

Origin, Evolution, Growth and Spatial Pattern of Urban Centers in Gadag District: A Geographical Analysis

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Abstract

The history of the origin of urban centers is closely associated with geographical and administrative factors. The relationship between human society and landscape phenomena are required for the exits of an urban centre. Every urban center has a long history of their existence as good urban community since prehistoric period. The energies of almost the whole human race have been claimed in providing the minimum food, clothes and shelter. (Arthur E. Smailes 1968). Throughout the human history, urban centers have played an important role in transforming the society. They have been the scene and setting of major social, economic and political change (K. Siddhartha and S. Mukherjee 2000). The present study is exclusively based on secondary data collected from Govt. and non- Govt. offices. In all the study area has 9 urban centers, each of which bears their own history in respect of origin and evolution. Keeping the background an attempt has been made in the present paper to examine the factors that are influenced for the origin and evolution of urban centers in Gadag district. The paper also reveals the spatial pattern of the urban centers. The area under study came into exists in 1997 when the erstwhile Dharwad district is bifurcated in to three district namely Dharwad, Haveri and Gadag. During 1961 the total urban population was 1,50,077 but in 2011 it increased to 3,79,309 within a span of 50 years the urban population increased by 152 per cent in the study area. The total urban area in 1961 was 125.3 sq. kms and in 2011 it increased to 175.03 sq. kms, it shows the net increase by 28 per cen. The land and population ratio in 1961 was 1198 persons and 2167 persons in 2011. The spatial distribution of urban centers in present study clearly shows that it is having 0.44 Rn value and indicates that the pattern of urban centers approaching towards clustered.

Key Words: Urban Centers, Origin, Evolution, Growth and Spatial Pattern, Land population ratio

INTRODUCTION

The history of the origin of urban centers is closely associated with geographical, socio-cultural, economic and

administrative factors. The relationship between human society and landscape phenomena require for exist an urban

centre. The urban communities are supported to yield a surplus food over and above the needs of food producers in the ancient period. In those days, the man was devoted to his time to grow more food than his family needs. For most of the time man has existed as a species. The energies of almost the whole human race have been claimed in providing the minimum food, clothes and shelter. (Arthur E. Smailes 1968). Throughout the human history, urban centers have played an important role in transforming the society. They have been the scene and setting of major social, economic and political change (K. Siddhartha and S.Mukherjee 2000).

Now-a-days urban centers are having a long history for exist as good urban community since prehistoric period. The rate and growth of urbanization in the world has been observed into three different periods namely Ancient, Medieval and Modern and each period gives different causes for the origin, evolution and growth of urban centers in the world. In Ancient time, urban centers were formed by the result of production of food grains, trade and merchant travels, and economic development were cause for the formation of urban centers

in both Medieval and Modern Period respectively.

STUDY REGION

The study region is located in the Northern part of the state of Karnataka, India. The district was formed in 1997, when it was split from the Dharwad district. The district lies between 14° 57' to 15° 52' North Latitudes and 75° 05' to 75° 56' East Longitudes (Fig 1). The total area of the district is 4656 square kilometers. Gadag district is surrounded by Bagalkot district on North, Koppal district on East, Bellary district on South, Haveri district on Southeast, the Dharwad district on West, and Belagavi district on the Northwest. The district has nine urban centers namely, Gadag – Betageri (District head quarter), Gajendragarh, Lakshmeshwar, Mundargi, Mulgund, Naregal, Naragund, Ron and Shirahatti. Between Gadag and Bagalkot districts Malaprabha River forming the natural boundary about 25 kilometers in the Northern side of the district. In Southern side of the district, river Tungabhadra forms the boundary between Gadag and Bellary districts about 20 kilometers. These two rivers bounded the region and flows from West to East direction.

According to 2011 census Gadag district consists of 9 towns and 337 villages with a population of 10,64,576 of which 3,79,309 (35.63%) are Urban and 6,85,267 (64.37%) are Rural population. The total geographical area of the district is 4656 Sq.km, of which 175.03 square kilometer of urban centers and population density of the area under urban centers is 2167. Sex ratio is 967 and a literacy rate is 65.64 percent.

DATA BASE AND METHODOLOGY

The present study is purely based on secondary sources collected from the District Census hand books of six decades i.e. from 1961 to 2011, District census reports, and economic reports. Collected data has been analyzed with the help of statistical techniques like Gibb's and Hegget Method to measure the absolute population growth rate, and Nearest Neighbor technique has been used to analyze the distribution pattern of urban centers. Results have been presented with the help of graphs, maps, tables.

OBJECTIVES:

The present study envisaged to understand and analysis the origin,

evolution, growth and spatial distribution of urban centers in Gadag District.

- To find out the major causes responsible for the origin, evolution and growth of urban centers in Gadag District.
- To evaluate the extension of urban area and population from 1961 to 2011
- To examine the spatial patterns and spacing of urban centers and to provide a brief overview of the development of cities from antiquity to the present.

HYPOTHESES:

To achieve the above mentioned objectives the following hypotheses formulated

- 1) Origin, Evolution and Growth of Urban Centers are closely associated with geographical, Socio-Cultural, Economic and administrative factors.
- 2) The spatial distribution and spacing of urban centers in the region is not ubiquitous owing to their size of population and physiographic influence.
- 3) The distance varies with variation in the urban size class. Large-sized urban centers are spaced widely while small-sized urban centers are spaced closely.

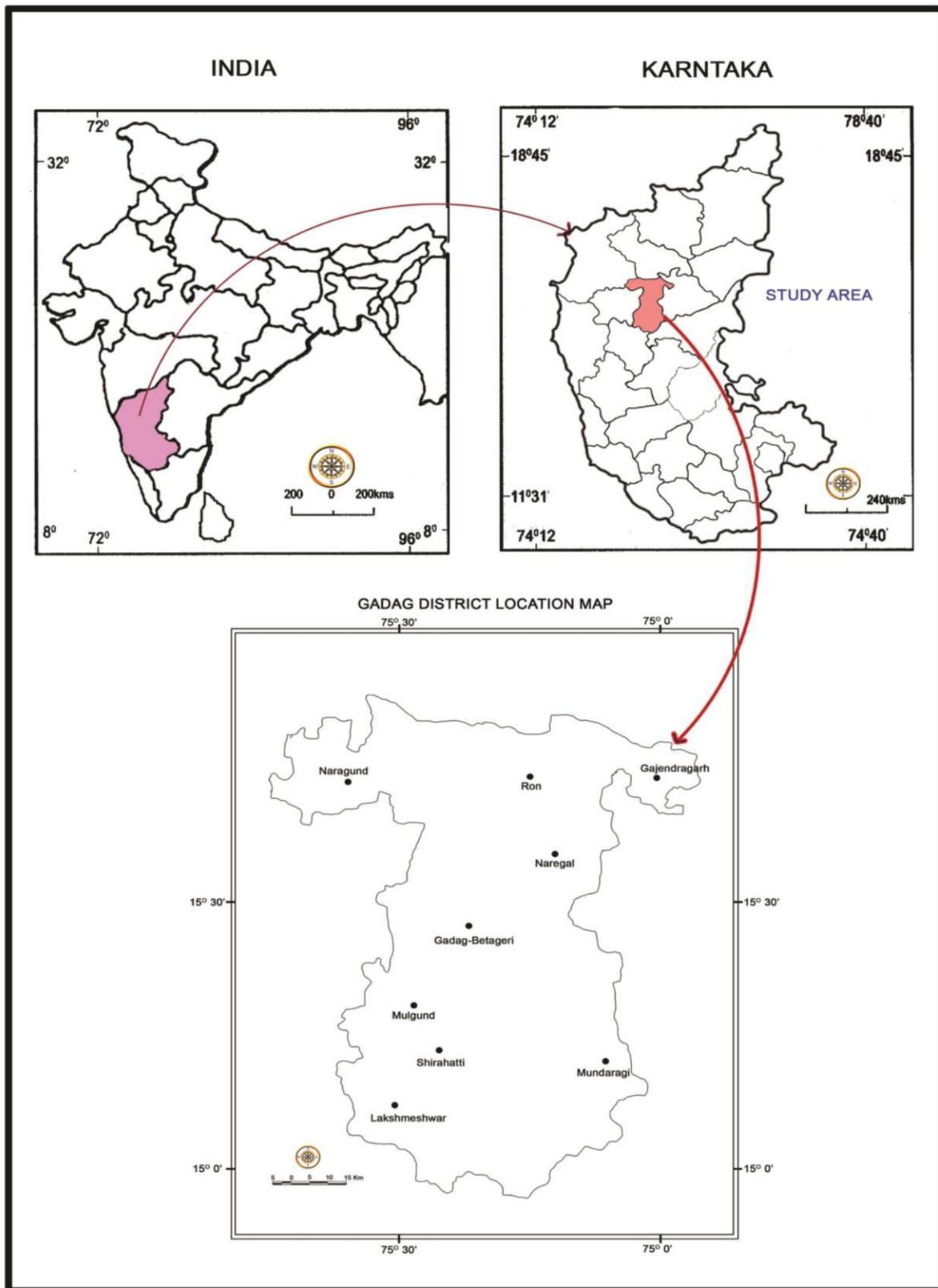


Fig. I

The existence of urban centers on the earth surface is influenced by several factors which are very essential to understand the evolution of urban centers. Defensive Sites, Important Roads, Railway Stations, Trading Site, Mineral and Power Resource, Industrial Sites, Religious and Cultural Factors and Special Attractive Sites are some of the important factors generally responsible for origin, evaluation and growth of urban area and the urban areas of the present study area not exception to it. The present paper focused on the origin, evolution, growth and spatial pattern of each urban center in Gadag District. There are nine urban centers in Gadag district their origin, evolution, growth of each center is explained hereunder.

GADAG-BETAGERI: It was a great seat of learning during early historical and mediaeval periods. According to a legend it was founded by King Janamejaya. It has been called Krataka, Kratupura, Kardugu, Galadugu and Gadugu by various inscriptions which relate to reign of Rashtrakuta King, Indra III in the year of 918. Gadag has most important object is Vira Narayana temple and trikuteshwar temples are the important temples in this town and were built by Vijayanagar empires. It is said that the famous Kannada poet Gadugina Naranappa wrote the Kannada version grate epic of 'Mahabharata'. Wright from its origin to till date this town is well known for printing the books and calendars not only in Karnataka state but also in India. Earlier Gadag was the only town in the district in due course of time there are as many as 9 towns emerged.

The two separate towns like Gadag and Betageri were merged into single municipal Council in 1885 and thereafter this town is known as Gadag –Betageri town and now these are twin cities in the study area. The city municipal council consisted 1,72,612 persons which is most populated city in the district. The total geographical area of the CMC is 54.54 sq. km. In 1961 the total area of the CMC was 10.61 sq. km but in 2011 it increased to 54.54 sq. km. The population density in 1961 was 7220 but in 2011 it has decreased to 3163 (2011) owing to extension area has increased but the proportionately number of persons not increased. The literacy rate of CMC in 2011 was 85.38 per cent and sex ratio was 1009 females per 1000 male.

GAJENDRAGAD: The name of town became from the fort built on adjoining hill by Shivaji. This town was ruled by The Chlukyas, The Yadavas and The Vijayanagar Kings. Gajendragad famous for Kalakaleshwara temple belonging to the reign of Chalukya Someshwara IV (1184-89), Yadava Singhana (1210-46) and Vijayanagar King Harihara II (1344-77). The town situated in State Highway No.42 and 57 km to the north east from its district head quarter i.e. Gadag. Recently the town is famous for oil ginning factories, handloom industries as well as agricultural activities. As per 1961 census the town recorded 6.80 sq. km. but 2011 it increased to 18.82 sq km with 23 wards. Within a span of 50 years the net area increased was 176 per cent. The population of the town was increased to 32,359 in 2011 from 15,195 in 1961. The land people ratio was 2234 in 2011 and 1719 in 1961. The town is witnessed 998 female

per 1000 male and the total literacy was 79.49 per cent.

LAKSHMESHWAR: Lakshmeshwar is a place of historical and religious known by as many as 53 inscriptions during the 7th to 16th centuries. It was known as puligere, Huligere, Purigere, Porigere or Pulikaranagara. Lakshmeshwar governed by Ankush Khan during reign of Bijapur Adilshahi Kings (1486-1686), later it was given to Gavinda Desai who was became the Nawabs of Savanur. In 1756 it was handed over to Marathas and in the year of 1948 it became part of Dharwad district. The town is known for agricultural marketing town. The town registered 15,997 in 1961 and in 2011 it increased to 36,754 people. The urban area extended to 12.32 sq. km with 23 wards from 3.62 (1961) sq. km. The town recorded 2983 (2011) of population density where as in 1961 the population density was 4419 (1961). The density of population shows a decreased trend due to rapid increased in urban area. The centre reported 78.41 per cent of literacy rate and sex ratio was balanced i.e. 1000 females per 1000 males.

NAREGAL: The inscriptions of Naregal said it was a historical place during the reign of Rashtrakutas, later Chalukyas, Kalachuris, Yadavas and Hoysala dynasties. It was ruled by Sinda Chief Achugi II (1098-1122) and Permadi (1104-44) who had capital of Eramarage or Yelburga of Raichur district. This urban centre had 10,539 people in 1961 with 17 wards; in 2011 it has increased to 16,690. The total urban area was 33.10 sq km. in 1961 but in 2011 it has decreased to 22.50 sq. km. This is caused due to the fact that the urban area

reclassified as a result large size of revenue area, widely spread over the neighboring settlements and later demarcation was made by the Town Panchayat. 78.20 per cent of people were literates and sex ratio was 991.

NARGUND: It was an Agrahara administered by 220 Mahajanas, in that time it was ruled by chalukyas. Nargund was fortified by Shivaji in 1674 and called Mahilgad. Later it was ruled by Haidar Ali and Tipu Sultan (1761 – 1799), Marathas and British. During first war of independence in 1857, Baba Saheb the chief of Naragund rebelled against British rule and at that time Nargund was one of the strongest forts with its chief was known for his intelligence. Nargund is one of the traditional wholesale markets of Dharwad district where cotton ginning factories and oil mills were known for marketing. The TMC reported 36,291 populations in 1961 which has increased to 23,141. The urban area was spread over 19.57 sq. km in 2011 in 23 wards. The Nargund TMC reported 74.46 and 977 literates and sex ratio respectively.

RON: Ron was a prominent town in the past is revealed by the numerous epigraphs found in and around the town. It was a center of learning and Maha Agrahara which was being administered by 104 Mahajanas. The name of this town is closely associated with Dronacharya of Mahabharata to whom one of the local shrines.

The available inscriptions which are dated 874 said that it was belongs to the reign of Rashtrakuta Amogha Varsha I (814-77). Ron town is famous for Jain temple enshrining an idol of Parshwanatha which has an inscription on its pedestal. 23,311

population recorded in 2011 and during 1961 it had hardly 10,890 (1961). The geographical area of the centre is reclassified by the TMC which resulted in to decrease of urban area; this de-notified urban area was incorporated in the boundaries of revenue area of the neighboring settlements 78.10 of literates and 1030 of sex ratio was found in this urban centre.

SHIRAHATTI: During the reign of Bahmani Kings and Bijapur Kings Shirahatti was part of Lakshmeshvar sub-division. It was granted to some local leaders as 'Jaghir' and 'Saranjam'. In 1801 when the Saranjam was divided among the family members, this sub-division and the fort of Shirahatti came to the share of Sangli Chief Chintamanrav. The Shirahatti, is an taluk-headquarter-town and famous for two Mathas, such as Avlingavva Matha and Fakirsvami Matha. The Town Panchayat had 17,610 of population in 2011 and in 1961 it had 7,692. The geographical area of the town is extended 11.76 sq.km. (2011) from 2.59 (1961) sq. km. TP indicates 75.93 of literates and 997 of sex ratio in 2011.

MULGUND: The town derives its name from "Muni Vrinda" which Means group of saints. During the rule of the Jain Kings, the place served as Brahmin Agrahara (residence). Historically the town is the very significant because of three inscriptions of the 11th and 12th century written in Kannada language and belonging to the Rashtrakuta dynasty were excavated from here. A distinguished line of Jain scholars and monks flourished here, reputed among them was Nayasena, author of the Kannada classical work Dharmamrita. The Town

Panchayat had 14,535 population in 1961, in 2011 it has increased to 18,763 (2011). As per the 2011 the total geographical area was 16.10 (2011) sq km .This town consists of 19 wards.

MUNDARAGI: The town has a history of over 400 years. In 1857, during the Sepoy mutiny, Bheemarao Nadagouda, who was a British official, rebelled against the British East India Company and confiscated huge amounts of revenue. Mundargi is the taluka headquarter of the same name. The name 'Mundaragi' is said to have derived from the stone hill, located to north-west of the town, Murudagiri, meaning 'Hill of Shiva'. Surrounded by the Kappatagiri range of hills. The town famous for the ancient Mundaragi fort located on the hill top. It is also famous for the Annadaneshwara Matha. Annadaneshwara was a veerashaiva monk, known for his generosity and annadaanam (alms of food). The Town Municipal Council represents 24,919 populations in 2011 but in 1961 it had 11,580 populations. It shows the net increase of 13,339 in span of 50 years. This town spread over an area of 8.50 (2011) sq km, The Town Municipal Council comprises of 23 wards, 17,178 (79.14) of literacy rate and 991 of sex ratio.

Growth of Urban Centers:

The concept of the growth of urban centers is refers to size and structure of the physical, socio – cultural and economic factors. The present paper has aims to understand the growth of urban centers since 1961 to 2011. According to 2011 census Gadag district consists of 9 urban centers and 337 villages with a population of 10, 64,576 of which 3, 79,309 (35.63%) are Urban and 6, 85,267

(64.37%) are Rural population. The total area of urban centers is 175.03 square kilometer and population density of the area under study is 2167 per sq. km.

Table 1 shows extension of the urban centers. The Total area of urban centers has increased to 175.03 sq. km (2011) from 125.35 (1961). The highest extension of urban area is registered in 1991 (340.78 sq.km). It is because of the census of India had included the neighboring revenue villages in urban area. Among nine urban centers of the study area Gadag-Betageri is rapid growing urban center which extended to 54.57 sq. km in 2011 from 10.61 sq.km in 1961 (Fig.2). Administrative head quarter and maximum small and medium scale industries are main causes for the fast growing as a result of which people

from the surrounding towns and villages immigrating to this town. Mundaragi town is the smallest urban center in the study which has only 8.50 sq.km. the main reason are lack of infrastructure facilities, improper allocation of funds by TMC, non implementation of urban area policies, unplanned.

In the present study Nargund, Shirahatti, Gajendragarh and Lakshmeshwar centers also fastest growing centers in the district due to better developmental planning, policies and infrastructural facilities. The remaining urban centers like Mulgund, Mundaragi, Naregal and Ron witnessed slow growth in the study region. It is mainly because of demarcation of urban area by the TP and TMC.

Table.1. Growth of urban area in Gadag District (1961-2011) (Area in Sq.km)

Sl. No	Urban Centers	1961	1971	1981	1991	2001	2011
01	Gadag –Betageri (CMC)	10.61	11.65	17.10	34.75	54.57	54.57
02	Mulgund (TP)	--	--	77.20	77.20	16.10	16.10
03	Mundaragi (TMC)	--	--	42.05	42.05	8.50	8.50
04	Naregal (TP)	33.10	85.72	85.72	85.72	22.50	22.50
05	Nargund (TMC)	5.43	5.43	5.43	5.43	19.57	19.57
06	Ron (TMC)	63.20	63.20	68.65	68.65	10.89	10.89
07	Shirahatti (TP)	2.59	2.59	2.81	2.81	11.76	11.76
08	Gajendragarh (TMC)	6.80	10.64	18.82	18.82	18.82	18.82
09	Lakshmeshwar (TMC)	3.62	2.72	5.35	5.35	12.32	12.32
10	Total	125.35	181.95	323.13	340.78	175.03	175.03

Source: District Census Hand Books (from 1961 to 2011)

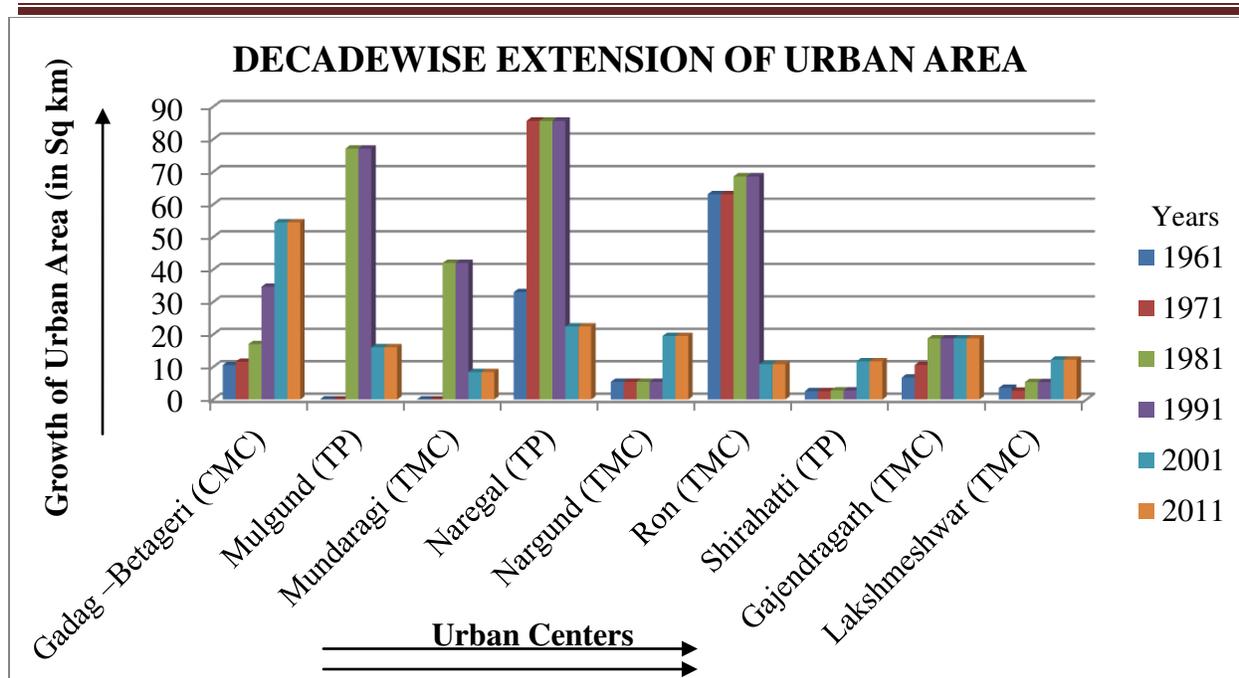


Fig. 2

Submergence and Divergence of Neighboring Villages

During the six decades i.e from 1961 to 2011 the urban centers have been influenced by divergence and submergence of neighboring villages especially in Mulgund TP, Mundaragi TMC, Shirahatti TP, Lakshmeshwar TMC and Nargund TMC. In Mulgund TP the urban area has been came to rapid down due to demarcation of new revenue villages i.e., Shethalahari and Basapur in 2001 as a result some area come into the premises of emerging new revenue villages therefore the urban area is reduced from 77.20 to 16.10 sq km. In Mundaragi TMC there are four villages i.e Shirol, Byalawadagi, Ramenhalli and Mundaragi rural have been emerged in 2001 and the

area has been reduced to 8.50 from 42.05 sq. km. Similarly Shirahatti TP urban area also reduced due to emergence of Khanapur and Shirahatti rural as revenue villages 2001. In the present condition this urban center is growing rapidly and it become market hub for the surrounding villages due to this cause the urban revenue area has been increased to 11.76 sq km from 2.81 sq km. Desai Ban, Hireban, Ramageri, Pethban, Bastiban and Hulgeriban villages have been emerged in Lakshmeshwar TMC in 2001 as a consequences urbna area has been increased to 12.32 sq km from 5.35 sq km. The Nargund TMC has been submerged with the villages like Peth, Dandapur, Nargund TMC,

Arban, Nargund rural and Somapur in 2001 and the area has been increased to 19.57 sq km from 5.43.

In the present paper the trend and pattern of urban centers can be observed into two phases i.e, Before Independence and After Independence periods.

DISTRIBUTION OF URBAN CENTERS IN GADAG DISTRICT

Table 3. Phases of Urban Centers in Gadag District

Before Independence	After Independence			
Up to 1947	1951	1971	1991	2011
07	07	09	09	09

Source: Computed by Author.

Before Independence Period: Due to the slow growth of population in Gadag district there were hardly few urban centers noticed in the study area. Draught, flood and famine are the major factors which might be obstacle for the growth of urban centers. During this period of time 07 urban centers such as Gajendragarh, Naregal, Nargund, Ron, Gadag-Betageri, Lakshmeshwar and Shirahatti notified as urban centers.

After Independence Period: In the Second Phase of the growth of urban centers in the study area 09 urban centers came into existed. During this time major changes took placed in respect of administration, social, political and cultural fields. In the year of 1971 Mulgund and Mundaragi towns added in the existing list and the total number of urban centers in the area under study is 09.

POPULATION DISTRIBUTION

Table 4 exhibits the distribution of urban Population in Gadag district (1961 to 2017). The spatial distribution of population has been categorized into three groups such as areas with highly populated (than 50,000 population), areas with moderately distributed population (25,000 to 50,000) and area with less population (less than 25,000) (2011).

- 1) Areas with High Population (> 50,000):**
The highest population of the Gadag district has been found in district head quarter notably Gadag-Betageri city municipal council. It has more than 50,000 populations due to the availability of all urban amenities and infrastructural facilities providing to the urban dwellers and people stayed within the urban limit.
- 2) Areas with Medium Population (25,000 to 50,000):** Moderately distributed of population found in Nargund, Gajendragad

and Lakshmeshwar urban centers. Recently these centers are developing very fast due to inadequate availability of urban facilities

3) **Areas with Low Population (< 25,000):**

The least population of the urban centers is Mulgund, Ron, Naregal, Shirahatti and Mundaragi. Still these urban centers are dominant in agrarian sector and secondary and tertiary sectors not developed as a result their development is not at the expected level.

DECADAL GROWTH OF URBAN POPULATION

In the present study an attempt has been made to analyse the decadal growth of urban population in Gadag district from 1961 to 2011. The total decadal growth of urban population of the district is registered highest (61748) (Fig.3) in 1971 due to immigration of population into urban areas

and it is decreased to 37126 in 2011. This was mainly due to increase in the rate of literacy and socio-economic changes in urban dwellers that made it control natural growth of population.

Among the centers Gadag-Betageri urban center registered highest growth in 1981 (21940) and 2001 (20931) due to establishment of medium and scale industries, new educational institutions and commercial complexes were opened in the city are the important factors attracted population from the surrounding rural area and major socio-economic services were made available during this decade. Gajendragarh (314), Mundaragi (278) and Naregal (409) centers have noticed low growth in population from 1971 to 1991.

Table 4: Growth of urban Population in Gadag District (from 1961 to 2011)

Urban Centers	1961	1971	Decadal Variation (in 1971)	1981	Decadal Variation (in 1981)	1991	Decadal Variation (in 1991)	2001	Decadal Variation (in 2001)	2011	Decadal Variation (in 2011)
Gadag - Betageri	76,614	95,428	18,814	1,17,368	21,940	1,34,051	16683	1,54,982	20931	1,72,612	17630
Mulgund	--	14,535	--	14,535	--	15,760	1225	18,098	2338	18,763	665
Mundaragi	--	13,339	--	13,617	278	16,542	2925	20,363	3821	24,919	4556
Naregal	10,539	12,707	2168	14,183	1476	14,592	409	16,685	2093	16,690	05
Nargund	13,150	17,338	4188	23,531	6193	29,944	6413	32,561	2617	36,291	3730
Ron	10,890	13,097	2207	16,363	3266	19,116	2753	21,643	2527	23,311	1668
Shirahatti	7,692	9,278	1586	13,307	4029	14,984	1677	16,208	1224	17,610	1402
Gajendragarh	15,195	15,509	314	20,226	4717	24,184	3958	28,226	4042	32,359	4133
Lakshmeshwar	15,997	20,594	4597	25,444	4850	28,784	3340	33,417	4633	36,754	3337
Total	1,50,077	2,11,825	61748	2,58,574	46749	2,97,957	39383	3,42,183	44226	379309	37126

Source: District Census Hand Books (from 1961 to 2011)

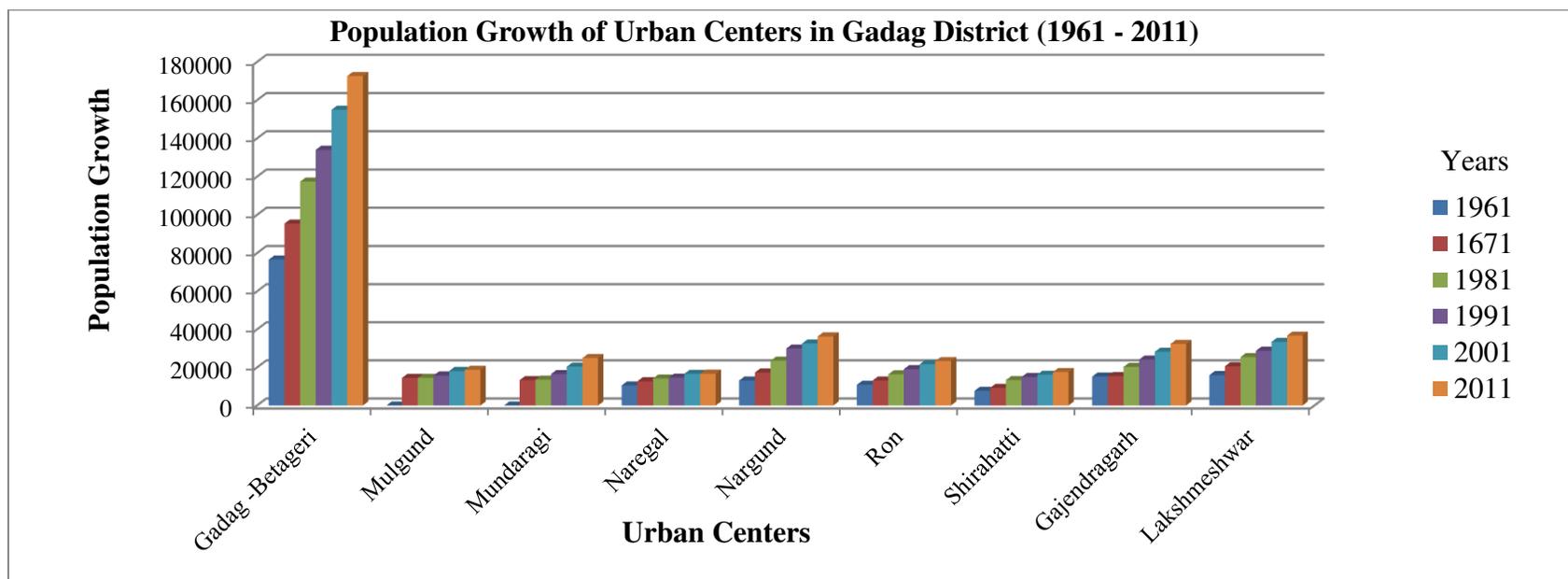


Fig.3

SPATIAL PATTEN OF URBAN CENTERS IN GADAG DISTRICT

The distribution patterns of urban centers have been examined by analyzing the randomness index and the estimated and actual inter service centre distances. The randomness or dispersion of the urban centers has been analyzed on the basis of nearest neighbour distance of urban centers in space which was envisaged by **Clark and Evans (1954)**. This technique measures the variation or departure of location points from nucleated or random distribution. The following formula has been considered to be the most suitable in the regional context.

$$R_n = \frac{\overline{D_o}}{\overline{D_e}}$$

Where as

R_n = Departure for randomness in the context of nearest neighbour
 $\overline{D_o}$ = Observed mean distance and
 $\overline{D_e}$ = Expected mean distance

After the calculation of nearest neighbor technique the spatial distribution of urban centers in the study area clearly shows 0.44 R_n value and it indicates that the spatial patterns is approaching towards clustered. In the study area one can observe that the

spatial pattern of urban centers with two pairs has good connectivity with each other. The one pair is having mulgund and shirahatti urban centers which are found in nearest and neighbor to each other. Another one pair found between Ron and Naregal urban centers. Ron and Shirahatti urban centers are distributed as central places and Nargund and Mundaragi distributed as outer places from their surrounding centers. The salient features of the distribution of urban centers may be discussed in view of their number, mean area as following –

- 1) The spacing of urban center in the region is not same in everywhere.
- 2) The spatial distribution of urban centers is depends up on Size and Population of the each urban center.
- 3) The distance varies with variation in the urban size class. Large-sized urban centers are spaced widely while small-sized urban centers are spaced closely.
- 4) The differentiation of distance between urban centers depends on the functional complex and specialization of towns.

SPATIAL PATTERN OF URBAN CENTERS IN GADAG DISTRICT

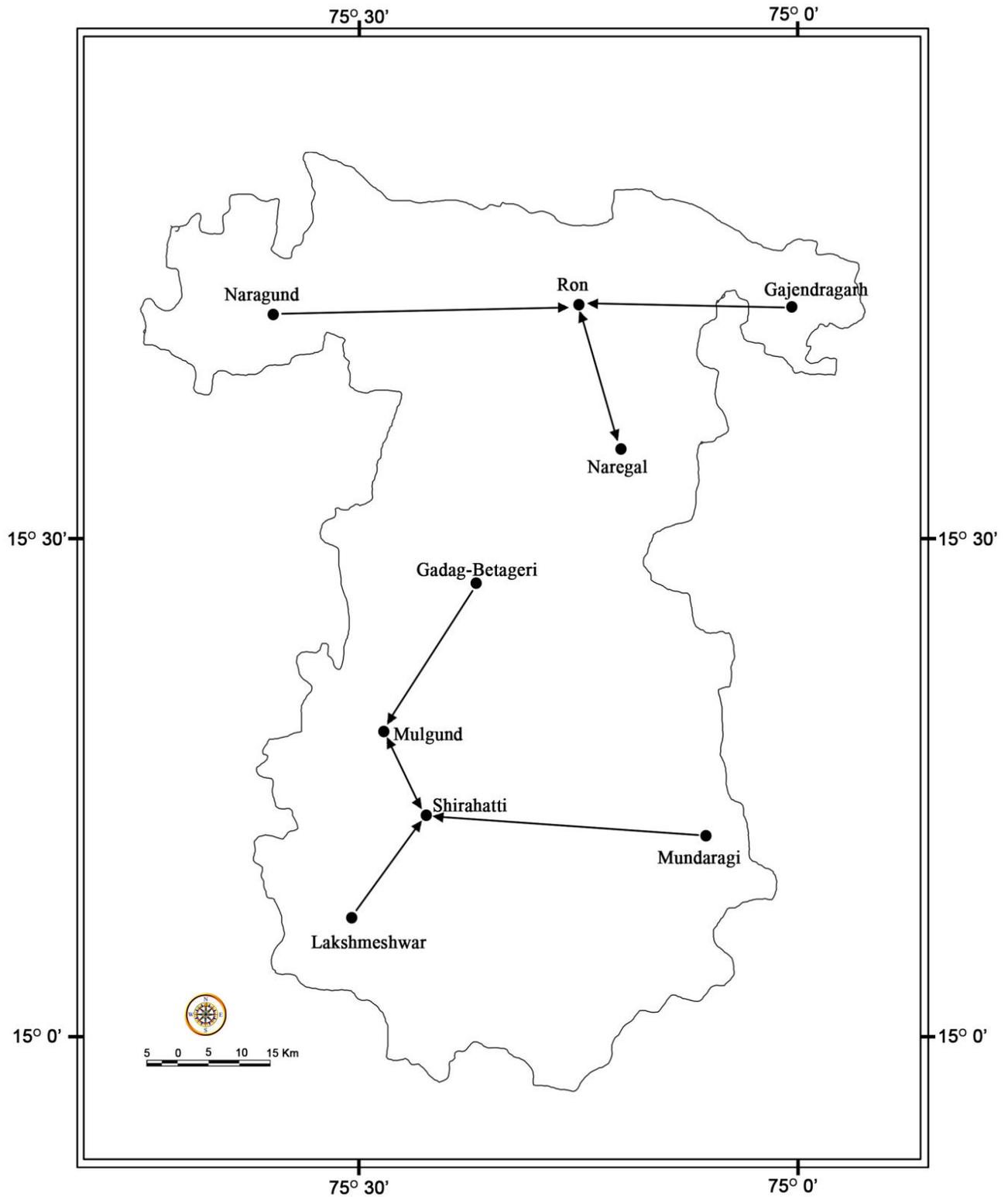


Fig. 4

CONCLUSION

In the present paper we may be observed that the origin, evolution, growth and spatial pattern of urban centers are closely associated with physical, socio-cultural and economic factors. The history of the origin of urban centers was started from ancient civilization and it is passed through three periods i.e., ancient, medieval and modern. The spatial distribution of urban centers in

present study clearly shows that it is having 0.44 Rn value and indicates that this is the pattern of approaching towards clustered. Among the nine urban centers, Nargund, Shirahatti, Gajendragarh and Lakshmeshwar has been registered as fast growth rate except Gadag-Betageri in one hand and on the other hand Mulgund, Mundaragi and Naregal centers has been registered slow growth rate.

REFERENCES

- 1) "Urban Structure and Interaction: A Study of Bulandshahar", Submitted Ph.D theses by Mr. Gyan Prakash to the C.C.S University Meerut.
- 2) Arthur E.Smailes (1966): "The Geography of Towns", Hutchinson & Co. Publishers 178-202 Great Portland Street, London.
- 3) Clark, P.J., and Evan, P.C. Distance to nearest neighbour as a measure of spatial relationship in population ecology, 1954.
- 4) Janaki X.A (1954) "Functional Classification of towns in Gujarat", Geographical Research paper Series No.2.
- 5) K.Siddhartha and S. Mukherjee (2000): Cities Urbanization and Urban Systems, Kosalaya Publications, New Delhi.
- 6) Karimi,S.M. (1968): "Functional Classification of Towns in Bihar Plain" Trans. I.C.G., Vol.5, p.49)
- 7) L.N.Verma (2008): Urban Geography, Rawat Publications, Jaipur.
- 8) S.P. Sinha, V.N.P. Sinha and R.B. Ram (1994): "Levels And Trends of Urbanization in India" Published Research Article in Regional Symbiosis Vol 2, 1994.