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**REMOTE SENSING AND GIS INPUTS FOR MAPPING AGGLOMERATION  
ECONOMY – A CASE STUDY FOR RAJNANDGAON URBAN AREA  
(CHHATTISGARH STATE, INDIA)**

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**ABSTRACT:**

The term agglomeration economy is utilized as a part of urban financial matters to portray the advantages that organizations get when situating close to each other. The agglomeration economy outline under this contextual investigation will be distinguishing proof of the major monetary action in the Rajnandgaon urban zone and criticalness of Remote Sensing and GIS innovation use in mapping agglomeration economy.

**KEYWORDS:** Agglomeration Economy, GIS, Remote Sensing, Thematic Map.

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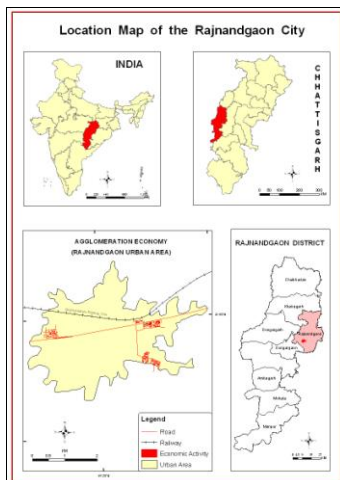
**INTRODUCTION:**

The term agglomeration economy is used in urban economics to describe the benefits that firms obtain when locating near each other ('agglomerating'). This concept relates to the idea of economies of scale and network effects. Simply put, as more firms in related industries cluster together, costs of production may decline

significantly (firms have competing multiple suppliers, greater specialization and division of labor result). Even when multiple firms in the same sector (competitors) cluster, there may be advantages because that cluster attracts more suppliers and customers than a single firm could alone. Cities form and grow to exploit economies of agglomeration (*Wikipedia*).

The detailed geographic analysis of agglomeration economy using conventional field techniques is highly time consuming and also laborious. The tasks become more difficult in highly industrialized and populated cities. Satellite technology has several advantages over conventional field based mapping methods as far as geographical mapping. The states of the art of Remote Sensing technology in conjunction with Geographic Information system (GIS) form a powerful set of tools for mapping (*Moon & Choukade, 2012*). The agglomeration economy map preparation under this case study will be identification of the major economic activity in the Rajnandgaon urban area and significance of Remote Sensing and GIS technology utilization in mapping agglomeration economy.

### **STUDY AREA:**



**Figure 1: Location map of study area**

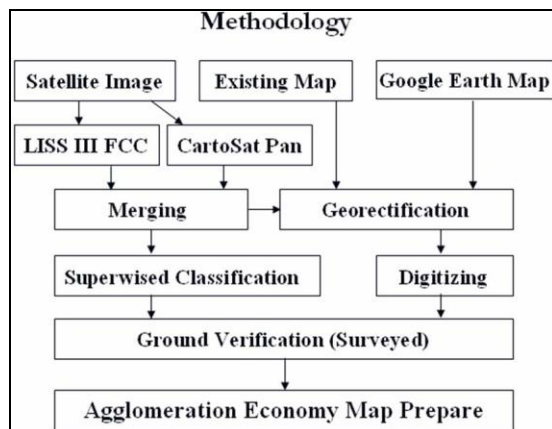
Rajnandgaon is an important city in Chhattisgarh State (India) which is situated on Great Eastern (NH 6) highway and Mumbai – Howrah South-Eastern railway line. (See map no.1) The city lies between 21° 04' 40.61" N to 21° 07' 00.61" N Latitude and 81° 00' 44.66" to 81° 03' 57.15" E Longitude. The Climate of the city is quiet warm during the months of summer and the winters are quiet pleasant. Average rainfall 150 cm. per year and the area is famous for rice and wheat production. Here bauxite and arsenopirites minerals are found. The town is surrounded by ponds and rivers and is known for its small-scale industries and traders. It is famous for the economic activity in the state Chhattisgarh, such as Bidi, Engineering works, Puffed Rice and Saw Mill.

#### **DATA USED:**

Satellite Images (LISS III and CartoSat Pan), Google Earth Maps, Existing Land Use Map, Survey Data.

#### **METHODOLOGY:**

The following methodology has applied for preparation agglomeration economy map for the Rajnandgaon urban area.



**Figure 2: Methodology for preparation agglomeration economy map of study area**

**1. Data collection:**

Satellite images such as Landsat LISS III FCC and CartoSat PAN image required. Existing land use land cover maps collected from Town and Country Planning department. Economy activity centers identification snap shots have been taken from the Google earth map. Classifying economic activity in the Rajnandgaon urban area by survey work.

**2. Image merging and georeferencing:**

Landsat LISS III FCC image having 23.5 m. resolution can not possible to mapped urban area. But it can done using CartoSat PAN image with 5.8 m resolution. Merging both images is useful for the classifying urban area with multi color combination. The images georectify in Erdas software with slandered procedure. This can helpful for spatial distribution of the economic activity in the city. Google earth maps also superimposed with satellite images.

**3. Classification and marking economic activity:**

Merge satellite image classify in the Erdas imagine software with maximum likelihood classification method to identify urban area and other land use in the image. Using classified image, existing land use map and superimposed google earth map, the economic center / building mark by digitizing in Arc GIS mapping software.

**4. Ground verification and data attachment:**

The marked economic centers surveyed for differentiate from one to another. The survey data attached to the digitized economic centers as different activity i.e. Engineering's activity, puffed rice mills, bidi patti godown and clusters of this in the Arc GIS software.

**5. Thematic map preparation:**

As per survey and data attachment to the economic centers, the thematic map prepare by symbolizing different activity centers in the urban area. Thematic map

prepared in the Arc GIS software by categorised the economic centers.

### Agglomeration Economy Mapping - Rajnandgaon



**Figure 3: Agglomeration economy map of Rajnandgaon**

### **RESULT AND ANALYSIS:**

Three economic clusters found in Rajnandgaon urban area.

#### **1. Engineering activity clusters:**

Near collectorate office on NH 6, about 2 to 3 different engineering activities (i. e. tractor parts, auto parts, fiber product) and 6 to 7 different farm are situated in this area. One cemented products preparation factory is also found in the same economic clusters.

## **2. Bidi patti godown clusters:**

On NH 6, near BSNL head office 7 to 8 bidi patti godown firm are identified. Desai bidi is one of the famous godowns among them. Some official buildings are also marked in these clusters.

## **3. Puffed rice mill:**

The 3<sup>rd</sup> clusters of economic activity found on Lakholi road. Near 4 to 5 Puffed rice mill firm are situated in this cluster. Rice is the major crop taken by the farmers in this region.

## **CONCLUSION:**

The study is important because agglomeration economy contribute to the formation and growth of cities. The better network linkages, water supply, electricity to the cluster are helping to growth of the economy activity and growth and formation of the city. Agglomeration economy production is facilitated when there is a clustering of economic activity. Although this may be true, the existence of agglomeration economies is central to the explanation of how cities increase in size and population; which places this phenomenon on a larger scale. This concentration of economic activity has their advantages and disadvantages. So, urban planners need to map this activity and amenities in the agglomeration economy.

Remote sensing and GIS techniques have unique importance in mapping agglomeration economy clusters in the urban area. Satellite images give a synoptic view of the large area and its spectral characteristics to land use classification and temporal resolution to map urban sprawl, structures help to saving time and money. The significant benefit of GIS technology is its ability to visualize spatial data and to interpret information visually. It can handle large geo-spatial database for quick management decision and can also used in urban infrastructure management.

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