Trans. Inst. Indian Geographers
Vol. 3, No. 1, January 1981

PATTERNS OF URBAN GROWTH IN INDIA SOME CROP REGIONAL PROFILES

K. M. KULKARNI, Ahmedabad

ABSTRACT : India, with its history of land centred economy, developed its centres of commerce and trade into towns that commanded large agricultural hinterland. The growth of urban centres and the emergence of new towns took place subsequently as a result of increasing activities in agricultural production processing storage, trade and commerce. The yields from certain crops are just enough to support families (subsistence farming), certain others allow economic surplus, leading to increased investment in economic activities. Though the present study does not consider income and investment patterns as such, it does take into account the major food crops, millets and cash crops which make broadly the said pattern. The study brings out the impact of size class, time factor and crop regions in the process of urbanisation.

Introduction

Spatial patterns of urbanisation are associated with natural endowments including locational advantages and agricultural resources. The growth of urban centres and emergence of new towns took place as a result of increasing activities in agriculture, trade and commerce. In the present paper it is hypothesised that the variation in growth of urban population is associated with food crop region, cash crop region, towns having different population sizes and temporal phenomena. The main objective of this paper is to analyse the trends in urbanisation in India from 1901 to 1971 with reference to crop regions, size class and decades.

Choice of regions

At the initial stage, three natural regions-the Northern Plains, the Central Hills and Plateaus and the Deccan were selected. As suggested by A. Mitra (1964) in his ' Levels of Regional Development, ' the natural regions were converted into different crop regions taking district as a unit. These three regions cover major part of the country except the girdle of coastal plain and the Himalaya. The total urban population in each size class is considered for analysis.

Method of Analysis

Since the purpose is to evaluate the bearing of crop region, size class and the time factor on growth of urban population, the three way analysis of variance with interaction is employed. The values obtained were screened with the table values at 5 per cent. level, of significance.

Size of Towns

Except the Northern Plains, the towns in the Deccan, and the Central Hills and Plateaus show a significant association of towns with different sizes and growth rate. The towns of large size are growing faster than the smaller towns. The implication of it will be regional disparity. Spatially polarised urbanisation surrounded by a vast area of dispersed villages is a common phenomena. Population in Class I and II has increased significantly in all the crop regions compared to other size classes in their respective regions. Medium size towns

Table I : Urban Population Change 1901-71*

Crop Regions	Natural Regions								
	Deccan			Northern Plains			Central Hill & Plateaus		
	I & II	III	IV, V & VI	I & II	III	IV, V & VI	I & II	III	IV, V & VI
Rice	—	—	14.80	65.38	30.03	3.59	514.88	230.77	35.31
Wheat	—	—	—	43.04	29.35	-2.84	72.99	39.04	8.15
Millets	124.12	149.45	6.55	69.48	58.76	3.14	63.57	29.99	4.91
Pulses	—	—	—	62.57	14.64	-2.31	—	35.36	1.57
Food Crop + Cash Crop	190.21	67.35	9.43	52.46	35.71	1.31	74.38	19.24	12.05
Millet + Cash Crop	142.12	56.45	0.37	—	118.63	6.95	—	—	—
Pulses + Cash Crops	—	—	—	—	84.13	8.78	28.56	48.68	3.03

* $\frac{P_{71}-P_{01}}{P_{01}}$ X 100 in each class for groups of classes.

in the millet-region of Deccan show a higher growth rate than their counterpart in Class I and II (Osmanabad, Poona, Ahmednagar, Mandya, Bangalore, Chikmagalore, Hassan, Coorg and Nilgiri).

Small towns of wheat and pulse region (see Class IV, V and VI of Table I) in the northern plain record negative growth during 1901-71. Highland districts of Himalayan Uttar Pradesh and Lower Ganga-Jamuna Doab show heavy out-migration resulting into negative growth of population in the region (Table I).

Small towns in rich region (South Bihar Plateau, West Bengal, Uplanads, Orissa Plateau and part of Central Madhya Pradesh Plateau) of Central Hills and plateaus, and Deccan (Chikmagalore) show relatively high growth rate. Chikmagalore the only rice district of Deccan shows high growth rate because of its progress in coffee estates. Small towns of Chambal ravines, Aravallis and uplands Trans Jamuna Alluvial veneer (pulse region), Uttar Pradesh Taria, Rohilkand, Oudh (food crop + cash crop), Marathwada and Vidarbha (Millets + cash crop) record a low rate of growth. The growth rate in Class III towns is more or less half of the growth rate of Class I and II towns.

Rate of growth in large towns of Central Hills and plateaus particularly Chhota Nagpur, Chattisgarh plateau, West Bengal uplands, Deccan particularly 'Desh', South Maidan and Malnad, Coimbatore plateau, Rayalseema' Telangana, Inland, Karnataka, Central and Deccan Maidan, Khan-desh, Nasik basin, Mahakosal, Marathwada and Vidarbha is more than 100 per cent. a decade. It appears from the table that the larger towns are growing rapidly at the cost of smaller towns (in Rice region of Central Hills, and Plateaus, Millet, Millet and cash Crop and Food crop and cash crop region of Deccan).

Decadal Variation in Growth Rate

The rate of urban growth in most of the crop regions during 1941-51 is significantly high compared to the previous decades. Out of 17 crop regions 10 crop regions recorded highest growth rate during 1941-51 and another 4 regions during 1931-41. The

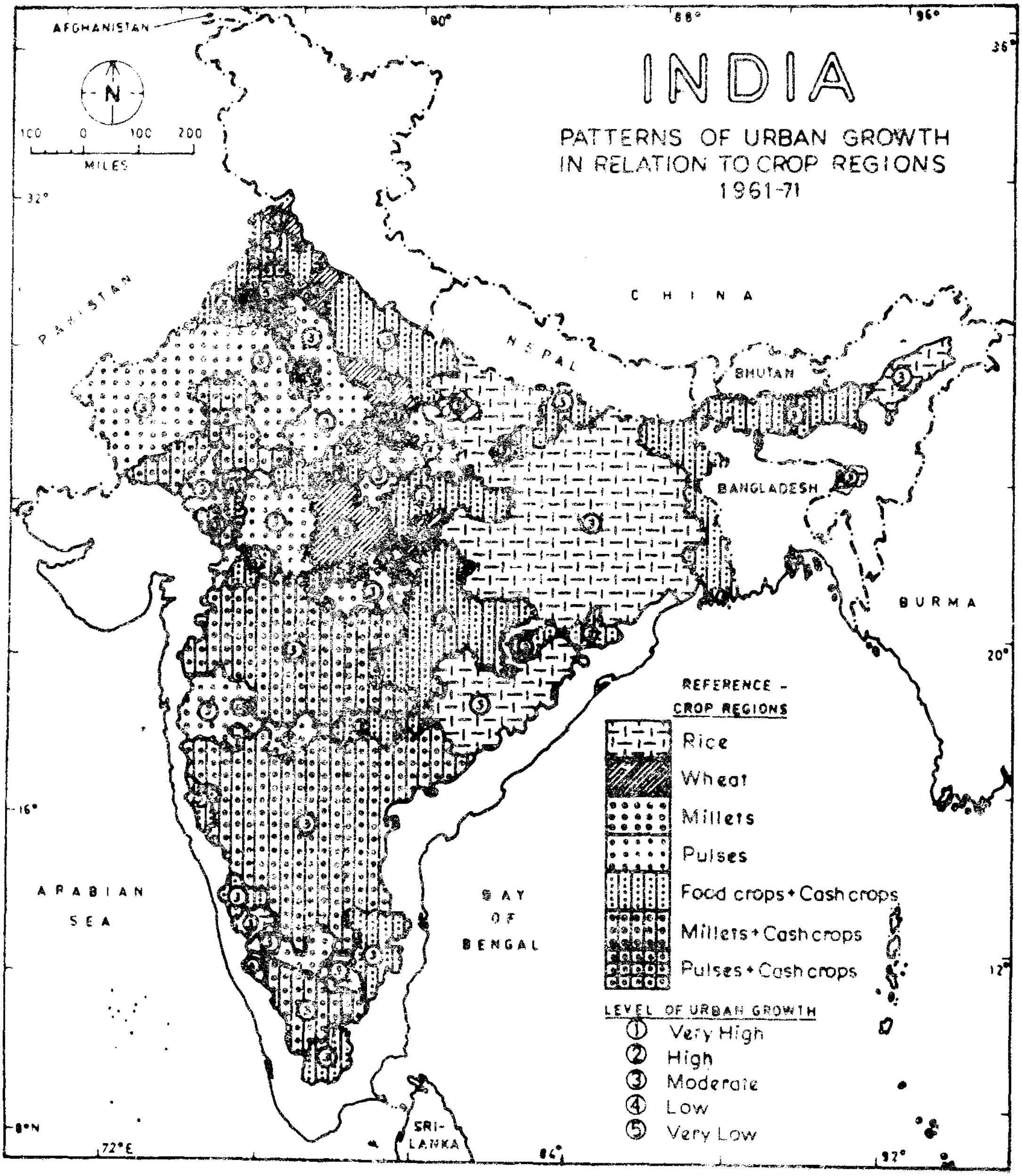
Table II : Three way Analysis of Variance with Interaction

Sl. No.	Source of Variance	Mean sum of squares (By Nature Regions)					
		The Northern Plains	F Value	The Central Hills & Plateaus	F Value	The Deccan	F Value
1	Crop Region	1203.64		2317.65		1495.55	
2	Size class	6724.52		8775.61		5826.88	
3	Years	6978.59		3587.16		1703.99	
4	Crop Region & Size class	3326.72	1.85*	1446.43	0.48	2239.24	0.91
5	Crop Region and Year	1235.48	0.687	357.89	0.15	3056.51	1.24
6	Size class and Year	5270.74	2.93*	6483.04	2.71	4112.06	1.67
7	Size class and Year as well as Crop Region	1797.88		2395.27		2460.59	

* Significant at 95 per cent. level of confidence.

Table III : Urban Areas and Number of Towns (Crop Region wise) 1971

Crop Regions	Total Area (in sq-km.)	Urban Area (in sq-km.)	Per cent. of Urban Area to the Total	Total Number of Towns	Per cent. of Total Towns	Number of Towns per lakh sq-km
Rice	1259929	18180.30	1.44	1295	48.17	103
Wheat	329431	3392.30	1.02	371	15.80	113
Bajra	279606	4571.60	1.63	175	6.51	63
Jowar	741896	12404.30	1.67	581	21.61	78
Maize	71981	517.30	0.71	51	1.89	71
Gram	123168	1321.30	1.07	135	5.02	110
Barley	4040	36.40	0.90	6	0.22	149
Ragi	52243	659.40	1.26	74	2.75	142
Total	2962294	41082.90		2688	100	


INDIA
PATTERNS OF URBAN GROWTH
IN RELATION TO CROP REGIONS
1961-71
AFGHANISTAN
PAKISTAN
CHINA
NEPAL
BHUTAN
BANGLADESH
BURMA
SRI-LANKA
ARABIAN SEA
BAY OF BENGAL
MILES
100 0 100 200
REFERENCE - CROP REGIONS
Rice
Wheat
Millets
Pulses
Food crops + Cash crops
Millets + Cash crops
Pulses + Cash crops
LEVEL OF URBAN GROWTH
1 Very High
2 High
3 Moderate
4 Low
5 Very Low
80°
88°
96°
36°
32°
20°
16°
12°
8°N
72°E
84°
92°

1941–51 influx to urban areas may be due to rural urban migration and may be partly due to redistribution of population due to Indo-Pak partition. During 1901–21 about 10 crop regions out of 17 showed negative growth rate. This may be possibly due to epidemic followed by subsequent high death rate.

Variation in growth rate due to years is quite significant which is next only to size class. Only in Northern Plains the variation in growth rate is prima facie due to years. The effect of size class on growth rate is relatively less than the effect of time period. It is also evident from the analysis of variance that the interaction of size class and year contribute to the cause of variation in growth rate.

Role of Crop Regions in the Growth of Urban Population

It appears from the table that the crop-regions have much less to do with the increasing urban population. This may be due to early British rule and port oriented transport network and industrial activities. It is likely that a town may be lying on the periphery of one crop region and drawing food crops and cash crops from the neighbouring region for consumption, processing and marketing. So the impact of one crop region may be felt in the growth of a town located in the adjoining crop region. Towns are living organsims having a symbiotic relationship with rural settlements, Since the symbiotic relation is not functioning properly, the parasitic tendency of towns creep in. Urban resident looks towards countryside for his daily supply of goods such as foodgrains, vegetables, sfruifs, milk and poultry goods. Flow of commo dities from rural to urban areas vary depending upon the size of urban population. So it is the size of a town that directly determines the rate of growth, though crop region affects the size of a town.

Spatial and Temporal Variation of Towns

The analysis of variance technique applied to the distribution of towns over space and time reveal some significant findings as detailed below :

1. During the last ten decades (1872-1971) the number of towns has increased from 1005 to 2688 (excludes Union Territories but includes urban agglommerations). This shows an increase of 268.8 per cent The average decennial increase is 17 towns.

2. It is revealed from the data (See appendix) that the rate of addition of towns is higher in case of larger towns particularly Class I and II. Class IV towns show low rate of addition whereas Class V towns show negative rate of addition. This may be perhaps due to the heavy rate of declassification. As against this, the rate of addition of towns in size class VI, is relatively high.

3. Nearly 48 per cent. of the total towns of 1971 are in the Rice region. Anothor 21 per cent. of the towns are in the Jowar region (Table III). In terms of towns and per cent. of urban area together, the Rice region shows urbanised characteristics. The Jowar region has high per cent, of urban area to the total area having poor second largest number of towns. Rice, Ragi, Maize and Barley regions record an increase in the percentage share of towns during 1872-1971. Wheat region records the lowest rate of increase in the number of towns. Except Rice region, all other crop regions show a percentage decrease in the number of towns. There is a maximum increase in the number of Class IV towns in the rice region (i. e. one town in 1872 to 98 towns 1971). In brief, the rate of addition of towns is relatively higher for large towns and lower for small towns. This partly proves that the larger towns are growing at the cost of smaller towns or the more and more smaller towns are entering the higher size class.

4. Percentage share of lower size class show a decline during the period 1901 and 1971 as against the higher size classes.

5. The number of towns in different size classes show a significant trend. Number of towns in IV, V and VI are on the decrease whereas the number of towns in Class I, II

Table IV : Urban Population per 100 sq. kms. (1971)

Crop Regions	I	II	III	IV	V	VI
Rice	961	218	529	313	167	164
Wheat	2667	686	595	419	2507	12
Millet	1799	167	345	322	110	139
Millet + Cash Crops	1197	361	599	412	109	133
Food Crops + Cash Crop	1611	872	819	526	247	23

Note: Excleding the Himalayas and the Coastal Plains,

and III are on the increase.

6. Within the crop regions there is a considerable variation in the number of towns between size class. IV, V, and VI and no variation between size classes I and II. As against this, between crop regions, the variation in the number of Class I and II towns is highly significant and much less so in case of Class IV and V and VI towns. If we include Class III towns in the group of Class I and II for analysis, the accentuated variation between crop regions is nullified.

7. Crop regionwise the distribution of urban population in different size classes is significant. In wheat region the density of urban population is 2667 per 100 sq. km. which is high compared to other crop regions.

The distinction botween the Millet + Cash crop region and the Food crop + Cash crop rogion is significant. The high urban population of size class I in the Millet region is possibly due to other economic ativities and transport network. The disparity in the urban population of class I and Class VI is greater (nearly 20 times) in the wheat region and it is minimum in the Rice region (6 times only).

Crop Regions and Growth Rates

Urban population of different size classes and of various crop regions has been analysed. It is assumed that the rate of population growth is fairly associated with different types of crop regions. This assumption is based on the different patterns of savings and investments associated with crop regions and size classes.

1. It is being observed that the rate of growth of class I towns in millet + cash crop regions is far more consistent than it is in the Food crop + cash crop regions.

2. Up to 1931, the urban population in Rice regions was fluctuating and during 1951-61 it recorded rapid growth. This is possibly due to our progress in the construction of dams and irrigation facilities reaching the fields.

3. Though the Millet region showed fluctuation in the growth of urban population there was a net increase in the urban population.

Conclusion

The analysis of variance with three way interaction leads us to conclude that both size class of a town and temporal aspect are significant in the process of urbanisation. But the crop regions have much less to contribute as the economic activities of our towns are getting diversified because of inter crop regional commodity flows. However, cerwftain crop regions have recorded rapid growth of urban population in Class I and

II and also have developed smaller towns due to the establishment of agro-based industries, new economic activities and decentralisation of economic functions. This will at least minimise regional disparities expressing spatial polarisation of city growth surrounded by vast underdeveloped rural areas.

References

Deshpande C. *D*, and *Bhat L. S*. (1977), ' INDIA ' in *Essays on World Urbanisation*, Edited by Ronald Jones, Phillips, London.

Kulkarni, K. M, (1977), Micro-Regional Variation in Economic Development of Rajasthan, *Indian Journal of Regional Science*, Vol. IX, No. 1, 1977.

Mitra Ashok and *Kulkarni K. M* (1976), *Growth of Urban Population 1901-71 A study of Differences by Crop Regions in India*, Mimeo. Presented in IASP Conference at Bangalore.

Mitra A. (1964), *Levels of Regional Development in India*, Census of India 1961, Vol. I, Part I, A (i), New Delhl.

Address of the author

Dr. K. M. Kulkarni, Dept. of Geography, Gujrat University, Navrangpura, Ahmedabad - 380009

APPENDIX
Numerical Growth of Towns 1872-1971
(Crop Regionwise and Size Classwise)

Crop Regions	Size Class	1872	1881	1891	1901	1911	1921	1931	1941	1951	1961	1971
RICE	Large I,II	18	23	24	24	26	35	39	63	79	120	183
	Medium III	46	45	59	70	80	84	103	129	160	239	286
	Small, IV,V,VI	344	448	483	541	579	663	690	747	880	785	826
WHEAT	I,II	9	16	17	18	17	17	20	25	30	39	51
	III	15	20	20	20	20	26	30	41	48	56	70
	IV,V,VI	170	250	336	337	311	304	312	295	367	235	250
BAJRA	I,II	—	4	4	4	4	5	5	7	11	14	18
	III	7	8	9	9	10	8	13	19	27	30	41
	IV,V,VI	65	113	133	145	135	143	139	144	201	118	116
JOWAR	I,II	6	8	11	12	9	10	16	26	20	52	74
	III	20	29	34	32	33	38	46	54	77	107	135
	IV,V,VI	227	295	392	394	421	428	447	465	653	399	372
MAIZE	I,II	—	—	—	1	—	—	1	1	1	1	3
	III	—	1	1	—	1	2	1	1	2	2	1
	IV,V,VI	—	12	18	23	28	31	36	38	45	42	47
GRAM	I,II	9	4	5	4	3	3	3	5	6	9	15
	III	4	9	8	8	8	11	11	16	16	29	33
	IV,V, VI	50	108	130	125	103	109	115	108	157	90	87
BARLEY	I,II	—	—	—	—	—	—	—	—	—	1	1
	III	1	1	1	1	1	1	1	1	—	—	—
	IV,V, VI	1	3	6	6	6	6	6	6	6	4	5
RAGI	I,II	2	2	2	3	3	4	4	4	3	3	6
	III	—	—	—	1	1	—	—	1	6	10	13
	IV,V,VI	16	15	69	86	69	68	73	72	69	69	55