

Vol 2 Issue 11 Aug 2013

ISSN No : 2249-894X

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*Monthly Multidisciplinary  
Research Journal*

*Review Of  
Research Journal*

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RNI MAHMUL/2011/38595

ISSN No.2249-894X

Review Of Research Journal is a multidisciplinary research journal, published monthly in English, Hindi & Marathi Language. All research papers submitted to the journal will be double-blind peer reviewed referred by members of the editorial Board readers will include investigator in universities, research institutes government and industry with research interest in the general subjects.

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## SPATIAL VARIATIONS IN LEVEL OF URBANISATION IN AHMEDNAGAR DISTRICT OF MAHARASHTRA STATE

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### Abstract:

*At the demographic point of view level of urbanization refers simply the proportion of urban population to total population. This paper endeavors to illuminate the tahsil wise level of urbanization in Ahmednagar district of Maharashtra state. Ahmednagar District census Handbook, 2001 is the main source of secondary database. There are fourteen tahsil in Ahmednagar district. Out of them nine tahsil namely Ahmednagar, Shrirampur, Sangamner, Kopergaon, Rahuri, Rahata, Jamkhed, Pathardi and Shrigonda characterized urban in nature with 11 statutory towns and 07 census towns. Remaining five tahsil are Akole, Nevasa, Shevgaon, Karjat and Parmer characterized rural in character.*

*Tahsil is considering as an urban unit for present study. Multi-indicator method has been employed for measuring level of urbanization, which is devised by Verma, S. S. (1979) and Amitabh Kundu (1980). Tahsil wise variations in urbanization of Ahmednagar district studied with the help of nine indicators namely: proportion of urban population, urban to rural population, urban growth rate, and average size of urban centre, average connectivity, accessibility and urban concentration. Low, medium and high urbanized tahsil have been categorized on the basis of composite score. Four tahsil, namely, Jamkhed, Rahata, Shrigonda and Pathardi are low urbanized. Other four tahsil are Shrirampur, Kopergaon, Sangamner and Rahuri indicates medium urbanized and only Ahmednagar tahsil, which is a headquarter of district indicate high urbanized tahsil. At present, moment Ahmednagar district is amongst the districts in Maharashtra state indicates low level of urbanization. Urbanization is a long term and spatio-temporal variation process due to variations in availability and utilization of resource base not only physical but also socio-cultural in character.*

### KEY WORDS:

Spatial variations, Urbanization, Urban accretion, Spatial organization.

### INTRODUCTION:

Urbanization has been a popular and interested field amongst a variety of scholars such as geographers, sociologists, demographers, town planners, and economists. They studied urbanization process to the different point of views and approaches. Urbanization is basically a product of demographic explosion and result of rural-urban migration. It is occurring not only due to urban pull factors but also due to rural push factors.

Urbanization is an index of transformation from traditional rural economies to modern industrial one. Number of urban agglomeration /town has grown from 08 in 1901 to 18 in 2001 of Ahmednagar

Title: SPATIAL VARIATIONS IN LEVEL OF URBANISATION IN AHMEDNAGAR DISTRICT OF MAHARASHTRA STATE  
Source: Review of Research [2249-894X] THOMBARE PANDURANG YADAVRAO AND ADAVITOT S.C. yr: 2013 vol: 2 iss: 11

district. Population residing in urban areas has increased from 78,221 in 1901 to 8, 03,697 in 2001. Only 9.54 percent was urban population in 1901 whereas 19.90 % of population was living in urban areas as per 2001 census. Over the years there has been continuous concentration of population in class I towns. On the contrary, the concentration of population in medium and small towns either fluctuated or declined.

**STUDY AREA:**

Ahmednagar district of Maharashtra state has been selected for the study of present research work. Ahmednagar district is situated partly in the upper Godavari basin and partly in the Bhima basin, occupying a somewhat central position in Maharashtra State. It extends between 1802' north and 190 9' north latitudes and 7309' east and 7505' east longitudes. The district is irregular in shape and resembles a slanting cross with a length of 200 kms. and breadth of 210 kms. It is surrounded by Nashik district to the north, Aurangabad district to the north-east, Bid district to the east, Osmanabad and Solapur districts to the south, Pune district to the west and Thane district to the north-west.

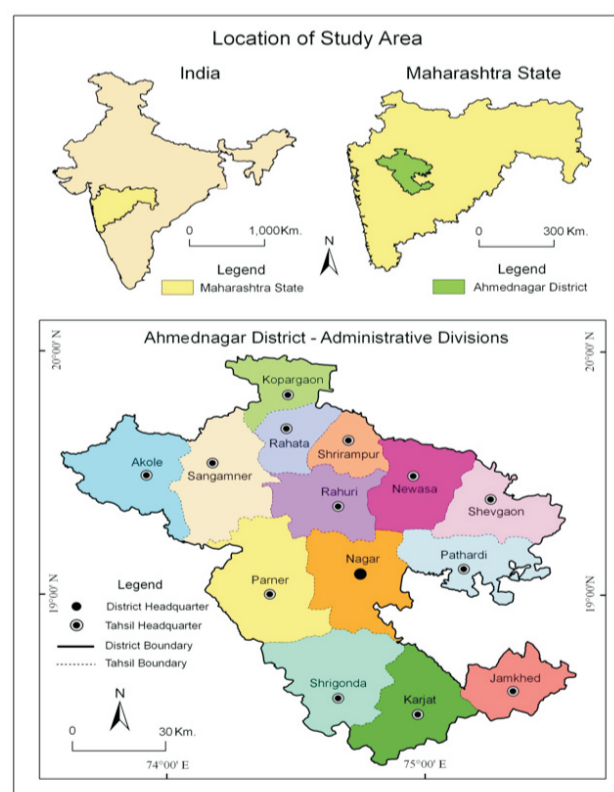
The Ahmednagar district is one of the largest districts of Maharashtra in respect of area. District covers an area of 17,048 Km<sup>2</sup>, with 40, 40,642 populations and it consists of 14 tahsil, 1587 villages, 11 statutory towns and 07 census towns. As per 2001 census the total rural population of the district is 32, 36,945 (80.1%) and urban population is 8, 03,697 (19.9%). The study area shares 4.27 percent of the state's total area and 4.17 percent of the state's population and decadal population growth rate is 19.8 percent.

**OBJECTIVES:**

The present paper aims at investigating the level of urbanization in Ahmednagar district of Maharashtra as on the basis of 2001 census data.

**DATABASE AND METHODOLOGY:**

Ahmednagar District census handbook, 2001 is the main source of secondary database. The collected data has been tabulated in suitable format. The data computed and classified by the recent research methods and techniques such as 'Arithmetic



Map 1: Location of Ahmednagar district. Mean', 'Standard deviation' etc. Finally the results were presented through choropleth maps and diagrams.

**BRIEF REVIEW OF METHODS FOR MEASURING LEVEL OF URBANISATION:**

There are two methods namely; single indicator and multi indicator have been employed by various authors and scholars to find out level of urbanization. But in single indicator method only one parameter namely 'percentage of urban population to total population' has been taken into consideration as an index for the degree of urbanization. But, single indicator method rather weak than multi-indicator method to give us clear, truth and comparative picture of the level of urbanization.

In multi-indicator method composite index of level of urbanization is computed. Statistical methods and techniques like multi-regression analysis, principal components analysis and factor analysis are widely used. Childe (1950), Berry (1962), Reissman (1964), Schore (1961), Brush (1977), Pathak, Azir and Chatterjee (1970), Pal, M. N. (1963), Sharma (1992), Dutt and Chattopadhyaya (1983), Verma S. S. (1979) and Amitabh Kundu (1980) etc. have widely adopted multi indicator method.

Therefore, Recently Nidagundi (2007) also used Verma's and Kundu's 'multi indicator method' for to know 'Regional disparities in urbanization of Gulbarga division in Karnataka state'. The same method employed by Kande (2011) for 'spatial pattern of urbanization in Solapur district'.

Therefore, in this research work authors adopted 'multi-indicator method'. This method is devised by Verma, S. S. (1979) and Amitabh Kundu (1980) for measuring level of urbanization. They have considered two main terms containing with nine parameters or indicators which follows as: a) urban accretion and b) spatial organization of urban centers:

**A) URBAN ACCRETION:**

Urban growth refers only the percentage variation of urban population during a given period but urban accretion includes not only the urban growth but also the economic viability in the regional and intra-urban context. Therefore, the term 'urban accretion' is comprehensive than that of urban growth. 'Urban growth' is a single indicator whereas urban accretion has multi indicator which comprises five indicators namely, i) proportion of urban population to total population, ii) proportion of urban population to rural population, iii) decadal growth rate of urban population, iv) average size of urban centers and v) density of urban population.

1. Proportion of urban population (U/T): This indicator is a common and widely used in all over the world for measuring level of urbanization for comparative study amongst different continents, countries or urban units. Index value of this indicator can be find out with the help

**Table-1: Ahmednagar District-Composite levels of Urbanization, 2001**

Sr. no.	Name of Tahsil/ Urban Unit	% of urban population to total (U/T)	Ratio of urban to Rural population (U/R0)	Urban growth rate (UGR)	Avg. Size of urban centre	Urban Density	Avg. Number of Urban center	Average connectivity	Accessability	Urban concentration	Composite rank score of urbanization
1	2	3	4	5	6	7	8	9	10	11	12
1	A'nagar	61.97 1	162.9 4 1	69.28 1	75191 1	2839 4	3.12 2	2.6 3	100.00 1	0.39 2	16
2	Shrirampur	34.61 2	52.93 2	12.28 8	44380 2	6522 1	3.51 1	2.5 4	100.00 1	0.12 6	27
3	Kopargaon	25.55 3	34.33 3	19.85 6	35415 4	4031 3	2.76 3	2.0 5	100.00 1	0.21 4	32
4	Sangamner	18.42 6	22.58 6	65.76 2	40662 3	4207 2	1.17 6	4.0 2	100.00 1	0.17 5	33
5	Rahuri	21.98 4	28.17 4	20.64 5	32408 5	753 7	1.93 5	2.0 5	100.00 1	0.66 1	37

6	Jamkhed	20.60 5	25.95 5	32.18 3	27654 6	937 6	1.14 7	6.0 1	100.00 1	0.07 9	43
7	Rahata	15.68 7	18.60 7	10.94 9	22601 9	1280 5	2.63 4	2.0 5	100.00 1	0.26 3	50
8	Shrigonda	9.49 9	10.49 9	20.66 4	26324 7	307 9	0.62 9	6.0 1	100.00 1	0.05 7	56
9	Pathardi	10.62 8	11.89 8	16.87 7	22827 8	679 8	0.82 8	6.0 1	100.00 1	0.06 8	57
	Dist. Total	19.89	24.83	35.16	44649	1682	1.03	3.68	100.00	0.22	351

Mean ( $\bar{x}$ ) = 39 and Standard Deviation ( $\sigma$ ) = 12.96

Of formula as given below:

$$PUP = \frac{UP}{TP} \times 100$$

Where:

PUP is the proportion of urban population to total population,  
UP is the urban population of x tahsil and  
TP is the total population of the same tahsil.

Table-1 reveals a tahsil wise composite index of urbanization of Ahmednagar district. In Ahmednagar district 19.89 percent population residing in urban area and 80.11 percent in rural area. It is observed from table-1 that proportion of urban population in Ahmednagar, Shrirampur, Kopergaon Rahuri and Jamkhed tahsil are indicates more than district average and less than district average proportion observed in Sangamner, Rahata, Pathardi and Shrigonda tahsil.

It is observed that only Ahmednagar tahsil indicating very high proportion i.e. 61.97 per cent of urban population to rural population residing in urban areas followed by Shrirampur and Kopergaon tahsil indicates 34.61 and 25.55 percent population inhabited in urban area respectively. Pathardi and Shrigonda tahsil shows 10.62 and 9.49 percent population residing in urban respectively.

2. RUR urban to rural population (U/R): In it indicator the impact of urbanization on rural base of the district taken into consideration, can be calculated with the help of following equation.

$$RUR = \frac{UP}{RP} \times 100$$

Where:

RUR is the ratio of urban population to rural population,  
UP is the urban population of 'x' tahsil unit and  
RP is the rural population of the same tahsil unit.

Ahmednagar district displaying average ratio of urban population to rural population is 24.83 percent. Ahmednagar tahsil denotes too much ratio i.e. 162.94 of urban population to rural population. More than average ratio observed in tahsil namely, Ahmednagar, Shrirampur, Kopergaon and Rahuri and less than average ratio observed in Sangamner, Rahata, Pathardi and Shrigonda tahsil.

3. Urban growth rate: The urban growth rate find out by the following formula.

$$UGR = \frac{P_2 - P_1}{P_1} \times 100$$

Where:

UGR is the urban growth rate (%),  
 $P_1$  is the urban population of 'x' tahsil unit in the initial decade,  
 $P_2$  is the urban population of 'x' tahsil unit in the later decade and  
t is the period between  $P_1$  and  $P_2$

Process of urbanization mainly depends on urban population growth rate say tempo of urbanization. Ahmednagar, Sangamner, Jamkhed and Shrigonda tahsil are recorded highest growth rate of urban population than other tahsil. Shirampur and Rahata recorded very low growth rate of urban population.

4. Average size of urban centre: Variations in the size of urban centers is a significant and aspect of urbanization. This index can be finding out by the following equation.

$$ASUC = \frac{\sum UP_j}{\sum UC_j}$$

Where:

ASUC is the average size of urban centre,  
 $\sum UP_j$  is the total urban population of  $j^{th}$  tahsil and  
 $\sum UC_j$  is the total number of urban centers of  $j^{th}$  tahsil.

It reveals that, about 44649 is average population size of the urban centre in Ahmednagar district. Only Ahmednagar and Shirampur tahsil urban units indicate more than average size of urban centre and remaining all the urban centers in district are observed less than average size of urban centre. It means that except Ahmednagar city all the urban tahsil in Ahmednagar district have small urban units say towns as per census, considering average size of urban centre.

5. Urban Density: This indicator refers to the how population distributed over urban area. It can be calculated by using the below given formula.

$$UD = \frac{UP}{UA}$$

Where:

UD is the urban density  
 UP is the total urban population of 'x' tahsil unit and  
 UA is the total urban area of 'x' tahsil unit.

Average urban density is 1682 per sq. km. in Ahmednagar district. Shirampur recorded highest (6522 km<sup>2</sup>) average density followed by Rahata (4207 km<sup>2</sup>), Sangamner (4031 km<sup>2</sup>) and Ahmednagar city (2839 km<sup>2</sup>). It is generally, concentration of urban population broadly related to the problems of overcrowding especially in Shirampur Sangamner, Kopargaon, and Ahmednagar city has put enormous strains on the urban services such as housing, transportation, water and power supply, drainage, sanitation, health care, education and recreation and above all the acceptable aesthetic urban environment. To construct an index of social well being is a difficult task. For this purpose the index of urban density per sq. km. has been used as proxy for the composite index of social well being.

Lowest urban density recorded 307 per sq. km. in Pathardi tahsil urban unit and second lowest density 679 per sq. km. in Shrigonda. Remaining urban units are medium in urban density.

B) Spatial organization of urban centers: The concept of Spatial organization of urban centers concern with the structural characteristics of urban centers, location of urban centers, linkages of urban centers and reciprocal interactions amongst them. The spatial organization of urban centers depends on how the space is organized through the development among them. The following four indicators have been chosen to articulate this concept.

1. Average number of urban centers: Tahsil wise variations in the average number of urban centers are the result of regional or tahsil wise inequalities of physical set up and economic development. Average number of urban centers in each tahsil find out with the help of following formula.

$$An_j = \frac{\sum_{j=1}^{N_{nj}} N_{nj}}{N_{Aj}} \times 100 \text{ km}^2$$

Where:

An<sub>j</sub> is the average number of urban centers of th tahsil,

$N_{ij}$  is the number of urban centers in th tahsil unit and  
 $j=1$

$\sum_{j=1}^{n_j} N_{aj}$  is the total number of towns in the same tahsil unit.

With the help of above formula finds out average number of urban centers in each tahsil unit in Ahmednagar district. There is 1.03 average number of urban centers per 100 sq. km. in study area. Considering at tahsil level it ranges from 0.62 urban centers per 100 sq. km. observed as minimum in Shrigonda tahsil to 3.51 urban centers as maximum in Shrirampur tahsil. There are 7 tahsil, namely, Shrirampur (3.51), Ahmednagar (3.12), Sangamner (2.76), Rahata (2.63), Rahuri (1.93), Sangamner (1.17) and Jamkhed (1.14) have more than district average index value. Remaining two tahsil namely, Shrigonda (0.62) and Pathardi (0.82) have less than the district average index.

2. Average connectivity: Number of transportation linkages, across in a town and number of urban centers are the basis of determining the average connectivity of urban unit. Higher the number of transportation linkages would be able to cover a larger hinterland serves with greater efficiency and higher the number of urban centers denotes higher is the connectivity and vice versa. Average connectivity for each tahsil has been found out from the following formula.

$$AC_j = \frac{\sum_{i=1}^n c_{ij}}{n_j}$$

Where:

$AC_j$  is the average connectivity

$\sum_{i=1}^n c_{ij}$  is the number of transport lines in th tahsil unit and

$n_j$  is the total number of towns in the same tahsil unit.

The average connectivity is 3.68 per urban centre in the Ahmednagar district. But, it ranges between 2.0 per urban centre as a minimum to 6.0 per urban centre as a maximum. Jamkhed, Shrigonda Pathardi and Sangamner display more than average connectivity and Remaining Ahmednagar, Shrirampur, Kopargaon and Rahata have less than average connectivity in Ahmednagar district.

3. The accessibility of rural population to the urban centre: The index of accessibility of the tahsil may be determined by Kundu after the work out the zone of influence of each tahsil or towns which can be obtained by using the following formula given by V. L. S. Prakash Rao.

$$R = \sqrt{\frac{TP \times A}{TUP}}$$

Where:

R is the radius of the urban influence,

TP is the population of the town,

TUP is the total urban population of the district

With the help of above formula the influence zone of the urban centers or no served area tahsil is computed and the no served population obtained. After subtracting this non served population from the total, the percentage of total population is calculated. This is used as an index of accessibility of rural population to urban centers.

The average accessibility of rural population to the urban centers is 100 percent in all the nine tahsil in Ahmednagar district.

4. Concentration of urban centers: The index of concentration of urban centers may be obtained through the calculation of the average distance of nearest neighbor towns. It can be found out with the help of following equation.

$$U_{cj} = \frac{\sum_{j=1}^n c_j}{m_{cj} + 2s_{cj}}$$



Where:

$U_{cj}$  is the urban concentration index,

$C_j$  is the average distance of the towns in  $j$ th tahsil unit,

$M_{cj}$  and  $S_{cj}$  are the mean and SD of  $c_j$  respectively

As per the result of above formula, it analyzes that lower the index value, higher is the urban concentration of the tahsil and vice-versa. Average urban concentration index value is 0.22 but it varies from 0.05 as a minimum in Shrigonda and 0.66 as a maximum in Rahuri. It means that urban concentration is higher in Rahuri than that of in other tahsil. Three tahsil are namely, Rahuri (0.26), Ahmednagar (0.39) and Rahata (0.26) indicates more than average concentration index. Six tahsil namely, Shrigonda (0.05), Pathardi (0.06), Jamkhed (0.07), Shrirampur (0.12), Sangamner (0.17) and Kopargaon (0.21) are less than average concentration value.

#### COMPOSITE LEVELS OF URBANISATION:

With the help of above mentioned nine indicators, in which five indicators from urban accretion and four from spatial organization of urban centers composite levels of urbanization have been constructed.

Below Table-2 clearly reveal results that the higher the composite rank value, the lower is the level of urbanization and lower the composite value, the lower the level of

**Table-2: Composite Levels of Urbanization, 2001.**

Sr. No.	Levels of Urbanization	*Range values of Tahsil	Number of tahsil (%)	Name of Tahsil
01	Low	$> 39$ ( $> \bar{X}$ )	04 (44.44)	Rahata, Jamkhed Pathardi and Shrigonda
02	Medium	26.04 to 39.00 ( $\bar{X} - \sigma$ to $\bar{X}$ )	04 (44.44)	Shrirampur, Kopargaon, Sangamner and Rahuri
03	High	$< 26.04$ ( $< \bar{X} - \sigma$ )	01 (11.12)	Ahmednagar

Source: Compiled by Authors.

\*Higher is the composite rank score lower is the level of urbanization and vice versa.

Urbanization and lower the composite value, the lower the level of urbanization. There are three namely high, medium and low levels of urbanization found in Ahmednagar district.

**1. LOW URBANIZED TAHASIL:** Four tahsil, namely, Jamkhed, Rahata, Shrigonda and Pathardi are low urbanized tahsil. Observed composite rank values of these four tahsil have 43, 50, 56 and 57 respectively. All these tahsil have a composite index value is more than 39 and also observed (Table-2) lesser intensity of all the indicators of urbanization.

Out of nine indicators four namely: 1) percentage of urban population to total population, 2) ratio of urban population to rural population, 3) urban density and 4) average number of urban centers are denoted lowest intensity. But, here note that the tahsil attained first rank in average connectivity and accessibility which have very good potentials for urbanization in future period.

**2. MEDIUM URBANIZED TAHASIL:** Four tahsil are Shrirampur, Kopargaon, Sangamner and Rahuri indicates medium urbanized and displaying a composite index value ranges between 26.04 and 39.00. Actually composite value of Shrirampur tahsil observed as 27 followed by Kopargaon -32, Sangamner -33 and Rahuri -37 composite index values.

When we consider each individual town in this group, and it indicates, and shows that, Shrirampur tahsil attained first rank in urban density, average number of urban centers and accessibility. Whereas Shrirampur tahsil indicates second highest rank in percentage of urban population to total population, percentage of urban population to rural population and average size of urban centers. Therefore, Shrirampur tahsil attained second highest urbanized tahsil in Ahmednagar district. Kopargaon tahsil attained fourth rank in urbanization of Ahmednagar district. A tahsil indicates third rank in context of percentage of urban population to total population, percentage of urban population to rural population, urban density, average number of urban centers and fourth rank in average size of urban centers and urban concentration. Rahuri tahsil stood fifth rank in urbanization of Ahmednagar district. But urban

concentration ratio and average connectivity indicates highest i.e. 0.66, and 100 respectively. Tahsil stood rank fourth in context of urban population to total population, ratio of urban population to rural population and stood fifth rank in urban growth rate, average size of urban centre, average number of urban centers and average connectivity of urban centre.

All these tahsil are situated in plain as well as rich fertile soil of Mula and Pravara river basin. Therefore, development occurred in agriculture and agro based industries especially in sugar factories. All the tahsil or towns in this category have high to medium potentiality of development and urbanization (Thombare and Adavitot 2012). It may be projected that tahsil in this category can attain high level of urbanization in future period.

**3. HIGH URBANIZED TAHASIL:** Only one tahsil namely, Ahmednagar stood rank first in level of urbanization. Ahmednagar is a district headquarter and important administrative centre of district. It situated at nodal point of Pune- Aurangabad road and Kalyan- Vishakhapattanam highway no. 222 and Manmad-Daund Railway on other hand. Development of transportation and communication facilities, various markets for agro products are available. Number of various sector district level offices, MIDC, Educational Institutes, Household Bidi Udyog and different types of occupations, stalls, markets are there in Ahmednagar city.

**CONCLUSIONS AND SUGGESTIONS:** All over, the conclusion is that all the tahsil in Ahmednagar district characterized with low to medium level of urbanization but Ahmednagar city is as a district headquarters has been high level of urbanization. Level of urbanization is one of the indicators of economic development. Therefore, it is essential to note that more attention may be given to the less urbanized tahsil. Development plan may be prepare for urbanization and healthy or sustainable development.

For the vision 2020 attention may be given to the process of urbanization and needs to be contextualized as a process of transfer of economic resources from rural to urban areas as an outcome of improvements in quantum and quality of economic activities in the rural areas and an increase in demand for raw materials for secondary and tertiary activities. Additionally, the process of industrialization should be viewed deepening the process of agro-industrialization as well as broadening the overall process of manufacturing sector. Tourism development plan for the district may be prepare for development and urbanization.

High and medium urbanized tahsil like Ahmednagar Sangamner, Shirampur, Kopargaon Rahuri and Shiridi facing number of different types of problems such as enormous strain on the urban services such as housing, transportation, water supply, power supply, drainage, sanitation, health, care, education and recreation and these all an acceptable aesthetic urban environment. Pollution, slums, traffic jam due to narrow roads and crowding are the result of unplanned urbanization. For the solution of all urban problems innovative programme may be launched.

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