and cost constraints. Another reason is Indian traffic being non-lane based and chaotic, is largely different from the western traffic but there is another important reason which has been neglected by the system since a long time that is availability of parking space in Indian cities. Usually people park their two and four wheelers in the side of roads which results in traffic congestion and discomfort for the pedestrians.

Parking areas need to be planned efficiently and effectively in order to avoid the road congestion. Advance technologies like GIS and Remote sensing play an important role in it. In the current scenario GIS and remote sensing have emerged as advance technological tools which can Capture, Store, Manipulate, Analyse and Disseminate spatially referenced data. GIS has the capability to integrate data from various sources, manipulate, analyse and display it geographically in a consistent manner. Avoiding vehicle parking at road side results in reducing traffic accidents, enhancing communication and response in emergency, reducing energy consumption and efficiency in reaching destination, increase national and regional economic output through efficient utilisation of transport facilities. Also reducing travel time and travel costs by smooth traffic flow. GIS enabled gathering of data and intelligence and timely feedback to traffic managers and road-users results in improved safety to drivers, better traffic efficiency, reduced traffic congestion, improved energy efficiency and environmental quality and enhanced economic productivity.

Study Area

Hyderabad City is the capital of southern India's Telangana State. It lies on the Deccan Plateau, 541 meters (1776 ft) above sea level, over an area of 625 km² (244 mile²). The population of the Hyderabad metropolitan area is estimated above 9 million. Hyderabad City with a vehicle population of about 33.8 lakhs in 2014-15, is the third highest road density of 773 vehicles per k.m. in the country after Chennai and Pune. It is facing Traffic congestion and transportation problems from a long time and one of the significant reasons is the lack of parking areas which results in roadside parking and road blockage. The research study focuses on the Spatial distribution of parking areas in Hyderabad City to analyse and highlight areas which need more parking areas to avoid the road side traffic congestion because they are a potentially important for sustaining and improving traffic mobility.

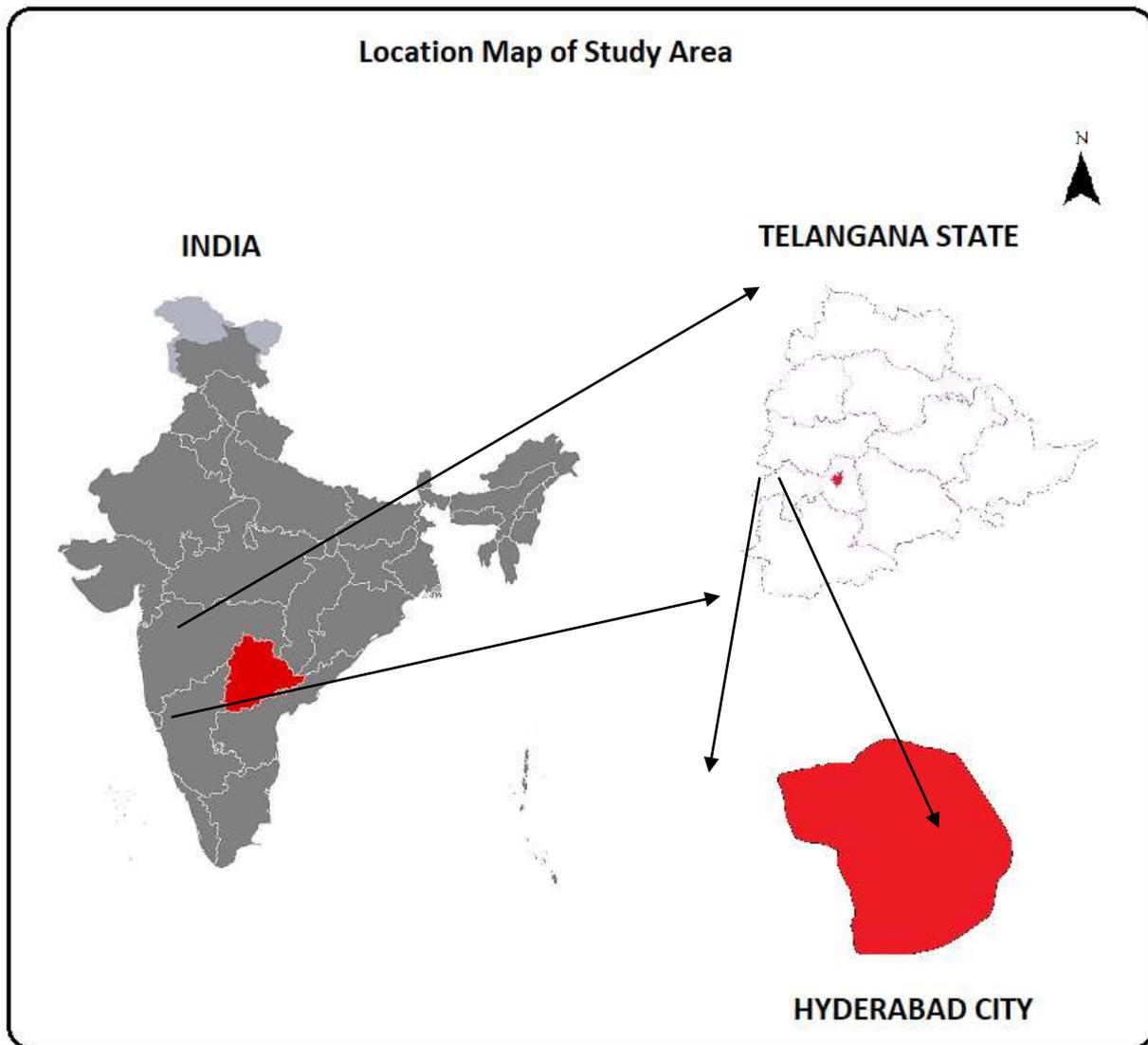


Figure 1. Location map of Study Area

Data Source

As spatial data source satellite imagery was procured and Satellite data sets were Georeferenced, Georectified and corrected at sub pixel accuracy. Further the road network was digitized and Parking area locations were identified and extracted as a spatial layer. While digitizing the road network the connectivity was ensured between all the road segments as it is a key requirement for accurate network analysis. Character and Properties of Spatial Layers i.e. Road names, Localities, Parking Areas name etc were prepared and spatially joined with the digitized spatial layers.

Methodology

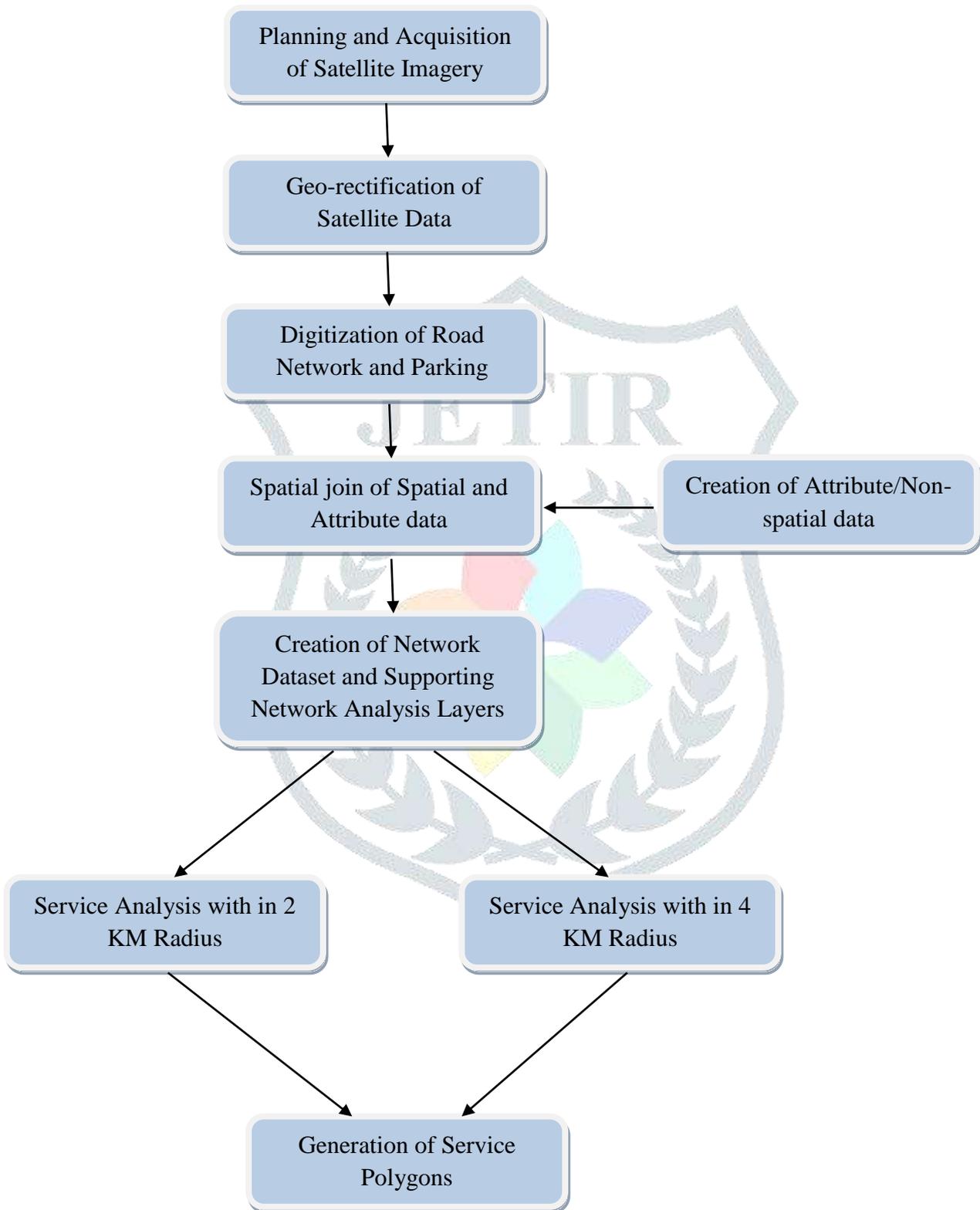


Figure 2. Showing the Methodology adopted for the Study

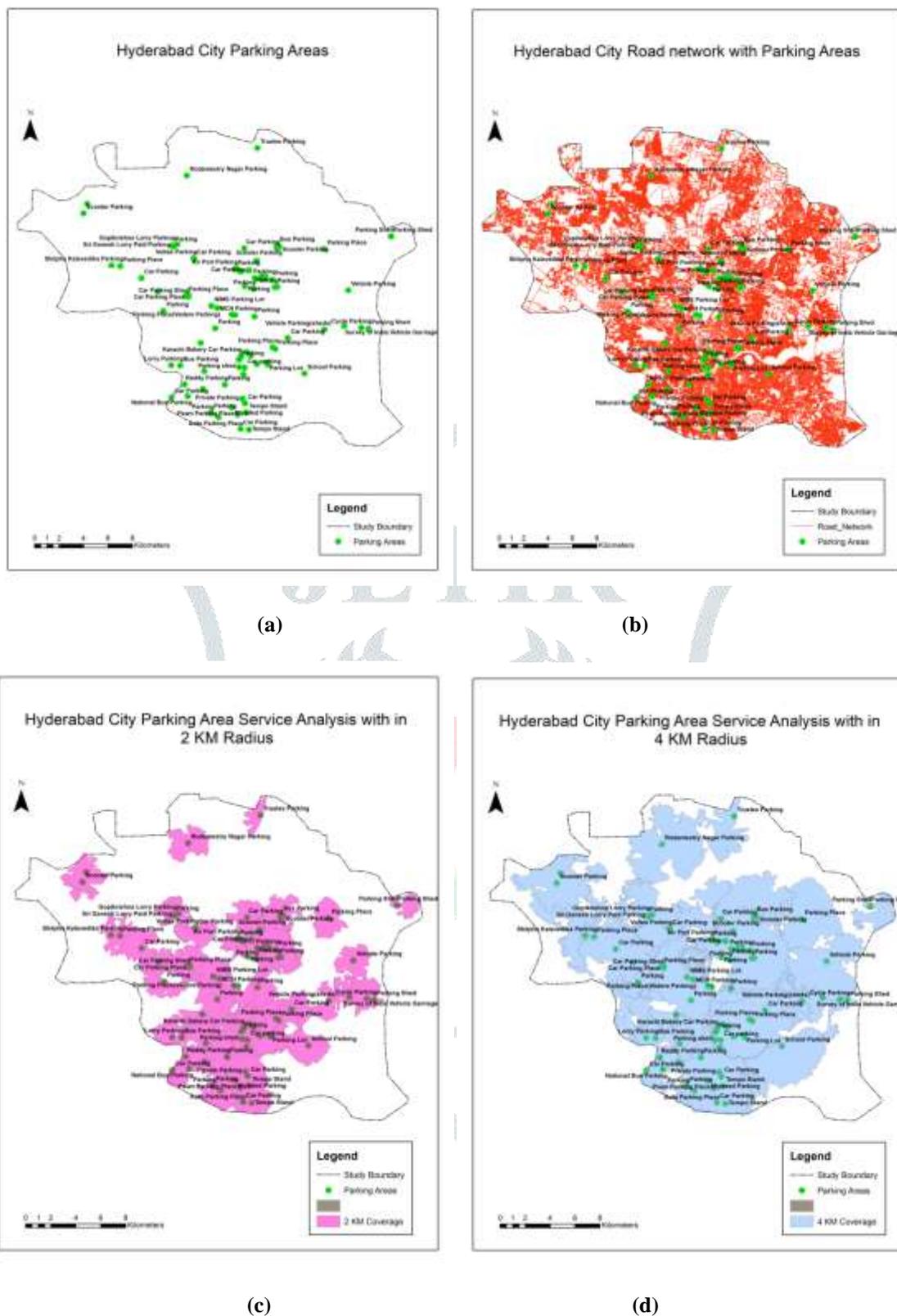


Figure 4. a, Hyderabad City Parking Areas map. b, Road Network with Parking Areas map. c, 2 KM radius Service Area map. d, 4 KM radius Service Area map

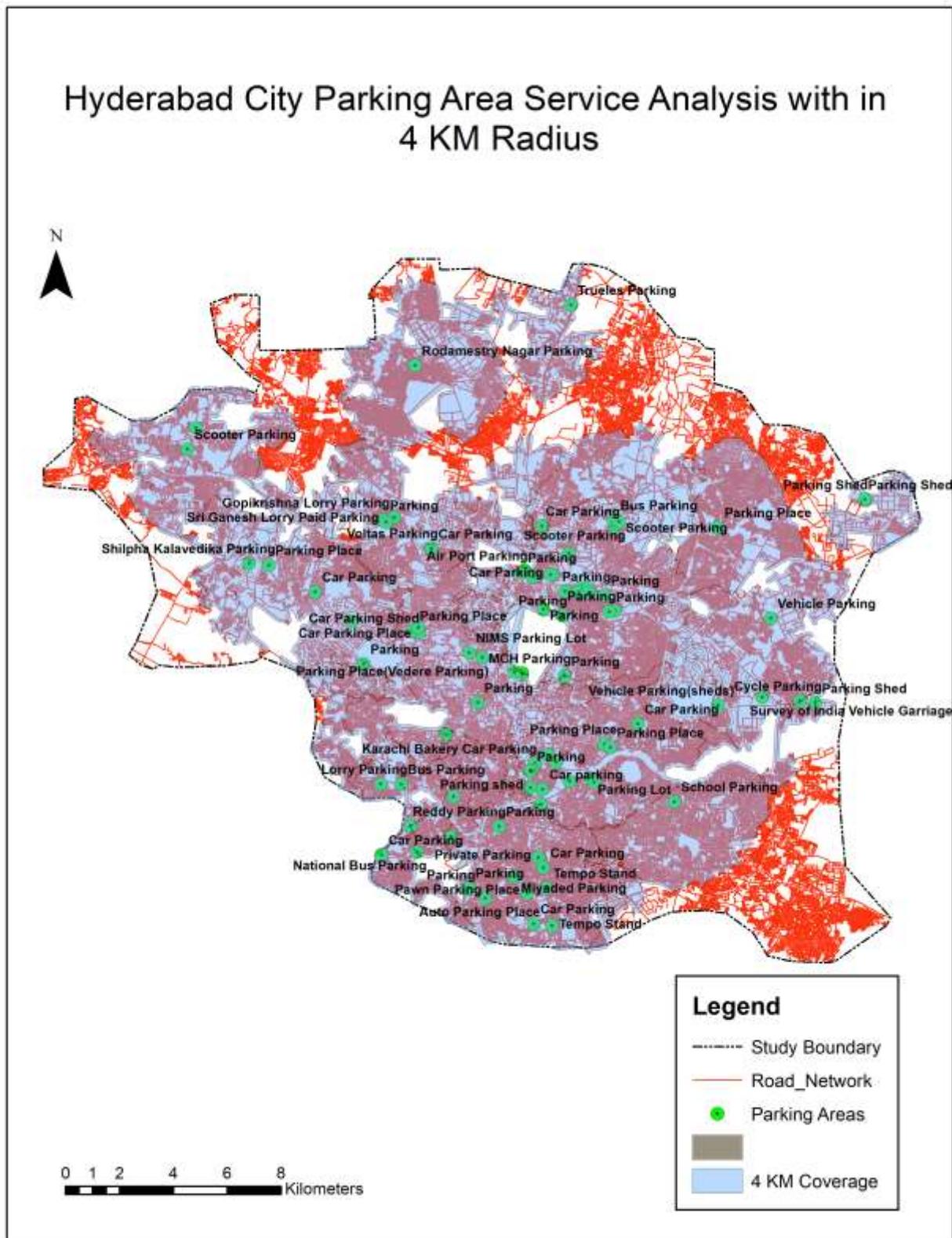


Figure 5. 4 KM radius Service Area map

Distance or Road length has been considered as cost for the Service analysis. The analysis has been performed for 2 and 4 KM coverage radius from a parking area which means a parking area or location serves as a facility for parking service and service reachability has been analysed for both the scenario.

Results and Discussion

Though the 2 KM radius service analysis highlights a lot of areas which are out of service polygons (Figure 4c) and need more parking spaces to be arranged by the administration.

Similarly 4 KM radius service analysis (Figure 4d and Figure 5) highlights that there are a lot of areas in Hyderabad city which have very less parking areas and there is an urgent need to establish more parking areas to mitigate the traffic congestion. As clear from the Service area analysis map the South-East Hyderabad, North-East and North-West Hyderabad has very less parking areas and are not even under 4 KM reach from other parking locations. The study suggests that immediate action need to be taken for the areas highlighted which are not under the Parking service polygon layer.

References

1. Ramaswami, G. (1976) : Road Network in Tiruchi, Department of Geography, University of Madras, Madras.
2. Aradhya (1984) : Road network and Traffic flow in Mysore District. Department of Geography, University of Mysore.
3. Dayananda (1994) : Road Transport and Regional Development – A Study of Mandya District, Department of Geography, University of Mysore, Mysore
4. <https://en.wikipedia.org>.

