

# Decentralization Strategies for Ludhiana City (Implications for Balanced Regional Growth)

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## Abstract

*The goal of the current paper is to evolve certain spatial strategies for the Ludhiana City that include a polycentric system of settlements. Cities all over the world have experienced several hurdles over the years, and these challenges have hurt their development, efficiency, and performance, resulting in a slew of dangerous issues. In recent decades, Ludhiana City has also witnessed unprecedented population growth as well as physical growth. A close understanding of the dynamics of urbanization is important for managing the negative impacts posed by urban sprawl. A detailed study has been done to understand the push and pull factors that compel the inner-city population to move outwards to the peri-urban areas and on the other hand, certain other factors pull or attract the peri-urban population or the population from different parts of the country to come in the center or city. The final findings of the study include causes of centralization, its negative effects, forces of development of economic and social activities, problems associated with urban development, physical and environmental implications concerning haphazard growth, non-compatible land uses, and the recommendations to be applicable for the planned and balanced regional growth.*

**Keywords:** Agglomerations, delineation, peri-urban areas, urbanization, urban fringe, urban sprawl

## INTRODUCTION

In most metropolitan cities in India, the urban population increases because of economic activities within the urban area, rural-urban migration for better job opportunities, access to basic needs, and better quality of life. As the migration increases, the limits of the city also increase. Thus, there is a concentration of a larger number of people on a smaller chunk of land. As the population increases, class and status of the city gradually increases (Class I, II, III, etc.) as shown in Table 1.

**Table 1.** Population growth.

S.N.	Year	Population of Ludhiana	Decadal growth rate (%)
1.	1991	1473743	-
2.	2001	1944908	32
3.	2011	2887992	51

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As the population increases, the surrounding villages around the city merge into the city limits. Urban expansion is not just geographic expansion, it also brings about the expansion of urban activities to the surrounding agricultural land. Gradually, the farmlands get converted into other urban uses.

The living environment may also be affected due to the level of congestion. The city was gradually divided into several economic zones. The economic potential of the city has hardly flown down to the

other regional urban centers especially those located in the vicinity of the metropolitan city. These towns continue to remain comparatively undeveloped with a poor living environment. The same situation arises in Ludhiana City also. The spatial organization of the Ludhiana City region appears to be undergoing significant changes which are being driven by main commercial and industrial centres expanding their footprint into adjacent areas. Ludhiana is a junction on the main broad-gauge railway and is hence more accessible. Its location helped in attracting more and more industries. The high pace of industrial growth resulted in a huge influx of migrants and high population growth of Ludhiana City thus imposing serious stress on urban infrastructure. Indeed, the city's expansion has been explained using this approach to economic location and agglomeration. Because of the high transportation costs to the city from other parts of the country, individuals flock to the city as consumers and businesses flock to the city as producers. Certain centripetal forces, more accurately, tend to drive population and production into agglomerations [1]. As a result, variables that contribute to the attractiveness of central places such as backward and forward connections, experience and idea exchange, the realization of agglomeration economies, and so on, all act as concentration-enhancing factors.

The spatial structure of a city is frequently defined by two complementary components: first, the spatial distribution of population as captured by census data, and second, the pattern of trips taken by people as they travel from their home to their place of employment, schools, shops, social gatherings, and other places where they will engage in productive activity [2]. The population distribution is thus a static depiction of the town when its residents are at home, whereas the pattern of journeys may be a schematic representation of the complex trajectories that these same residents will take when they are not at home. Hence, decentralization strategies help in determining the population growth differentials in a city and another close-by urban center with the specific objective of concentration and dispersion of economic activities over the period. So, it is important to understand the character of the city to analyze the hierarchy of economic activities and their interrelationship with other settlements to promote sustainable development of the urban centre. It also puts light on the reason behind the evolution of development with its negative and positive impacts. This study of patterns spatially over time also gives guidelines for future development.

The absence of regional or spatial dimensions is a vital gap within the Indian planning system. This is often because plans have been prepared at the centre and state levels. They consider the issues and realities in a region, but it is necessary that planning should come down to the area level. Parameters need to be defined to examine existing conditions within the study area and to realize the objectives set for the study.

## **CENTRALIZATION**

### **Causes of Centralization**

#### ***Commercial Areas***

Availability of a higher-order hierarchy of wholesale, retail, and wholesale-retail commercial centers fulfill every type of need of the people. Moreover, land availability in the LPA region at a cheaper rate, therefore malls and multiplexes can be built up with ease along the roads connecting the inner city and periphery.

#### ***Industrial Base***

It provided the base for the growth of any city. Improved machinery, improved productivity, and transportation linkages work as a catalyst for the growth of the city. More industries will attract a large number of populations to the city.

#### ***Accessibility***

The transportation linkages such as rail and road have a major impact on the development of the settlement. Every development such as industrial, institutional, commercial, etc. is directly dependent on the city's transportation system. It is not only increasing the connectivity but also generates employment and increases the productivity of the city.

### ***Availability of Infrastructure Facilities***

The better infrastructure facilities such as water supply, sewerage facilities, etc. attract people to the city as the city is almost fully equipped with the physical infrastructure facilities.

### ***Educational and Medical Facilities***

The growth of educational institutes will attract a greater number of students to the city to receive an education. Moreover, medical facilities of higher-order hierarchy such as super specialty and multispecialty hospitals will invite the population to the city for treatment purposes.

### ***Population Growth***

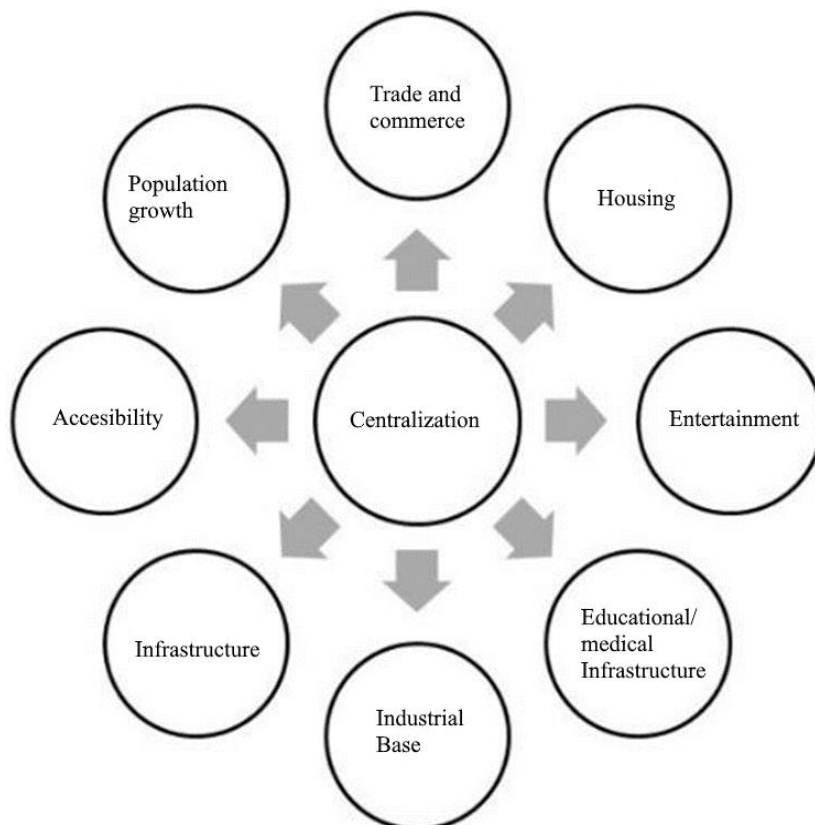
There can be two factors for the rapid growth of population in urban areas.

1. *Natural growth*: This condition arises when the birth rate is more than the death rate in the city.
2. *Migration*: The concentration of economic activities in metropolitan regions causes this situation.

As a result, individuals relocate to cities in quest of work.

### ***Entertainment***

Sometimes the factor of entertainment is lacking in rural settlements, therefore people visit the nearby settlements for entertainment purposes as summarized in Figure 1.



**Figure 1.** Factors for centralization.

### ***Impacts of Centralization***

#### ***Traffic Congestion***

Traffic congestion is caused by the fluctuating kind of traffic on the road as well as the mixing of slow- and fast-moving cars. Due to the non-provision of parking spaces along the road, the haphazard parking also causes congestion on roads.

### ***Environmental Degradation***

Smoke, foul odors/air pollution, and traffic concerns are all caused by industrial units located in residential areas. It raises SPM level and hence degradation of environment takes place [3].

### ***Slums***

Slums are a primary source of annoyance for planned colony members. As with the growth of the industrial sector, the slums also accumulated near industries. Due to the lack of a sewerage system, slum inhabitants litter the surrounding areas, generating unsanitary conditions for the locals.

### ***Utility Network Load***

The existing water supply and sewerage system is being strained by uncontrolled growth and rural-urban migration to the metropolis because a huge number of people living on a tiny property create unsanitary circumstances for settlements.

Figure 2 depicts the impact of centralization summarized in the text.



**Figure 2.** Impact of centralization.

### ***Change in Land Use***

#### ***Conversion of Agricultural Land***

There is a huge conversion of agricultural land from 4865ha to 894ha which is being used in non-agricultural land use such as real estate, commercial, industrial, etc.

#### ***Conversion of Residential Land use to Industrial Land Use***

In the core of the city, the residential land use is being converted into industrial. Therefore, people shift from the inner core to the periphery, and the inner zone is accommodated by small-scale industries [4].

#### ***Conversion of Public Semi-public to Commercial Land Use***

In the core of the city because of the change of character of the area, the educational institute is being sent outside the core on the wider road and the area is being converted into commercial land use for the informal organized sector.

## **Push and Pull Factors**

There are certain factors present in the city or center that compel the inner-city population to move outwards to the peri-urban areas and on the other hand, other certain factors pull or attract the peri-urban population or the population from different parts of the country to come in the centre or city. Some of the push and pull factors are being discussed here.

### ***Push Factors***

#### *High Land Values within the City Limits*

In Ludhiana City under the municipal limits, the land value is higher. High demand and less supply of land within the existing municipal limits lead to inflation in land prices. So, it becomes difficult for people to afford the land within the city, therefore they move outside to the peripheral zone where the land prices are comparatively low.

#### *Environment Degradation*

With the increase in population, the vehicular traffic on the road also increases, thus existing road network also becomes inefficient and causes congestion, and leads to various problems like pollution, health issues, crime, etc. Industrial development is also another major reason for environmental degradation. Therefore, in the case of Ludhiana city, the SPM level reaches 200  $\mu\text{g}/\text{m}^3$ . So, the environment in the inner city gets degraded and pushes people outwards in search of a better environment [5, 6].

#### *Congestion in the Inner City*

With the increase in population, the vehicular traffic on the road also increases, thus existing road network also becomes inefficient and causes congestion. Moreover, Industrial growth in Ludhiana led to large-scale migration. This in-migration in the municipal limits causes higher densities in the inner zone which results in congestion.

### ***Pull Factors***

#### *Commercial Areas*

Ludhiana being a commercial hub has a higher-order hierarchy of wholesale, retail, and wholesale-retail commercial centers to fulfill every type of need of the people. Moreover, land availability at a cheaper rate therefore malls and multiplexes can be built up with ease along the roads connecting the inner city and periphery.

#### *Industrial Base*

Ludhiana is one of the foremost industrial centers of northern India and is usually called the “Manchester of India”, the “hub of the Indian Hosiery Industry” and the commercial capital of small-scale industry within the country. The list of items exported from Ludhiana also includes machine tools, dyes, cycle components, mopeds, sewing machines, and motor parts. It is also a generator of a serious proportion of employment within the city which attracts people from outside the city.

#### *Accessibility*

Ludhiana is the most centrally located amongst the 19 districts of State of Punjab. In terms of roads and trains, it is also quite well-connected [7]. The city is connected to the Indian capital city of Delhi and other key Punjab cities such as Jalandhar, Amritsar, and others via the NH1-Grand Trunk Road. In the south-east direction, NH95 connects the city to Chandigarh and Ferozepur in the south-west direction. Every development such as industrial, institutional, commercial, etc. is directly dependent on the city’s transportation system. It is not only increasing the connectivity but also generating employment as more work-based trips that ultimately increase the city’s productivity.

#### *Availability of Infrastructure Facilities*

The better infrastructure facilities such as water supply, sewerage facilities, etc. attract people to the city as the city is almost fully equipped with the physical infrastructure facilities.

### *Educational and Medical Facilities*

On the educational front, Ludhiana has a number of the foremost prestigious institutions. There are two Medical Colleges, an Engineering College and also the famous Punjab Agricultural University. The expansion of educational institutes will attract a greater number of scholars to the city to receive an education. Ludhiana is also a hub of medical facilities, following the pattern of educational institutions. Ludhiana has a great number of healthcare-related facilities due to its strategic location which benefit not just the city's population but also the regions and in many ways, the state as a whole. This will invite the population to the city for treatment purposes.

## **FINDINGS**

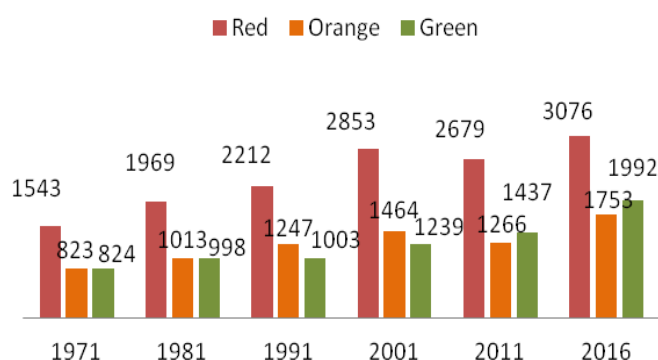
### **Industrial Findings**

Polluting industries such as electroplating, dyeing, and finishing have been put up haphazardly in residential areas where an effluent treatment plant is not available. These polluted industries release all of their wastewater into residential sewers and open ditches. This has led to the creation of major environmental problems for the residential areas in the city. Furthermore, it has contaminated the groundwater in the area, rendering the water unsafe for human consumption.

A huge number of slums can be found in the area [8]. (Zone-C) Slums are generally built on land that has been encroached upon by industry. They litter along highways because to the lack of a wastewater system, generating unsanitary conditions for surrounding industries and commuters on the road.

Industry in Ludhiana's local planning area has increased from 1.75 to 4.1% indicating the strong economic potential of the local planning area in the southeast direction attracting a large-scale migration of workers in the industrial sector shown in Figure 3.

1. Apart from the intended industrial districts, several other locations have emerged as industrial concentration clusters, with over 70% of plots in the cluster having industrial activity. Freight corridors have resulted in unplanned commercial development along with them. The corridor is not provided with formal parking forcing the visitors to park along the roadside reduces the net carrying capacity of 50% of the road network.
2. In Ludhiana city, there are 3076 units of red category industry and 1753 units of the orange category industries raising the SPM level to  $358 \mu\text{m}^3$  whereas permissible is  $120 \mu\text{m}^3$ . This indicates the environmental degradation of the city.



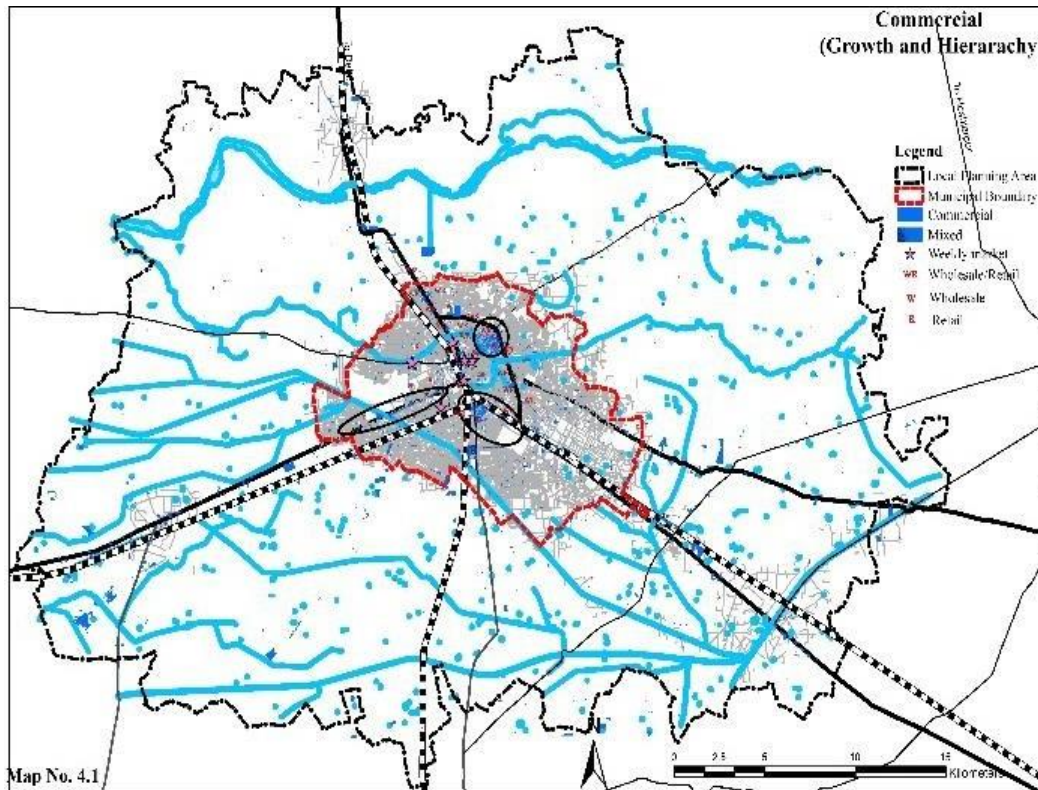
**Figure 3.** Categories of industries in the city and its LPA.

### **Trade and Commerce**

1. Commercialization of narrow residential streets covering a total distance of 20 kilometers and with widths as low as 6 feet constitute a severe danger to traffic and transportation efficiency. In the historic city, parking places are in scarce supply. Around 80% of the total establishments dealing in the wholesale trade (except bulky materials like timber, iron and steel, marble, grain, fruit, etc.) of Ludhiana city are located in the old city (inner zone) catering to traffic jams due to loading/unloading as shown in Figure 4.



2. The change of land use from residential to commercial being allowed by M.C. Ludhiana on this road without the supply of parking could be a major problem.



**Figure 4.** Map showing growth of commercial activities.

### Real Estate

1. Due to the haphazard and unplanned growth of residential areas in Haibowal, Janta Nagar, etc., there is an acute shortage of wide roads, and open spaces. Around 57% of the total area of Ludhiana city (14343) is suffering from this problem.
2. The unauthorized colonies have grown either near to work areas i.e., Hargobind Pura or on outer fringes of the municipal boundary as about 75% of total unapproved colonies are located outside the municipal boundary. This happens because of no control over the peripheral haphazard growth [9]. The figure 5 depicts the finding of all land uses.

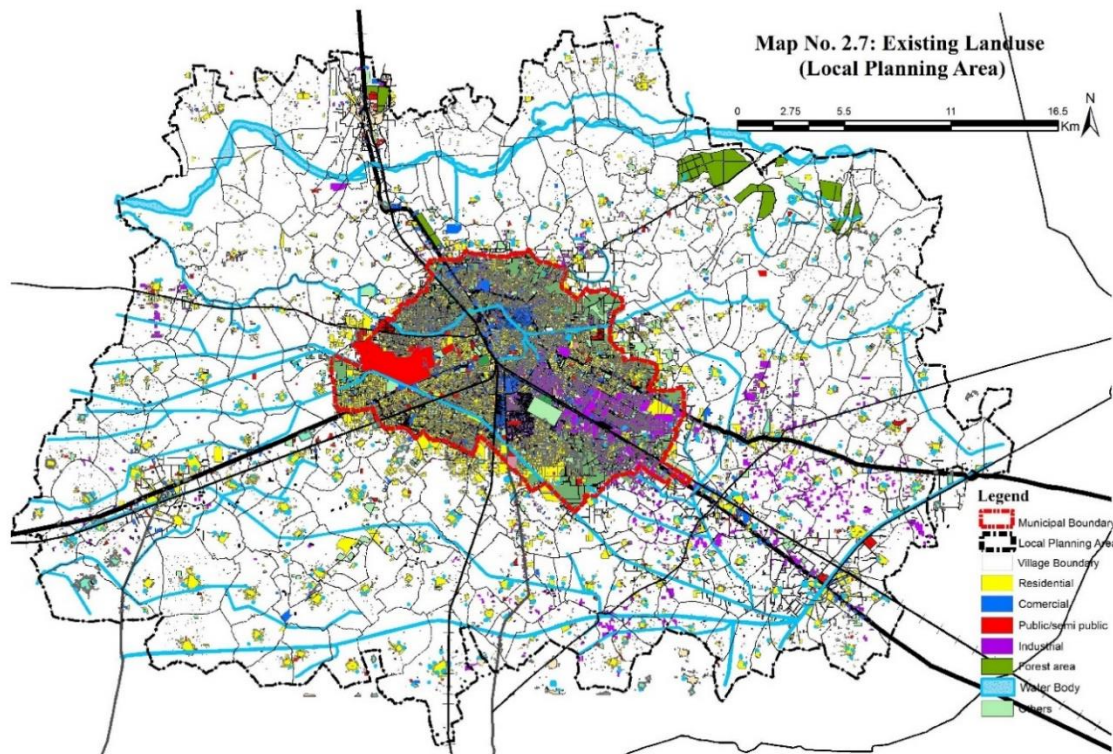
### Educational and Medical Facilities

1. Out of the 209 slums identified in the cities, 97 slums have several educational facilities. Around half of all slums lack access to educational facilities. Because slums house a big proportion of the city's inhabitants, the majority of underprivileged children are affected by a lack of educational opportunities.
2. It has been found that 53 per cent slums in the city have the access to medical facilities whereas 47 percent have no healthcare unit operating in their areas.

## PROPOSED STRATEGIES

### *Relocation of Wholesale Market*

All wholesale markets dealing with hazardous materials which include woolen market, garment market, shoe market, and spare parts markets are proposed to be developed in a decentralized manner and shifted near Dhandari Kalan railway station in the area of 1306 hectares outside the old city. All unauthorized encroachments/projections on roads would be removed to facilitate easy movement of traffic. Moreover, for the export/import purposes, it is near to the railway station.



**Figure 5.** Showing Findings of all land uses.

### ***Collection and Distribution Centre***

The grain mandi is in the old city but one collection and distribution center are to be located near Dhandari Kalan railway station as grain is coming from Khanna as it is the first largest grain market. Therefore, the freight complex must be in a freight corridor from where the direct distribution of goods to other states without entering the grain market in the old city which cause heavy traffic jams and problems related to loading and unloading.

### ***Industrial Housing***

The housing for industrial workers in Zone C is earmarked with an area of 6 acres. The private as well as Govt. agencies at the time of developing group housing should ensure that a minimum of 10% of the buildup dwelling units and 10% of the total plotted area of the scheme under residential use, as the case may be, is earmarked for housing of community-service personnel/EWS or lower-income group. Industrial housing shall be proposed under NUHHP-2007. This will eliminate slums in the city.

### ***CBD and Neighborhood Centers***

The CBD will be built on 4 acres in Shaheed Bhagat Singh Nagar and will serve as the city's apex multi-nodal activity centre. It will be conceived as a major shopping centre while also serving the community with a reasonable variety of other services and facilities, as well as centres of socio-cultural activity where the community can gather. This will relieve pressure on the city's existing CBD, Chaura Bazaar. Furthermore, neighbourhood centres are being built in the central area where the industry has gone.

### ***Shifting of Polluting Industries***

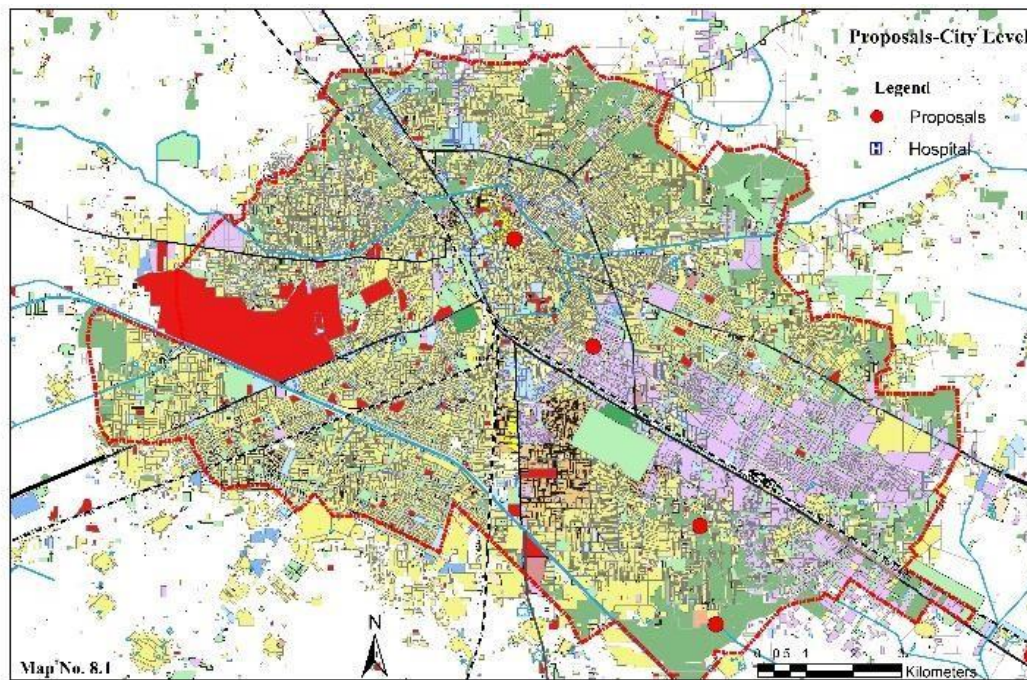
Keeping in view the extension of the industrial corridor from Mumbai to Ludhiana, the shifting of polluting industrial units from Ludhiana City to the rural settlements i.e. Area between Chandigarh road and Tajpur road comprising areas of villages Sahibana, Buddhewal, Paharuwal, Mehlon, Mangal,



Hiran, Chak Sarwan Nath, Kohara, Laton Joga, Laton Dana, Raian, Bhaini Sahib, Katani Khurd with 20 m wide green belt all around under the Industrial policy 2009 to be proposed. This will reduce the traffic and environmental degradation problems of the city and on the other hand promote balanced economic growth with a green buffer in the local planning area.

### City Level

Figure 6 shows the proposed strategies at city level in the form map.



**Figure 6.** Map showing proposals at city level.

### Local Planning Area

#### *Agro-recreational Zone*

In Khaira Bet, an agro recreation zone is to be proposed with 3.5 acres of land. As it is near the Satluj belt, so it is a low-lying area with increased fertility. The area should be made to enhance the microclimate and give the industrial training in agro products to increase skill labor.

#### *Medical Facilities*

Medical facilities are to be provided in Mullanpur and Jagraon to make it sustained and this will reduce the pressure on Ludhiana city.

### Satellite Towns

#### *Doraha*

The proposed infrastructure facilities in Doraha are multi-specialty hospitals, to reduce pressure on Ludhiana City. The informal organized a marketplace to be developed. This not only supplies job opportunities but also creates self-sufficiency.

#### *Jagraon*

The distribution center is proposed to make the grain stored here and distribute directly from the rail network to the other parts of the country. Moreover, super specialty hospital to become up with the area of 2.5 acres as it is dependent on Ludhiana city for medical facilities. This proposal will create employment and self-sufficiency in itself.

### ***Phillaur***

Medical and educational facilities are inadequate and are therefore completely dependent on Ludhiana City. Therefore 2 higher secondary school and a hospital are proposed to make it self-sufficient within itself [10].

### **Counter Magnets**

#### ***Industrial Hub***

The success of the counter magnets as migratory interceptors are totally dependent on their ability to develop new economic activity in order to provide appropriate possibilities to the working-age people of the surrounding areas who would prefer to migrate to Ludhiana City. Mandi Gobindgarh is already an industrial city but industries are going out of the city so it should be supplied with such a policy that it get subsidies at lower prices plus boost the physical infrastructure.

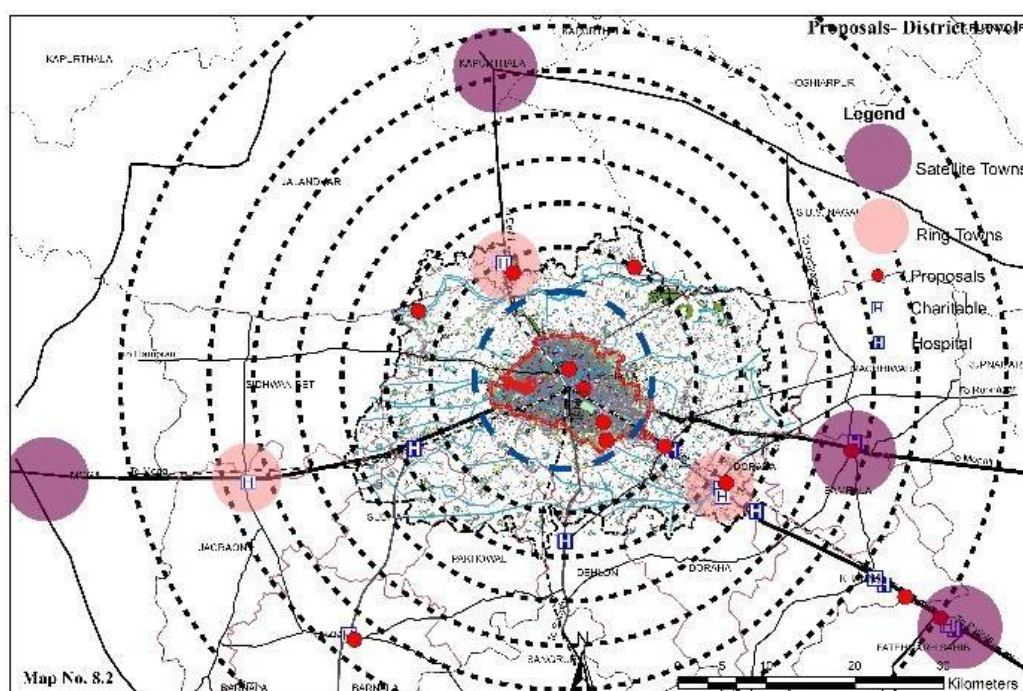
#### ***Medical Hub***

To support and sustain the economic infrastructure envisaged in the counter-magnet areas, Samrala requires exceptionally high-quality physical and social infrastructure. Medical tourism is promoted with multi-specialty and super-specialty hospitals. It will counterbalance Ludhiana City, then the nearby population will go to Samrala rather than Ludhiana and the load on Ludhiana city get distributed.

#### ***Education Hub***

Specialized social, cultural, and institutional activities like universities and centers of higher education i.e. professional colleges could be established in Moga as there are 124 colleges present within a 20 km of radius. Therefore, the pressure on educational facilities at terms of regional level will be reduced in Ludhiana City.

The Figure 7 shows the proposals of the activities at district level.



**Figure 7.** Map showing proposals at district level.

## CONCLUSION

The proposed strategies if implemented would be able to promote balanced regional development and decentralize the city spatially. So, the proposed strategies are an attempt to improve the condition of the city.

## Acknowledgement

First of all, I am thankful to God who blessed me with patience and strength to complete the research work on “Decentralization Strategies for Ludhiana City”. Then I would like to thank my teacher, the CT Institute of Architecture and Planning, and my family for supporting me throughout the making of this paper.

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