Urbanization and Economic Growth in Punjab (India): An Empirical Analysis

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Abstract

In recent decades, urbanization in Punjab is occurring rapidly by reducing the share of agricultural activity and increasing rural to urban migration. In this perspective, the present paper using Census data describes the recent past trends and patterns of Punjab's urbanization from 1961 to 2011. It investigates the relevant determinants of urbanization in Punjab. Finally, it measures the impact of urbanization on urban economic growth in Punjab. The empirical results show that the growth rate of urban population is higher than that of the total population in Punjab. Urban agglomerations and urban areas of in Punjab also are increasing rapidly. Most importantly, it has been seen that urban population in Punjab is concentrated in an around Class I cities than other class of cities/towns. The OLS regression results show that road distance to sub division (or nearest city population of 1 lakh and more) has a negative effect on urbanization in Punjab measured by size of city population. On the other hand, city-wise total road length has a positive impact on urbanization in Punjab. In addition to that, city-wise total number of schools, colleges and electricity connections has a positive impact on urbanization in Punjab measured by city population density. The paper also finds the positive link between urbanization measured by size of district urban population and urban economic growth measured by district domestic product in Punjab. Finally, the paper suggests several policy options for planned urbanization in Punjab for not only to improve economic growth in Punjab but also in India as well.

Key Words: Urbanization, Urban Economic Growth, Punjab, India

JEL Classification: O18, R11, R12

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I. Introduction

Urbanization plays a crucial role in the economic growth of a nation.[1] There is a strong correlation between urbanization and economic growth. In other words, fast urban growth does translate into fast GDP growth and urbanization generally occurs with modernization and industrialization. No country has grown from poor to developed economy without industrializing and modernization which occurs through urbanization by improving consumption and standard of living of peoples.

More than half of the world's population lives in urban areas. Top ten urbanized countries in the world are Singapore, Kuwait, Belgium, Qatar, Venezuela, Uruguay, Argentina, Israel, United Kingdom and Australia. This indicates that developed countries are more urbanized than developing countries. However, recently developing countries are experiencing a higher rate of urbanization than developed countries by increasing their share of urban population and share in national economic growth rate. In 1991, China's urban population was 26.94 per cent and rural population was 73.06 per cent but in 2011 China's urban population increased to 51.27 per cent and rural population decreased to 48.73 per cent. India is the second most populated country in the world. Urbanization in India is also taking place in higher rate. Urbanization has been found with spillover effects like rapid industrialization (increase the employment opportunities), social factors (better education facilities, better schooling and college, standard of living), modernization (better infrastructure, medical facilities, communication, transportation and technology). Large numbers of people are migrating from rural to urban areas which lead to higher urban growth. The rapid urban economic growth in India helped to reduce poverty, increased standard of living by increasing job opportunities, decline dependency on agriculture.

The economic development of India couples with increasing rate of urbanization. Cities are engines of economic growth because there is a positive correlation between urbanization and growth. Urban population in India has increased from 27.81 per cent in 2001 to 31.16 per cent in 2011. On the other hand, rural population decreased from 72.19 per cent in 2001 to 68.84 per cent in 2011. As per 2011 census, top five most urbanized states are Tamil Nadu (54.4 per cent), Maharashtra (46.2per cent), Gujarat (40.3 per cent), Punjab (39.5 per cent), and Karnataka

[1] Urbanization refers to the gradual increase in the proportion of people living in urban areas.

(36.02per cent). Urban agglomeration increased in India from 384 in 2001 to 475 in 2011.[2] Top five agglomerated states in India are Mumbai (1.84 Crore), Delhi (1.63 crore), Kolkata (1.40 crore), Chennai (86.54 lakh), Bangalore (85.20 lakh). Statutory Towns increased from 3799 in 2001 to 4041 in 2011.[3] The number of census towns increased from 1362 in 2001 to 3894 in 2011.[4] Most importantly, cities and towns of India constitute the world's second largest urban system and contribute over 50 per cent of the country's gross domestic product (Tripathi, 2013).

Recently, many public policies have been introduced to promote urbanization in India for higher and sustainable economic growth. The Jawaharlal Nehru National Urban Renewal Mission (JNNURM), National Urban Sanitation Policy, Urban Transport Policy, Service Level Benchmarking, setting up of a high powered expert committee on urban infrastructure, public-private partnership, canters of excellence in urban development, 100 Smart Cities, Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Swatch Bharat Abhiyan and Digital India are some of the actions launched by the government of India. Among these policies, JNNURM was one of the very important mission is launched in 2005. The main objective or aim of the JNNURM is to improve and speed up planned development of identical cities and to increase the efficiency of infrastructure and service delivery mechanism, community sharing and accountability of urban local bodies' parasternal agencies towards citizens. Most recently, 100 smart cities programme also has been put forth. The main aim of 100 smart cities project is to achieve inclusive growth. Under this scheme three cities Ludhiana, Jalandhar, and Amritsar were included from Punjab. Government has made comprehensive plans for the management of urban green spaces. Under this programme, city as the smart city will be prepared by the department of industrial policy with higher infrastructure facilities such as transport, water management, energy management, and solid waste management and travel safety and securities.

[2]Urban agglomeration (UA): An urban agglomeration is a continuous urban spread constituting a town and its adjoining outgrowths (OGs), or two or more physically contiguous towns together with or without outgrowths of such towns. An Urban Agglomeration must consist of at least a statutory town and its total population (i.e. all the constituents put together) should not be less than 20,000 as per the 2001 Census. In varying local conditions, there were similar other combinations which have been treated as urban agglomerations satisfying the basic condition of contiguity. Examples: Greater Mumbai UA, Delhi UA, etc

[3]Statutory towns (ST): all places with a municipality, corporation, cantonment board or notified town area committee etc.

[4]Census town (CT) places that satisfy the following criteria are termed as census towns (CT). (a) A minimum population of 5000. (b) At least 75% of male main working population engaged in non-agricultural pursuits. (c) A density of population of population of at least 400 per sq. km.

Like in India, urbanization in Punjab is occurring through industrialization and modernization and lower opportunities of agriculture and primary sector job is making people to migrate from rural to urban area. Rural to urban migration in Punjab is about 19% whereas in India is about 20% in 2007-08. This indicates that Punjab is experiencing very high rate of migration from rural to urban areas. The Average gross state domestic product (GSDP) growth rate in Punjab was about 10.32 per cent between 2004-05 and 2014-15. Economy of Punjab is expected to grow at a slower pace of 5.32 per cent in 2014-15 at constant prices of 2004-05, compared with 5.73% in the previous year. In India, Punjab has been first ranked in terms of infrastructure facilities. Punjab's air transport network, road, construction of bridges, rail, connectivity and infrastructure facilities are good. The urban population of Punjab had increased from 33.9 per cent to 37.5 per cent from 2001 to 2011 census. This indicates that share of urban population in Punjab also is increasing very rapidly.

Table 1: Trends of urban population in Punjab 1961-2011

	Size and share of urban population			Growth rate of urban population (%)	
Year	Total Population (in lakh)	Urban Population (in lakh)	Percentage	Total Population	Urban Population
1961	111	26	23.06	-	-
1971	136	32	23.73	1.98	2.27
1981	168	46	27.68	2.17	3.75
1991	203	60	29.55	1.91	2.58
2001	243	82	33.95	1.82	3.24
2011	277	104	37.49	1.34	2.35

Source: Census of India for various years.

Table 1 presents the trends in population in Punjab. Today, one out of two people in Punjab is an urban migrate by making it the one of the most urbanized states in India and has resulted the concentration of higher urban population in urban areas. The total population of Punjab according to census 2011 was 277 lakh, out of which around 37 percent lives in urban areas. The population of the state has been increasing over the years as in 1961 the total population was 111 lakh which further increased to 135 lakh in 1971 and to 167, 202 and 242 lakh in 1981, 1991 and 2001, respectively. The ratio of urban population has been increasing over the different census years. In census 1961 the ratio of urban population to total population was reported as 23.06 percent which increased to 37.49 percent in 2011. The CAGR of the urban population is higher than that of the total population. For instance, in 1971 CAGR of total

population was 1.98 percent and CAGR of urban population was 2.27 percent. In 2011 CAGR of total population was 1.34 percent and CAGR of urban population was 2.35 percent. This indicates, in case of Punjab, the growth rate of urban population is higher than that of the total population.

Above discussion clearly indicates that urbanization in India, especially in Punjab is taking place very rapidly. Punjab is one of the most fertile regions in India. Though initially it was based on mainly agricultural activity through green revolution but now it is shifting towards more modernization and urbanization along with India. For instance, the share of agriculture in total GDP in India (or Punjab) was 40% (or 48%) in 1950-51 and has reduced to 17.9 % (or 19%) in 2014-15. On the other hand, percentage share of urbanization in Punjab has increased from 28% in 1981 to 38 % in 2011. In this background the present paper tries to answer the following three questions in the context of urbanization in Punjab; first, it describes the recent past trends and patterns of Punjab's urbanization from 1961 to 2011.[5] Second; it investigates the relevant determinants of urbanization Punjab. Finally, it measures the impact of urbanization on urban economic growth in Punjab. In addition to that it also suggests the relevant policies for the promotion of urbanization in Punjab for the higher economic growth.

II. Review of Literature

Davis (1995) found that the three fourths of humanity who live in underdeveloped countries are still in the early stages .the world's population double itself twice in a century, becoming at the same time highly urbanized. Cohen (2006) found that almost half the world's total population and over three quarters of the population of high income countries now live in urban areas. There are almost 400 cities around the world that contain more than a million residents and about seventy % of these are in less developed countries. Chandrasekhar and Sharma (2015) suggested that there is a need to develop methods for estimating urban growth and migration simultaneously. D'Souza (1982) found that urbanization of scheduled caste in Punjab follows a set of patterns in the rural urban migration fewer people among the scheduled castes go to the cities than among the rest of the population and greater the occupational complexity of the city the lower is the representation of scheduled caste population. Henderson (2003) argued that urbanization represents sartorial shifts with in an economy as development proceeds, but is not a

[5] Data on number of cities and towns are not adjusted for definitional changes in urban areas, especially, prior to 1961 Census.

growth stimulus per se. Bhagat (2011) found that the declining trend in the urban population growth rate observed during 1980s and 1990s was reversed at the national level, and level of urbanisation increased faster during 2001-2011. The contribution of the natural increase in urban growth has declined in terms of proportions. Datta (2006) argued that policy should related with proper urban planning and to build strong economic growth in the urban economy, growth efforts and investment should be directed toward small cities and development of strong economic base for urban economy. Cali (2009) explored the various possible implications of the urbanization process on development outcomes in India. Author found that the level of urbanization and that of economic development seem to go hand with in Indian states over time. Kalamkar (2009) analyzed the relationship between urbanization and agriculture growth in India. The population growth has resulted in a downward trend in per capita availability of forest and agricultural land since the 1950s. The faster growth in urban population is largely on account of migration from rural areas. Mundhe and Jaybhaye (2014) examined the trends and patterns of urbanization in Maharashtra during 1991-2011. The author found that urbanization with in Maharashtra is very lopsided. Western Maharashtra is more urbanized as compared to extreme parts of Vidharbha and Harathwada which have the lowest level of urbanization in the state. Tripathi (2015) described the recent past trends and patterns of India's urbanization and urban economic growth. The paper suggested that Indian government need to speed up the urbanization rate as it contributes higher share of national GDP by decreasing urban poverty and inequality. Sawhney (2012) reviewed the public policy issues in the State over the last two decades. There is an urgent need for governance reforms, transparency in the development delivery mechanism and fiscal reforms ensuring that the public funds are utilized according to sound financial practices and not diverted for gaining political mileage through wasteful public functions and populist announcements. Vaidya (2009) analyzed a number of issues including urban trends, projected population, service delivery, institutional arrangements, municipal finances and innovation in financing that are of direct relevance to urban development in India. The author suggested that there should be constitutional amendments as well administrative actions. Most importantly, inter-government transfers should have built-in incentives to improve performance and capacity building should be an important component of the future urban program. Henderson (2005) found that in less developed countries, bigger cities may be focused on manufacturing, but somehow with growth and technological change, big cities tend to specialize more in service

functions, purchased by manufacturers and retailers in smaller cities. Harris (1990) found that urbanization in developing countries is going to be of increasing importance as the low income countries enter the demographic transition to predominantly urban Societies. The role of government is of particular importance in utilizing the necessary increases in income which are one of the results of the process in order to create the means to ease this transition, and aid has a particular role in helping in the management of that process. Lo (2010) empirically tested the Granger causality of urbanization and economic growth. The results indicate that the two processes have a long-run equilibrium relationship. Furthermore, using Granger causality techniques, we find some evidence that the direction of causal link runs from urbanization to economic growth for developing countries, while the opposite holds for developed countries. Tripathi (2013) found that the bigger cities (as per population size) show lower level of inclusive growth in India. Mitra and Murayama (2009) analyzed the district level rural to urban migration rate (both intra and inter states) among males and females. They found that the intra –states migration are substantially larger than the inter-states rates secondly, the male and female migration rate are closely inter connected irrespective of whether they migrate from the rural areas within the states or outside the state. Rhoda (1983) suggested that governments should reconsider policies which rely on rural development to curb rural-urban migration and alleviate problems of urban poverty and underemployment. Perhaps making changes in urban areas is the most promising approach to slowing rural-urban migration.

Though there are many papers which analyze the systematic analysis of urbanization in India but role of urbanization in Punjab has not been highlighted. Therefore, our study aims to fill this gap by considering appropriate empirical research and suggests policy for future urban development in Punjab for higher economic growth.

III. Trends and patterns of urbanization in Punjab

Census 2011 shows the total population of Punjab is 277, 04,236 in which rural population is 17316800 (62.51 per cent) and urban population is 10,387436 (37.49 per cent). Total population of Punjab had increased from 2.45 to 2.77 crore from 2001 to 2011. The share of urban population of Punjab increased from 33.9 per cent to 37.5 per cent from 2001 to 2011 census. According to the census data, all the districts in Punjab had shown a rise in the percentage of population in urban areas. Two thirds population of Punjab is still living in rural areas. Almost

half of the Punjab's urban population is living in four districts namely, Ludhiana (59.16 per cent), Mohali (54.76 per cent), Amritsar (53.58 per cent) and Jalandhar (52.93 per cent). Tarn Taran is the minimum urbanized district in Punjab with 12.66 per cent and second least urbanized district is Nawanshahr with 20.48 per cent followed by Mansa with 21.25 per cent and Hoshiarpur with 21.11 per cent. The percentage growth rate of population in urban areas is 25.72 and the growth rate of rural population is 7.78 per cent in 2001. The growth rate of urban population is three times more than the growth rate of rural population. Mohali district has maximum urban population growth rate with 90.2 per cent and Faridkot is minimum urban population growth rate district with (12.1 per cent). Government of Punjab is developing Mohali at par with Chandigarh, and even developing the surrounding areas up to Kharar, in terms of residential facilities, educational facilities. Total urban population is living in 217 towns which are further categorized into different classes. The number of urban agglomerations has increased from 157 in 2001 to 217 in 2011, an increase of about 38.22 percent. The results show an increasing trend of number of urban agglomerations (UAs) /towns from 2001 to 2011.

Table 2 presents the proportion of urban areas with the total area of Punjab. The total area of Punjab in 1961 was 50235 square kilometers (sq. kms.) which rose to 50362 sq. kms in 1971 as this extra area was provided by Surveyor General, India (Table 3).The number of towns /UAs was 106 in 1961 and it is increased to 217 in 2011. The urban area has been increasing year by year. In 1961 total area was 50235 (sq. kms.) in which urban area was 627.71 (sq. kms.). The urban area had increased to 691.66, 1198.80, 1441.80 and 2096.62 (sq. kms.) in census years of 1971, 1981, 1991 and 2001, respectively. This growth in urban area to total area revealed that people are migrating from rural areas to urban areas in search of jobs and better living standard. But due to rise of population in urban areas, the stress on the infrastructural facilities has also maximized complexity. The ratio of urban area to total area of Punjab has risen from 1.25 percent in 1961 to 1.37, 2.38, 2.86 and 4.16 percent in 1971, 1981, 1991 and 2001, respectively. In 1961 CAGR of urban area of Punjab was 0.97 percent and increased to further 5.65 %, 1.86 %, and 3.82 % percent in 1971, 1981, 1991 and 2001, respectively.

Table 2: Trends of urbanization in Punjab: 1961-2011

Year	No. of Towns/ UAs	Total area of Punjab (sq. kms)	Urban area of Punjab (sq. kms)	Urban area as Percentage to total area	Growth rate Urban area of Punjab (%)
1961	106	50235	627.71	1.25	-
1971	106	50362	691.66	1.37	0.97
1981	134	50362	1198.8	2.38	5.65
1991	120	50362	1441.8	2.86	1.86
2001	157	50362	2096.62	4.16	3.82
2011	217	50362	2097.5	4.16	0.00

Sources: Authors' estimation using Census data for various years.

Table 3 represents the total urban area of Punjab and area of different class of cities from 1961 to 2001. The urban area of Punjab has been increasing over the years by increasing urban areas of Class I, II, III, IV and V cities from 1961 to 2001. The area of Class VI cities, the urban area was 23.13(sq. kms.) in 1961 decreased to 22.05 sq. kms. The area of Class I cities was 143.98 (sq. kms.) in 1961 which increased to 174.57 (sq. kms.) in 1971 and further increased 448.16, 556.46 and 763.12 (sq. kms.) in 1981, 1991 and 2001 respectively. The area of class II cities were increased from 57.18 in 1961 to 94.15 (sq. kms.) in 1971 and further increased 140.17, 294.39, 390.84 (sq. kms.) in 1981, 1991 and 2001, respectively. In 1961, the urban area of class III cities was 229.65(sq. kms.) which rose to 418.74 (sq. kms.) in 2001. The area of class IV cities was 73.80 (sq. kms) which increased to 129.82 (sq. km.) in 1971 and further to 197.81(sq. kms) in 1981, 242.07(sq. kms) in 1991 and 367.19(sq. kms) in 2001.The urban area in Class V cities was 99.91 sq. km. which increased to 134.68 sq. km. in 2001. The area of class VI cities was 23.13 sq. km. which decreased to 13.76 (sq. kms) in1971 then it increased to 16.27 (sq. kms) in 1981 and then it again decreased to 13.55 (sq. kms) in 1991 and it increased to 22.05(sq. kms) in 2001. These results indicate that the rate of increase in urban area of all Class cities was high except Class VI.

Table 3: Urban area for different size and class of cities in Punjab from 1961 to 2001

Year	Total area (sq. kms)	Urban area (sq. kms)	Area (sq. kms.)					
			Class I cities	Class II cities	Class III cities	Class IV cities	Class V cities	Class VI cities
1961	50235	627.71	143.98	57.18	229.65	73.8	99.97	23.13
1971	50362	691.66	174.57	94.15	199.93	129.82	79.43	13.76
1981	50362	1198.8	448.16	140.17	302.57	197.81	93.82	16.27
1991	50362	1441.8	556.46	294.39	284.03	242.07	51.3	13.55
2001	50362	2096.62	763.12	390.84	418.74	367.19	134.68	22.05

Sources: Various Census data

Note: According to1961, 1971, 81, 91and 2001 census all towns and U.A's have been grouped into classes according to their population size: Class I cities: Population of 1, 00,000 and above, Class II cities: Population of 50,000 to 99,999, Class III cities: Population of 20,000 to 49,999, Class II cities: Population of 10,000 to 19,999, Class II cities: Population of 5,000 to 9,999, Class II cities: Population of less than 5,000.

Table 4 represents the classification of urban population in different Classes. The table shows the increase in share of Class I towns in total urban population of Punjab from 33.11 per cent to 57.50 and Class II urban population from 7.73 per cent to 16.97 per cent during 1951 to 2011. But class III and Class VI tows show a decline in share of urban population in Punjab. This result indicates that peoples are shifting more to Class I cities then other categories of cities/towns. Table 4 has been represented in figure 1 to easy understand that the how share of urban population is increasing in different class of cities in different Census years. The figure shows that the share of population has increased in class I and class II cities and decreased in Class III, Class VI, Class V and Class VI cities/towns. We can see that in figure 1, Class I share of population increased during 1951 to 2011 and Class II share of population also increased but increase in share of population of Class I is more than Class II cities. The share of populations in Class III, Class VI, Class V and Class VI cities/towns have gone down during 1951 to 2011 but decrease in share of population of Class VI towns is more than other Class of cities/towns. Most importantly, the shares of population in Class III towns have experienced least decrease from 1951 to 2011.

Table 4: Trends in Urban Population in different size–categories of cities/towns in Punjab

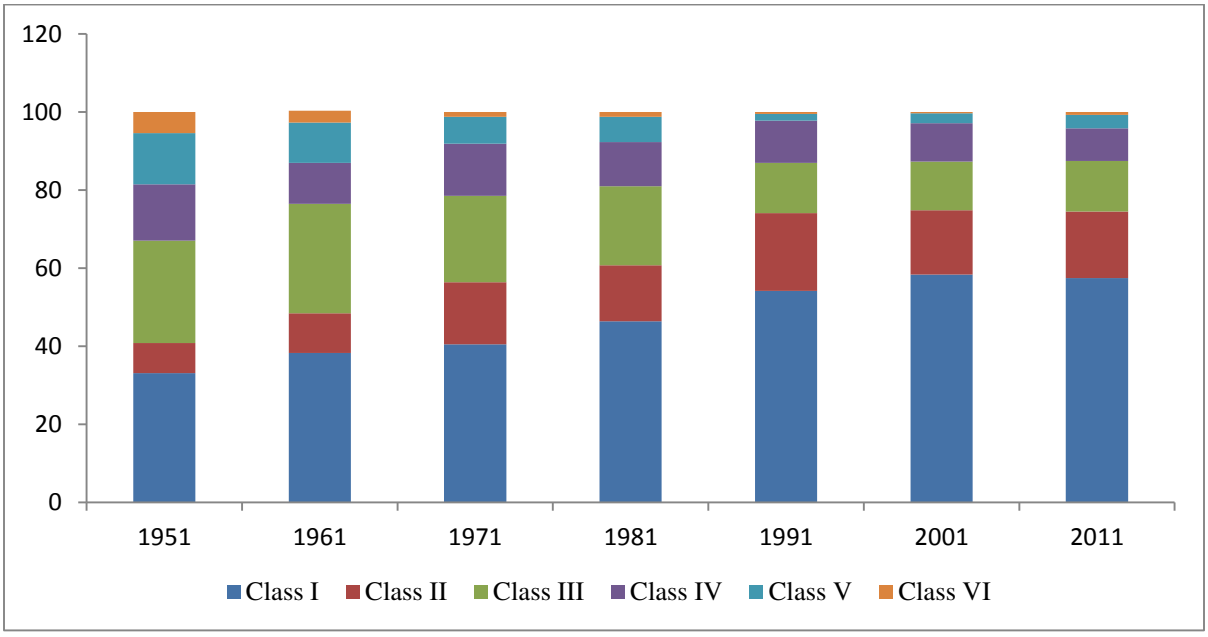
Trends in Urban Population in different size–categories of Cities & Towns							
Year	Class I	Class II	Class III	Class IV	Class V	Class VI	All Classes
1951	[33.11]	[7.73]	[26.17]	[14.44]	[13.18]	[5.37]	[100.00]
	6,58,725	1,53,719	5,20,558	2,87,223	2,62,197	1,06,845	19,89,267
1961	[38.25]	[10.15]	[28.11]	[10.44]	[10.38]	[2.67]	[100.00]
	9,81,890	2,60,707	7,21,684	2,67,913	2,66,439	68,673	25,67,306
1971	[40.52]	[15.84]	[22.20]	[13.32]	[6.84]	[1.28]	[100.00]
	13,03,128	5,09,389	7,14,176	4,28,413	2,19,911	41,162	32,161,79
1981	[46.38]	[14.39]	[20.24]	[11.28]	[6.50]	[1.21]	[100.00]
	21,55,714	6,68,780	9,40,482	5,24,505	3,01,905	56,371	46,47,757
1991	[54.16]	[19.91]	[12.92]	[10.82]	[1.72]	[0.47]	[100.00]
	32,46,224	11,93,171	7,74,453	6,48,230	1,02,945	28,202	59,93,225
2001	[58.38]	[16.45]	[12.50]	[9.82]	[2.52]	[0.33]	[100.00]
	48,14,405	13,56,386	10,30,623	8,09,366	2,07,891	26,895	82,45,566
2011	[57.50]	[16.97]	[12.95]	[8.41]	[3.44]	[0.73]	[100.00]
	5958871	1759228	1342379	871157	356585	75481	10399146

Source: Author's calculation using Census data

Note: -1. Percentage population in each class [ ]

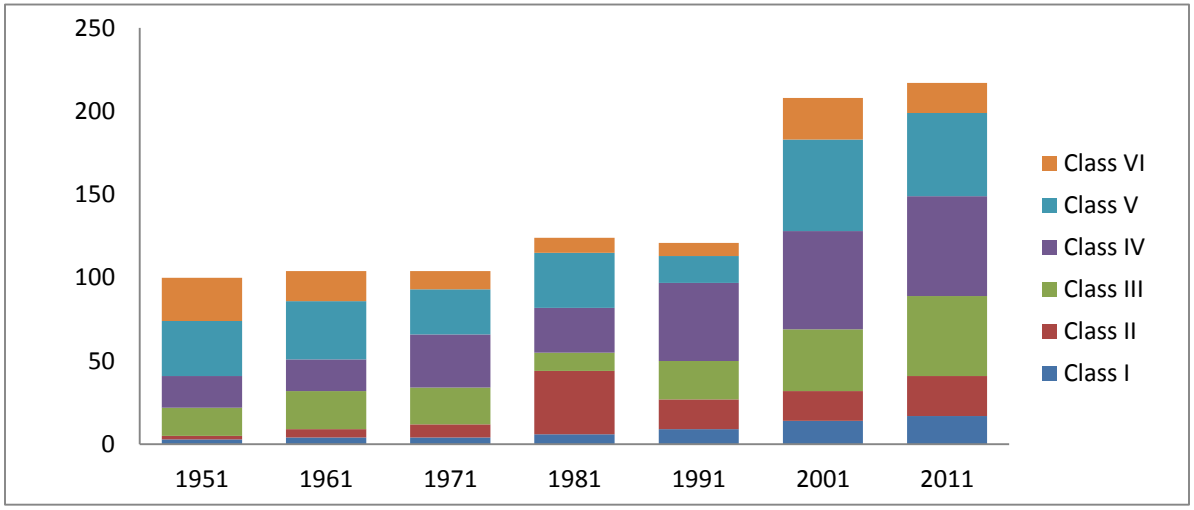
2. Total population in each class (without bracket)

Figure 1: Class-wise urban population percentage in Punjab



Source: Authors' using Table 4.

Figure: 2 Class-wise numbers of cities/towns in Punjab



Source: Authors' using different Census years.

Figure 2 shows different class wise number of cities/towns in different census years. It shows that the number of Class I cities in Punjab is increasing continuously 1951 to 2011 (3 to 17) and number of Class II cities also increased 1951 to 1981 (2 to 38) but in 1991 and 2001 it gone down and again it increased in 2011(18 to 24).The number of Class III towns rose from 1951 to 1961(17 to 23) then it decreased in 1971 with one town and in 1991 again it decreased (22 to 11) but in 1991 to 2011 it increased (23 to 48) again. The number of Class IV towns increased from 1951 to 2011(19 to 60) except in 1981. The number of Class V towns increased 1951 to 1961(33 to 35) but in 1971 it decreased (35 to 27) and again rose in 1981 (27 to 33) and again it gone down in 1991(33 to16) but in 2001 it increased (16 to 55) and in 2011 it again decreased (55 to 50). The number of Class VI towns continuously gone down from 1951 to 1991(26 to 8) but in 2001 it increased again but in 2011 it decreased (25 to 18). This indicates that though the number of Class I numbers towns increased continuously but there is fluctuation in other Classes of cities/towns in Punjab.

Table 5 presents the district-wise compound annual growth rate (CAGR) of urban population in different census years. In 1961-71, the highest growth rate of urban population has been experienced in Ludhiana and followed by Fatehgarh Sahib and Sahibzada Ajit Singh Nagar. But Rupnager has witnessed negative growth rate during the same period of time. In 1971-81 the highest CAGR is seen in Sahibzada Ajit Singh Nagar. It is still in second rank but Ludhiana goes down first rank to forth rank. In 1981-91, CAGR of Sahibzada's Ajit Singh Nagar decreased but

it is still on first rank and CAGR of Ludhiana increased from rank fourth to second. Fatehgarh sahib goes down second to ninth rank and the CAGR of Gurdaspur is experienced the least in 1981-91. But in 1991-01, the CAGR of Gurdaspur goes up from last to second and the CAGR of Sahibzada Ajit Singh Nagar still holds the first rank.

Table: 5 District- wise CAGR (%) of urban population in Punjab

District names	1961-71	1971-81	1981-91	1991-01	2001-11
Sahibzada Ajit singh nagar	3.1	10.0	6.6	7.8	4.9
Gurdaspur	2.1	2.9	1.3	5.8	0.7
Shahid Bhagat singh nagar	1.6	3.1	1.8	5.5	2.3
Mansa	3.0	3.0	2.2	5.3	1.4
Amritsar	1.4	3.0	1.7	4.1	1.3
Fatehgarh sahib	3.4	5.6	2.1	3.9	1.9
Jalandhar	2.3	3.4	1.9	3.6	2.0
Tarn Taran	1.4	3.9	1.4	3.5	0.6
Kapurthala	2.3	4.5	1.4	3.4	1.9
Ludhiana	4.3	4.3	5.2	3.4	1.7
Rupnager	-0.9	3.0	2.9	3.4	1.0
Sangrur	2.3	3.0	2.6	3.4	1.8
Barnala	1.3	2.3	1.5	3.1	9.0
Bathinda	1.3	2.3	1.5	3.1	9.0
Firozpur	1.0	2.5	2.3	3.0	1.4
Hoshiarpur	3.0	3.1	2.5	3.0	1.2
Patiala	2.1	3.6	1.9	2.7	2.2
Faridkot	0.7	3.6	2.6	2.5	1.1
Muktsar	2.1	3.8	2.6	2.2	2.4
Moga	2.5	2.6	5.0	2.1	1.8

Source: Authors' calculation using Census data for various years.

Table 6 presents CAGR of urban population of Class I towns in Punjab. In 1961 to 1971 highest CAGR of urban population was 5.1 % in Ludhiana (M Corp) and second highest CAGR of urban population was 2.9 % in Jalandhar and third CAGR was 1.9 % in Patiala and least CAGR was 1.5 % in Amritsar. But in 1971-81 CAGR of Ludhiana decreased to 4.2 % but CAGR of Jalandhar increased to 3.3 % and CAGR of Patiala and Amritsar also increased to 3.2 % and 1.7 %. In 1981-91, CAGR of Ludhiana increases with 5.6 % but CAGR of Jalandhar, Patiala and Amritsar decreased to 2.2 %, 2.1 % and1.8 %. In 1981-91 two new towns were included namely Bathinda and Pathankot and its CAGR was 2.2 % and 1.2 %. In 1991-01 CAGR of Ludhiana decreased to 3 % but CAGR of Jalandhar, Patiala, Amritsar, Bathinda and Pathankot increased to

with 3.3 %, 2.5 %, 3.5%, 3.2 % and 3.1 %, respectively. Three new towns were included in same year these are Hoshiarpur, Moga and Abohar and their CAGR were 2 %, 1.5 % and 1.5 %, respectively. In 2001-11 CAGR of Ludhiana decreased to 1.5 % and CAGR of Jalandhar, Patiala, Amritsar, Bathinda, Pathankot and Hoshiarpur decreased to 2 %, 2.3 %, 1.2 %, 2.8 %, -0.5 % and 1.2 %. CAGR of Moga and Abohar increased to 1.8 % and 1.6 %, respectively. The five new towns were included in same year these are Batala, SAS Nagar, Malerkotla, Khanna and phagwara and their CAGR were 0.6 %, 1.7 %, 2.4 %, 2.2 % and 1.4 %, respectively.

Table 6 CAGR of population of Class I cities in Punjab

Class I	CAGR (%)				
Name of cities	1961-71	1971-81	1981-91	1991-01	2001-11
Ludhiana (M Corp.)	5.1	4.2	5.6	3.0	1.5
Amritsar (M Corp. + OG) (Part)	1.5	2.7	1.8	3.5	1.2
Jalandhar (M Corp. + OG) (Part)	2.9	3.3	2.2	3.3	2.0
Patiala (M Corp. + OG)	1.9	3.2	2.1	2.5	2.3
Bathinda (M Corp.)	-	-	2.2	3.2	2.8
Pathankot (M Cl + OG)	-	-	1.2	3.1	-0.5
Hoshiarpur (M Cl)	-	-	-	2.0	1.2
Moga (M Cl + OG)	-	-	-	1.5	1.8
Abohar (M Cl)	-	-	-	1.5	1.6
Batala (M Cl + OG)	-	-	-	-	0.6
SAS Nagar (Mohali) (M Cl + OG)	-	-	-	-	1.7
Malerkotla (M Cl)	-	-	-	-	2.4
Khanna (M Cl)	-	-	-	-	2.2
Phagwara (M Cl)	-	-	-	-	1.4

Source: Authors' calculation using Census data for various years.

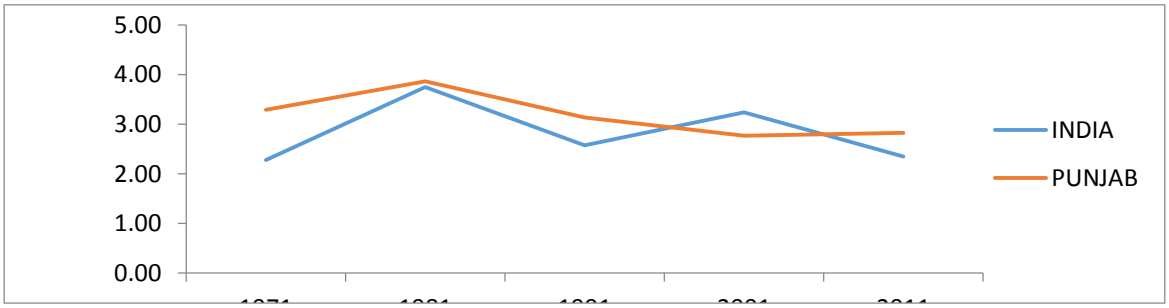
Table 7 and figure 3 represent the CAGR of urban population in India and Punjab in different Census years. In 1971 CAGR of population India was 3.29 % and in Punjab it was 2.28 %. In 1981, CAGR of India increased to 3.87 % and in Punjab it also increased to 3.75 % but in 1991 CAGR of India as well as Punjab decreased to 3.14 % and 2.58 %, respectively. In 2001 CAGR of India again decreased to 2.77 % but in Punjab it increased to 3.24 % and in 2011 CAGR of India increased to 2.83 % but in Punjab it decreased to 2.35 %.

Table 7: CAGR of urban population in India and Punjab

	India			Punjab		
Year	Urban population (in lakh)	percentage	CAGR (%)	Urban population (in lakh)	percentage	CAGR (%)
1961	789	17.97	-	26	23.06	-
1971	1091	19.91	3.29	32	23.73	2.28
1981	1595	23.34	3.87	46	27.68	3.75
1991	2172	25.72	3.14	60	29.55	2.58
2001	2854	27.86	2.77	82	33.95	3.24
2011	3771	31.16	2.83	104	37.49	2.35

Source: Authors' calculation using Census data for various years.

Figure: 3 CAGR of urban population in India and Punjab



Source: Table 7

Table 8 presents the trends of population dynamics in India and Punjab during 2001 and 2011. India has recorded a total population of 1027.2 million in 2001 and it increased from 1027.2 million to 1210.2 million with percentage change of 17.8 in which rural population increase from 741.1 million to 833.1 million with percentage change of 12.3. Urban population increased from 285.1 million to 377.1 million with percentage change of 32.2. In case of Punjab in 2001, out of the total state population 24.6 million the rural population recorded about 16.1 million and urban population recorded about 8.5 million. On the other hand, in 2011, total population recorded about 27.6 million with percentage change of 14.2 in which rural population stood at 17.1 million with percentage change and urban population was 10.5 million with percentage change 26.1. In India statutory town increased from 3799 to 4041 from 2001 to 2011 with percentage change of 6.4 and in Punjab it increased from 139 to143 (2001 to 2011) with percentage change 2.9. In India Census town increased from 1362 to 3894 (2001 to 2011) with percentage change of 185.9 and in Punjab it increased from 18 to 74 (2001 to 2011) with percentage change of 311.1. In India urban agglomeration increased from 384 to 475 (2001 to 2011) with percentage change

of 23.7 and in Punjab it increased from 157 to 217 (2001 to 2011) with percentage change of 38.2.

Table 8: Trends in Population in India and Punjab during 2001 and 2011

		Punjab			India		
Sr. No.	Type of town	2001	2011	% change (2001-2011)	2001	2011	% change (2001-2011)
1	Total population	24289296	27743338	14.2	1027015247	1210193422	17.8
(a)	Rural population	16096488	17344192	7.8	741660293	833087662	12.3
(b)	Urban population	8245566	10399146	26.1	285354954	377105760	32.2
2	Statutory town	139	143	2.9	3799	4041	6.4
3	Census town	18	74	311.1	1362	3894	185.9
4	Urban agglomeration	157	217	38.2	384	475	23.7

Source: Authors' calculation using Census data for various years.

Table 9: Class-wise numbers of cities/towns in India and Punjab

	India							Punjab						
Year	Class I	Class II	Class III	Class IV	Class V	Class VI	All Classes	Class I	Class II	Class III	Class IV	Class V	Class VI	All Classes
1951	76	91	327	608	1124	569	2795	3	2	17	19	33	26	100
1961	102	129	437	719	711	172	2270	4	5	23	19	35	18	104
1971	148	173	558	827	623	147	2476	4	8	22	32	27	11	104
1981	218	270	743	1059	758	253	3301	6	38	11	27	33	9	124
1991	300	345	947	1167	740	197	3696	9	18	23	47	16	8	121
2001	393	401	1151	1344	888	191	4368	14	18	37	59	55	25	208
2011	468	-	-	-	-	-	7935	17	24	48	60	50	18	217

Source: Authors' calculation using Census data for various years.

Table 9 presents the class-wise number of towns in India and Punjab during 1951-2011. The number of class I cities in India as well as in Punjab has increased drastically. In India, it increased from 76 in 1951 to 468 in 2011 and in Punjab it increased from 3 to 17 during 1951-2011. Similarly, number of class II towns in all India level increased from 91 in 1951 to 401 in 2001 and in Punjab it increased from 2 to 24 during 1951-2011. In all India level number of Class III towns increased from 327 to 1151 during 1951 to 2001 and in Punjab it increased from17 to 48 during 1951 to 2011. Similar with Class IV number of towns increased from 608 to 1344 during 1951-2001 in India and in Punjab it increased from 19 to 60 during 1951-2011 but Class V number of towns decreased from 1124 to 888 during 1951-2001 in India but it increased from 33 to 50 in Punjab during 1951-2011.In all India level, the number of Class VI towns

decreased from 569 to191 during 1951 to 2001. Similarly, the number of Class VI towns in Punjab also decreased from 26 to 18 during 1951-2011 but total number of towns increases in all India level as well as in Punjab. The number of cities/towns in all India level (or in Punjab) increased from 2795 (or 100) in 1951 to 7935 (217).

IV. Determinants of urban agglomeration in Punjab

Now we investigate the economic determinants of urban agglomerations in Punjab. It is important to investigate the determinants of urban agglomeration for the prescription of future urban policies. This also helps us to predict future urbanization and economic development in India by focusing on Punjab.

To find out the determinants of urbanization in Punjab, we use the following OLS regression model

$$UA = \alpha + \beta_1(RF) + \beta_2(TEMP) + \beta_3(SDRD) + \beta_4(NCP1L) + \beta_5(NCP5L) + \beta_6(NCP5L) + \beta_7(NS) + \beta_8(NC) + \beta_9(EC) + \varepsilon \quad \text{---------- (1)}$$

In this model urban agglomeration (UA) is measured by size of city population and city density. On the other hand, rainfall (RF), temperature (TEMP), State H.Q. Road Distance (SRD), Sub division H.Q. Road Distance (SDRD), Nearest City with Population of 1 Lakh and more Road Distance (NCP1L), Nearest City with Population of 5 Lakh and more Road Distance (NCP5L), Road Length (RL), number of School (NS), number of College (NC), number of electricity connection (EC) are used as independent variables. As per the findings of the previous studies (e.g., Tripathi, 2013; Sridhar, 2010), we expect that rainfall, lower temperature differences, road length, city-wise number of school, and city-wise number of colleges have positive effect on urbanization in Punjab. On the other hand, distance from a state H.Q. from a city/town, distance from sub-division H.Q., distance from nearest city with population 1 lakh (or 5 lakh) or more people will have a negative effect on urbanization in Punjab.

Table 10 presents the summary statistics (means, standard deviations, minimum, and maximum) of the variables used for the regression estimations. Rainfall, temperature differences, state H.Q. Road distance appear to have a little difference in their means, implying a more symmetrical distribution. However, it is not the case for Population size of a city/town, road length (RL), number of colleges, and number of electricity connections.

Table 12: Description of data used in regression equation 1

Variables	Mean	Std. Dev.	Min	Max	CV
Population size of a city/town (PSC)	48178	151769	2744	1618879	315.0
Population density of a city/town (PDC)	3206	2690	196	27729	83.9
Rainfall (RF)	675	211	130	1186	31.2
Temperature (TEMP)	40	3	31	49	8.4
State H.Q. Road Distance (SRD)	158	78	1	320	49.4
Sub division H.Q. Road Distance (SDRD)	9	9	0	44	95.9
Nearest City with Population of 1 Lakh and more Road Distance (NCP1L)	31	22	0	150	71.6
Nearest City with Population of 5 Lakh and more Road Distance (NCP5L)	65	45	2	180	69.0
Road Length (RL)	67	312	1	3860	463.2
Number of School (NS)	7	16	0	169	219.2
Number of college (NC)	15173	51181	153	585335	337.3
Electricity connection (EC)	15165	51167	153	585241	337.4

Source: Authors' calculation based on 217 observations.

Table 11 shows the raw correlation coefficients of the variables used in the regression model. Population size of a city/town (PSC) is positively correlated with road length and negatively correlated with State H.Q. Road Distance and Sub division H.Q. Road Distance. On the other hand, city population density is positively related with number of schools, number of colleges and number of electricity connections and negatively correlated with H.Q. Road Distance.

Table 11: Correlation coefficient of the variables used in regression equation 1

	PSC	PDC	RF	TEMP	SRD	SDRD	NCP1L	NCP5L	RL	NS	NC	EC
PSC	1.00											
PDC	0.01	1.00										
RF	0.01	0.06	1.00									
TEMP	0.09	0.03	0.08	1.00								
SRD	-0.01	0.04	-0.10	0.03	1.00							
SDRD	-0.23	-0.10	0.00	-0.02	0.07	1.00						
NCP1L	0.19	0.05	-0.26	-0.08	0.13	-0.06	1.00					
NCP5L	0.00	0.04	-0.19	-0.28	0.49	0.05	0.31	1.00				
RL	0.97	0.00	0.03	0.09	-0.03	-0.17	0.16	0.00	1.00			
NS	-0.03	0.30	-0.04	0.07	-0.05	-0.04	-0.16	-0.08	-0.03	1.00		
NC	-0.01	0.31	0.02	-0.03	-0.05	-0.03	-0.11	-0.02	-0.02	0.80	1.00	
EC	-0.01	0.31	0.02	-0.03	-0.05	-0.03	-0.11	-0.02	-0.02	0.80	1.00	1.00

Source: *Authors' calculation*. *Note: The correlation coefficients are based on 217 observations.*

Table 12: presents the estimated regression results from equation 1. Regression 1 measures the urbanization as size of city/town population and Regression 2 measures urbanization as density of city population. Regression 1 (or 2) explains 97 (or 14) % of the total variation in the dependent variables. Regression model 1 shows that sub division H.Q. Road distance (or nearest city with population of 1 lakh and more road distance) from city/town has a negative and statistically significant effect on size city/town population. In particular, a 1 % increase of road distance from sub division H.Q. Road distance (or nearest city with population of 1 lakh and

Table 12: Determinants of urbanization in Punjab

	Dependent variables	
	Urban population	City density
Independent variables	(1)	(2)
Intercept	5601.716 (33862.26)	405.18 (2373.75)
Rainfall	-4.914 (12.56)	1.32 (.881)
Temperature	281.665 (806.86)	25.44 (56.561)
State H.Q. Road Distance	-29.171 (132.98)	1.52 (2.62)
Sub division H.Q. Road Distance	-1063.76*** (293.69)	-29.23 (20.58)
Nearest City with Population of 1 Lakh and more Road Distance	-271.35** (123.49)	13.35 (8.65)
Nearest City with Population of 5 Lakh and more Road Distance	-49.504 (70.55)	2.32 (4.94)
Road Length	463.96*** (8.24)	-0.26 (.578)
Number of School	67.829 (268.40)	50.70*** (10.90)
Number of College	0.022 (0.2)	0.06*** (0.003)
Electricity connection	0.012 (0.08)	0.016 *** (.003)
No. of observation	217	217
R^2	0.97	0.14
Adjusted R^2	0.97	0.09

*Source: Estimated by using equation 1. Figures in parentheses represent robust standard errors. *** and ** indicate statistical significance at 1% and 5% levels, respectively.*

more road distance) to a city/town decreases city population by 1063 (or 271) %. The results match with our expected hypothesis. The road length distance has a positive and significant (at

1% level) effect on city population size. However, rainfall, temperature differences, nearest city with population of 5 lakh and more road distance, city wise number of schools, colleges, and electricity connections do not have any significant effect on size of city population. On the other hand, regression model 2 shows that city-wise number of schools, colleges and electricity connection have a positive and statistically significant (at 1% level) effect on city population density. In particular, 10% increase in city-wise number of schools (or colleges or electricity connections) increase city density by 507 (0.6 or 0.16) %. However, other independent variables do not show any significant effect on urban population density in Punjab.

V. Impact of urbanization in economic growth in Punjab

Finally, the paper tries to establish the linkage between urbanization and economic growth in Punjab. Urbanization has a positive link on economic growth (Tripathi, 2013). The positive link between urbanization and economic growth will help us to promote urbanization in Punjab for higher economic growth.

To establish the link between urbanization and economic growth we run the following economic growth regression model.

$$Urban\ GDP = \alpha + \beta\ (Urbanization) + \varepsilon \quad \text{---------- (2)}$$

Since, city level income data are not available for India. Size of district domestic product (DDP) data has been used as a proxy of urban level GDP. We only consider the non-primary DDP (i.e., secondary and tertiary sector) for a better proxy of urban GDP. On the other hand, district level urbanization has been measured by district level size of urban population and district level urban population density. We expect that both the variables which measure the urbanization will have a positive effect on urban economic growth in Punjab.

Table 13: Description of data used in equation 2

Variables	Mean	Stander deviation	Min	Max	Coefficient of Variation
GDDP	210494	176742	42842	788908	84
District urban population	851558	372740	357321	1568788	44
District urban density per sq. kms.	484	162	297	805	33

Source: Author's calculation based on 17 observations.

Table 13 Represents the summary statistics (i.e., means, standard deviations, minimum, and maximum values) for the variables used for the regression of the growth model estimation. City density shows the more symmetrical distribution and GDDP shows the less symmetrical distribution. We also find that GDDP is positively correlated with district urban population (i.e., r^2 is 0.53) and district urban density (i.e., r^2 is 0.79).

Table 14 presents estimated results of economic growth model. The estimated result shows that district urban density has a positive and significant effect (at 1 % level) on GDDP. In particular, a 1 % increase of district urban density increases GDDP by 867% in regression 4. Regression 5 shows that a 10% increase in district urban population increases GDDP by 2.5 %. This finding indicates that district urban population and district urban density increases district income measured by GDDP. i.e., urbanization leads to economic growth.

Table 14: Determinants of urban economic growth in Punjab

Independent variables	Dependent variable (GDDP)		
	(3)	(4)	(5)
Intercept	-240853.13* (90591.009)	-209052.09 (867.6)**	-2826.66 (96170.26)
District urban population	0.096 (0.083)		0.251** (0.104)
District urban density per sq. kms.	764.738*** (191.842)	867.67*** (171.53)	
No. of observations	17	17	17
R^2	0.662	0.630	0.528
Adjusted R^2	0.614	0.606	0.279
F statistics	13.73***	5.80***	5.8***
VIF	1.278	1	1

*Source: Estimated by using equation 2. Figures in parentheses represent robust standard errors. ***,**, * and indicate statistical significance at 1%, 5%, and 10% levels, respectively.*

VI. Conclusions and policy suggestions

During the period 1951to 2011 the population of Punjab increased at a faster rate, after independence, the urban population in Punjab also increased. The urban population of Punjab grew from 82 lakh in 1951 to 103 lakh in 2011. The majority of people moved towards urban areas for economic reasons. Punjab has 37.49 percent urban population in the2011 census. The ratio of urban area to total area of Punjab has risen from 1.25 percent in 1961 to 4.16 percent

2001, respectively. Urban agglomeration has increased by 38.22 % from 2001 to 2011. During 1961-71 urban area increased by 2.91 %. Similarly urban areas of Class I, II, III, IV and V cities has also raised during 1961 to 2001, except Class VI cities in which the urban area was 23.13 (sq. kms.) in 1961 which decreased to 22.05 sq. kms. This indicates that more people have moved to class I, II cities than other classes of cities/towns. Results also show that number of Class I cities in Punjab increased continuously from1951 to 2011 (3 to 17). Among the districts in Punjab, the highest population growth rate has been seen in Barnala district and lowest growth rate in Tarn Taran in 2001-2011. In 2001 while CAGR of India was 2.77 % but in Punjab it was only 3.24 %. In 2011 CAGR of India increased to 2.83 % but in Punjab it decreased to 2.35 %. In India urban agglomeration increased from 384 to 475 (2001 to 2011) with percentage change of 23.7 and in Punjab it increased from 157 to 217 (2001 to 2011) with percentage change of 38.2.Class I number of towns increase in India as well as Punjab. In India, it increased from 76 in 1951 to 468 in 2011 and in Punjab it increased from 3 to 17 during 1951-2011. In India, the number of Class VI towns decreased from 569 to191 during 1951 to 2001. Similarly, in Punjab Class VI number of towns decreased from 26 to 18 during 1951-2011 but total number of towns increased in India as well as in Punjab. Regression results show that there is significant negative impact of road distance to sub division H.Q. and nearest city with population of 1 Lakh and more and size of urban population. On the other hand, city wise road length has positive impact on size of city population in Punjab. High value of correlation coefficient (i.e., r = 0.528) shows that there is a strong correlation between urban population and urban GDP of Punjab. The regression growth model shows that there is significant impact of district urban density (per sq. kms) on DDP which stands as proxy for urban GDP. This indicates that urbanization leads to economic growth in Punjab.

Punjab is one of the most urbanized states in India, the growth outline of urbanization is generating imbalances in infrastructure, housing and level and quality of services and it creates slums, criminal activities, unemployment, and mortality rate. The condition is the poorest in small and medium towns in Punjab. City governments are economically weak and functionally unbalanced. There is vital need of an 'urbanization strategy' to cover the entire population with water supply, housing, electricity, solid-waste management, sewerage, employment, basic amenities and infrastructure, civic services and effective transportation services with special importance on small and medium towns so cities and towns in Punjab will be the engine of

economic growth not only in Punjab but also in India. Metropolitan Planning Committees and District Planning Committees is an essential for the authorization of ULBs. There are serious shortages in the quality of municipal services as well as infrastructure and volume. A state level regulatory body should be formed to monitor quality of services, prices charged, and involve private sector participation (PSP) in infrastructure development and urban service delivery. As per Rangarajan committee report, urban poverty rate in Punjab is about 17.6 % which is much higher than rural poverty of Punjab, i.e., 7.4 % in 2011-12. On the other hand, consumption inequality in urban area of Punjab is about 32 % which is higher than rural areas, i.e., about 28 % in 2011-12. Therefore, reduction of urban poverty and inequality has to be taken care of in different urban policies and programmes.

The Punjab Government needs to renovation its institutional system for housing, provide housing loans at reasonable interest rates, increase funds from the private sector, include ULBs and encourage development and use of small cost and locally existing material and easy technologies for building of houses for the urban poor. Slums/slum populations need instant care. Alost 2.23% of urban slum lives in Punjab in 2011 which is about 15 lakh urban populations. Programmes and schemes should be fulfilled properly for improving the living circumstances of slum persons. The state must use central government endowments to solve this problem. Slum persons should be involved in slum progress events and support from national and international organizations should be organized. Programmes and schemes need to be reforms. Well managed 'urbanization' will assist and bear economic growth, develop service transport and improve environmental infrastructure to progress the quality of life. The 'urban development strategy' should encourage good control, offer cent percent attention of basic civic facilities and suitable housing to the house less urban poor, decrease urban poverty and highlight on well-organized management of municipal resources and growth of municipal properties for income generation.

The study is useful for the planners and policy makers for the future urban planning of the state of Punjab to overcome the issues of haphazard urban development and to maintain balance of regional development for higher and sustainable economic growth not only in Punjab but also in India as well.

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