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ENVIRONMENTAL IMPACT ON URBANISATION : A CASE OF KERALA, INDIA

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ABSTRACT : Emergence of a unique urbanisation trend, particularly in the matter of rural-urban co-existence, in some of the Asian countries has drawn considerable attention in recent years. Kerala, in India, stands out from the rest of the states in urbanisation pattern. No where in the country is rural-urban co-existence so well manifested as Kerala. This paper is purported to demonstrate that Kerala's condition is primarily due to its peculiar physiographic condition, land use and its renewable resource based economy. The historical perspectives on which the present day settlement system has developed is also discussed. It is argued that the trend of rural-urban coexistence can not be properly understood without considering the environmental issues.

INTRODUCTION

Compared to the rest of India, Kerala's urbanisation pattern is characterised by certain distinct features. Urban population in Kerala (19%) is less than that in India (24%).While Class-I towns (+100 000) account for 60% of total urban population in India, they accommodate only 40% of urban population in Kerala. Maximum urban population (42%) in Kerala resides in Class III towns (20,000 to 49,999 population), in sharp constrast to the rest of India, where Class III towns have only 14% of total urban population. Decadal growth (1971-81) of urban population in Kerala (38%) is below all India average (44%), however, decadal growth of urban area (38%) in Korala is much above the all India figure(6%)

Kerala lags behind the all India average in terms of urban population density and urban household density. In short, the state is dominated by small and well distributed urban centres. Three corporation cities, Trivandrum, Cochin and Calicut are equidistantly located along the coastline. Moreover, the difference between rural and urban areas are continuously getting blurred. There is increasing co-existence of rural and urban functions adjacent to the urban areas and also in between the urban areas.

These areas are zones of intense economic activites. Agricultural land use here supports the urban centres and conversely urban functions are enjoyed by the rural people.

This type of phenomenon is also observed in parts of some Asian countries as reported by McGee (1987). In 1961 Gotmann drew attention to the co-existence of rural -urban functions along commuting lines connecting major urban centres in Atlantic seaboard of U.S.A. However, as pointed out by Chakraborty (1988) and Ginsburg (1988) the open areas in between major urban centres in U.S.A. do not support

much agricultural activity, and this reflects the fact that Gottmann's "megalopolis" is not dependent on those open spaces for agricultural commodities. In contrast to this, inter urban spaces of Japanese magalopolis are densely populated and are predominantly agricultural. Urban centres also depend on these areas for various agricultural products.

Emergence of these intermixing zones has been an important aspect in urban planning policy issues as has been highlighted in a conference on "Extended Metroplolis in Asia" hosted by East-West Environment and Policy Institute, Hawali in 1988.

McGee (1987) studied this phenomenon in a number of Asian countries.A term "Kotadesa" (which he subsequently changed to Desa Kota) is coined by him in the case of Indonesia to denote these regions, where rural urban activities occur side by side mainly adjoining to metropolitan cities. McGee(1987) has argued that these patterns reflect two spatial adaptations to structural transformation.

"First, the rapidly industrializing countries, such as Korea record increasing concentration in the core and growth of Kotadesasi regions,which are essentially a response to growing income and involve more sapecialized agriculture and diversified industrial production. The other spatial pattern is more traditional in that the growth of Kotadesasi regions in countries such as Indonesia occurs as a response to limited employment expansion in large scale industry, growing demographic pressure that encourage rural worker migration and slower growth of income. In between these polar types are many variants including some examples that may involve historical persistence of mixed agriculture and industrial activity."

Based on preliminary research Casinader (1987) and McGee (1987) suggested that Kerala's condition is an example of this intermdiate type. It is noteworthy that McGee's main observations are associated with metropolitan areas. However, Kerala is dominated by smaller cities.

Nickum (1989) reported a somewhat similar phnomenon from Hebei region of China where "intensive zones of mixed agricultural and non-agricultural activities are emerging outside the core areas. However, he contends that "corridors" along with non-agricultural-activity-spreads-over are missing in the case of China.

We attempt to argue in this paper that emergence of "Kotadesasi" or "Nagar desam" (in India version) is an expression of the peculiar environmental conditions pertaining to physiographic configuration, land water distribution, and land use type prevailing in the area. Certainly historical process and institutional forces are additional contributory factors.But in no way can these features be explained without considering the environmental conditions.

ENVIRONMENTAL SET UP OF KERALA

The state of Kerala in the south western part of India covers a narrow segment of land bounded by the Lakshadweep sea in the west and Western ghat crestline in the east. The state is longitudinally placed along the coast line of about 550 km. long with a maximum widith of 120 km. in the widest stretch from the coast to the hills in the eastern border. Physiographically,it can be divided into three longitudinal zones, low land (<8m),midland (8m-75m) and highland (>75m). The lowland,midland and highland account for 10%, 42%, and 48% of total area and accomodate 26%,59% and 15% of total population respectively. The coastal plain is dominated by

parallel sand ridges, and midland and highland are characterised by alternate laterite ridges and alluvial valleys. These ridges are at perpendicular direction with respect to longitudinal coastal dunes. Kerala receives around 3000 mm of rainfall on an average during southwest and northeast monsoons. Although the rivers are rainfed, they are perennial due to precipitation almost throughout the year.Latitudinal placement and maritime influence have resulted in a tropical humid climate with little diurnal or seasonal variations. The soil is mainly lateritic. Laterites and lateritic soils cover around 60% of total area interpersed by alluvial valleys. Riverine and coastal alluvium together has a coverage of 15% of total area.

Due to overall uniformity of climate and soil, the landuse type is mainly controlled by physiographic condition. As a result landuse varies from coastal plain in the west to the high hills in the east. While cocount is dominant crop in the coastal plain, tea, coffee, and other plantations are significant on the plateaus and mountains. Rubber plantations and tree crops dominate the midland. The northern part and also other areas with prevalent edaphic conditions show cashew plantations. The valleys all through the state are given for paddy cultivation and seasonal crops like banana. Tapioca is main crop covering undulated slopes. Forest and forest plantations-teak, eucalyptus etc., are confined to eastern highlands and adjoining rugged slopes. In general, landuse also records longitudinal zonation like physiography.

The state does not have any significant mineral deposits except clay and radio-active minerals. Mineral based industries are not developed, also. As a result, the economy primarily depends upon renewable resources like agriculture, fishery and forestry. Primary sector contributes 44% of gross domestic products followed by tertiary sector (34%) and secondary sector (22%)(Govt of Kerala, 1982). The secondary sector or industrial sector again depends on agro-forestry. Around 45% of total industrial establishments are based on primary sector. The state depends completely on hydel power to meet its commercial energy demand. It can be reasonably inferred that the economic base of the state is overwhelmingly dependent on environmental condition.

SETTLEMENT SYSTEM

The physiographic peculiarities,mentioned above have exerted a striking influence on the settlement system of Kerala. The basic structure is linear and dispersed. The landform condition does not encourage compact or nucleated settlement like other parts in India. Abundance of water and its near uniform distribution are also contributory factors for dispersed nature of settlement. The areas with compact settlements are adjacent to the Tamil Nadu state and are characterized by low gentle sloping relief.Some compact settlements are also found in the high mountainous region. Due to long coast line,the fisherman's settlements are linear and dispersed along the coast to enjoy equal opportunities of fishing. Similarly, settlements are also spread over the lateritic ridges and not over the valley floors in order to; 1) avoid flood damage and 2) maintain food production. This process was initiated in the early stages of settlement history, no doubut, and it has been continued. As a result even in the corporation cities like Trivandrum, Cochin, and Calicut, paddy fields are marked in the heart of the cities. This is further supported by the Government legislation against reclamation to preserve green belts within the city. The settlements in Kerala have no distinct core,nor the villages have any marked nodality. Along the coastal plain and midland from one end to

other end the state appears to be a single garden city or high density village admixtured with urban functions.

This picture is not of recent origin. Famous traveller Ibn Batuta recorded this type of situation in 14th century A.D. Logon (1887) noted that the coastal tracts of Malabar (Kerala) were so densely populated that it was difficult to say where one municipal town begins and where the other ended. Settlement over the coastal dunes are in an unbroken line. An urban center can only be recognised by the presence of some more commercial activities and market.

URBANISATION TRENDS

Distribution and Growth of Urban Population : According to 1981 Census data (Government of India, 1981) urban population in Kerala accounts for 19% of total population and is distributed in 11 districts. The 12th district, Wayanad, has no urban population. (At prsent there are 14 districts in Kerala. However,this analysis is based on 1981 data, when there were only 12 districts). Considering interdistrict variations it is observed that percentage share of urban population varies from 5% in Idukki district to 40% in Ernakulam district. The districts of Ernakulam, Kozhikode, Trivandrum, Cannanore and Trichur each records more than 20% of its population in urban sector. Incidentally, it may be pointed out that as many as 79 towns out of 106 towns are located in these 5 districts. The corporation cities, Trivandrum, Cochin, and Calicut are located in the districts of Trivandrum, Ernakulam, and Kozhikode respectively. To undrstand the distribution trend multiple regression analysis has been worked out by considering 14 variables (Appendix-1A). The regression equation (Table 1) indicates that 84% of the distributional variations of urban population can be explained by considering three factors, namely population density (X_1), availale amenities(x_9), and contribution to domestic products (X_{11}). Again population density (X_1) is highly correlated (r = 0.87) to the area under lowland and midland (X_3). The highest population density is recorded in the district of Alleppy, which is entirely within the lowland and midland zones. As indicated earlier domestic product significantly depends upon primary sector along with tertiary sector. These relations illustrate the environmental impact on population distribution pattern.

Table 1.:

Multiple Regression Equations

A. Distribution of urban population

$Y = -11.607 + 0.008x_1 - 0.005x_9 + 3.88x_{11}$

R^2 0.837, SEE 5.05

Y - Urban Population

X_1 - Population density

X_9 - Amenities

X_{11} - Contribution to domestic product

B. Growth of Urban Population

$Y = 447.49 + 6.815x_1 - 49.603x_2 + 0.629x_3 - 1.680 x_4 - 0.0603x_7 - 1.475 x_8$

R^2 0.8301, SEE - 30.30

Y - Growth of Urban Population

X_1 - Growth of population density

X_2 - Difference in rural urban amenities

X_3 - Growth of per capita income

X_4 - Growth of industrial workers

X_7 - Growth in secondary sector contribution

X_8 - Growth in tertiary sector contribution

APPENDIX - 1A

Variables for Multiple Regression Analysis : Distribution of Urban Population

Urban population (dependent variable)	Y
Population density (persons per sq. km)	x_1
Road density (length per sq. km)	x_2
Area under midland and lowland	x_3
Literacy	x_4
Sex ratio	x_5
Per capita income	x_6
Area under plantations	x_7
Industrial workers	x_8
Amenities	x_9
Workers in tertiary sectors	x_{10}
Contribution to domestic products	x_{11}
Index of industrial development	x_{12}
Index of overall development	x_{13}

Urban population in Kerala grew from 7% in 1901 to 19% in 1981. The trend of urban growth is not uniform throughout the 80 years period.

Considering the decadal growth it emerges that from 1941 to 1951 urban population had recorded a growth of 53% During 1971 to 1981 the growth was 38%. Analysis of district level data brings out certain peculiarities of Kerala's urbanisation trend. Two districts, namely, Cannanore and Trichur each has recorded decadal growth of more than 100% without having any class I town and number of class II town is only 2 for each district. It implies that this tremendous growth is supported by Class III towns or small towns, which is one of the unique features of Kerala's urbanisation. On the other side decadal growth is negative in the case of Palghat (-3.46%) and Kottayam (-23.49%). It is important to note that these two districts and another district in the state of Himachal Pradesh are the only three districts in India that have recorded negative urban growth during the last census period (Govt. of India, 1981). Growth of total population during 1971-81 in the case of Kottayam was quite low (10.29%), but the total growth in Palghat

Appendix - 1B

Correlation Martix - Distribution of Urban Population

		x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}	x_{12}	x_{13}
Y	-	.623	-.038	.472	-.109	.038	.509	-.325	.138	.530	.733	.8711	.309	.712
x_1	-	-	.474	.842	-.203	.255	.139m	-.488	.003	.461	.465	.533	-.140	.890
x_2	-	-	-	.353	-.049	-.185	.200	.128	.053	-.077	-.039	-.087	.156	.464
x_3	-	-	-	-	-.022	.381	.046	-.608	-.132	.448	.214	.360	-.235	. 695
x_4	-	-	-	-	-	-.070	.205	0.319	.912	.109	.216	.038	-.045	-.091
x_5	-	-	-	-	-	-	-.626	-.744	-.049	.480	-.170	.070	-.511	0.217
x_6	-	-	-	-	-	-	-	.434	-.0173	-.183	.565	.279	.618	.285
x_7	-	-	-	-	-	-	-	-	-.099	-.0482	.187	-.303	.199	-.533
x_8	-	-	-	-	-	-	-	-	-	-.333	.119	.512	.194	.202
x_9	-	-	-	-	-		-	-	-	-	.308	.751	-.354	.588
x_{10}	-	-	-	-	-	-	-	-	-	-	-	.643	.144	.293
x_{11}	-	-	-	-	-	-	-	-	-	-	-	-	.120	.695
x_{12}	-	-	-	-	-	-	-	-	-	-	-	-	-	.137
x_{13}	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2 :

Concentration of Industrial Workers

District	Urban Population (in percent to total population)	Industrial Workers (in percent to total workers)			
		Household		other than household	
		Rural	Urban	Rural	Urban
Cannanore	24.39	2.20	0.56	38.65	18.11
Kozhikode	27.18	2.33	0.57	51.32	25.88
Malapuram	7.40	2.90	0.16	41.04	5.56
Palghat	11.11	3.50	0.36	29.83	6.84
Trichur	21.10	4.67	1.06	41.79	17.50
Ernakulam	36.56	2.88	0.96	33.64	33.82
Idukki	4.59	0.90	0.06	48.26	2.57
Kottayam	9.37	3.68	0.32	45.36	7.73
Alleppey	15.89	7.98	0.82	42.03	11.71
Quilon	13.25	3.33	0.47	40.60	10.03
Trirandmam	25.26	3.83	0.81	32.65	20.56

(21.30%) was above the state average (19.24%). What are then the reasons for this negative growth of urban population?

One of the conditions to declare an area as urban centre in India is that 75% of male workers should be engaged in non-agricultural sector. So, for any urban centre to keep its status the primary condition is that the growth of non-agricultural workers should keep with the growth of total work force, so that 75% level is maintained. Due to slow growth of non-garicultural sector compared to the growth of work force and also as a result of dispersed development ofindustries this 75% level is not always maintained.

The problems of unit boundary to compute these data also contribute,as settlement boundaries in Kerala are virtually non-existent. As a result,many of the towns in Kerala get declassified in subsequent census periods. The negative growth is principally attributable to these factors. Further, Kerala is noteworthy for out-migration and also migration from urban to rural areas. It is noteworthy that 87% of rural migrants has migrated to the rural areas within the state and about 68% of the migrants originating from the urban areas has also moved to the rural areas (Chattopadhyay, 1988).In this context it is important to point out that the all India trend of rural-urban and urban to urban migration as observed by Bose (1978) is absent in Kerala. This also contributes to the instability (declassification) of urban centres. However, looking at it from another angle, it may be deduced that coexistence of rural urban sectors, easy accessibility and diffused pattern of industrial development are conducive to promote this type of situation. Industrial statistics indicate that proportion of workers with respect to total workers in household and other than household categories of industries are cocentrated more in rural areas than in urban areas in all the districts except in Ernakulam (Table-2), where workers in other than household categories are marginally above in urban areas than rural areas. It may also be point out here that modern industries are mainly concentraed in this district (Ernakularn).

The dispersed nature of industires due to near uniformity of distribution of agro-forestry based raw material does not support undue concentration of urban function in one or two places. From multiple regression analysis (Table 1) it is observed that urban population growth does not depend on any set of factors. The highest correlation (r = 0.3) it recorded is with growth of population density (Appendix 2B). Surprisingly, growth of urban population is negatively related (r = -0.25) with the growth of industrial workers. This is essentially due to the type and nature of industries that dominate Kerala. The general trend in India that high coefficient of urbanisation coinciding with high coefficient of industrialization (Aichbhaumik, 1978) does not appear to be significant in the case of Kerala.

Distribution and Growth of Urban Centres: By 1872 AD, when first Indian Census took place, seven towns Cannanore, Tellicherry, Badagara, Calicut, Ponnani, Palghat, and Fort Cochin were identified in Kerala. All these towns were administratively under British Malabar (north Kerala) annexed to Madras Presidency. These towns except Palghat are located along the coast and served as port towns to handle trade. The town of Palghat within the Palghat gap was and still is the connecting point between Kerala and Tamil Nadu state. Inspite of the differences among the then native states of Travancore and Cochin and British Malabar in the matter of defining urban centres more and more new places were declared as towns in subsequent census periods. Thus, by 1901, altogether 21 urban centres emerged in the state, and were distributed from Cannanore in the north to Trivandrum in the south. As many as 10 towns out of these 21 towns were located along the coast, and another 8 towns were located either beside back waters or beside a nevigable river in the midland zone. Clustering of Fort Cochin, Ernakulam, and Mattancherry towns occurred around Cochin port in the coastal plain. So from the early date the urban centres tend to concentrate in the coastal plain and were functioning as trade cum administrative centres.

APPENDIX - 2A

Variable for Multiple Regression Analysis : Growth of Urban Population

Growth of Urban Population	Y (dependent variable)
Growth of Population Density	x_1
Difference in Rural - Urban Amenities	x_2
Growth of Percepita Income	x_3
Growth of Industrial Workers	x_4
Growth of Workers in Other Services	x_5
Growth of Tertiary Sector Workers	x_6
Growth in Secondary Sector Contribution	x_7
Growth in Tertiary Sector Contribution	x_8

Appendix 2B.

Correlation Martix : Growth of Urban Population

	Y	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
Y	-	.303	.028	.088	-.251	-.003	.149	.109	-.341
X_1	-	-	.395	.126	.239	.272	.381	.291	-.114
X_2	-	-	-	.014	-.231	.144	.625	.419	-.556
X_3	-	-	-	-	-.237	.459	.646	.377	.226
X_4	-	-	-	-	-	-.298	-.249	-.431	-.053
X_5	-	-	-	-	-	-	.321	-.363	-.136
X_6	-	-	-	-	-	-	-	.699	-.444
X_7	-	-	-	-	-	-	-	-	-.365
X_8	-	-	-	-	-	-	-	-	-

Table 3 :

Distribution of Towns according to Class, Size, and Population (1981)

Class size	No. of towns	Area in sq. km.	In percent to total urban area	Total population	In percent to total urban pop.	Population Density persons/ sq. km.
I	6	385.5	22	1,871, 414	39	4842
II	8	165.2	9	512,197	11	3100
III	64	1027.0	57	2,051,615	43	1998
IV	21	157.6	9	282,689	6	1796
V	6	49.6	3	48,871	1	981
VI	1	1.8	Neg	4,489	Neg	2494
Total	106	1787.7	100	4,771,275	100	2669

According to 1981 census data, there are 106 urban centres, an addition of 18 towns in over 10 years period (1971 to 1981). Based on population size all these towns are divided into 6 classes (Table 3). It may be observed from the table that Class III towns account for 57% of the total urban area and 43% of the total urban population. Distributional pattern of these towns indicate that as many as 24 towns are on the coastline itself. Out of 6 Class I towns, 5 Class I towns are along the coast. As many as 76 towns come within a zone of 20 km. from the coast. This zone is also characterised by high density transport corridors having railways, national highways, and waterways side by side. Drawing 20km. and 30 km. distance zones around Class I and Class II urban centres, it is observed that a major part of the state in the lowland and midland zone is well covered. In the southern part of the state, a considerable area is overlapped even with 20km. distance zone. As many as 65 towns are located within this 20km. distance zone followed by 18 towns within 30km. zone and only 8 towns beyond 30km. mark. The only part where the density of urban centres is low is the northern stretch to the north of Taliparamba. Within a distance of 90km. there is only 1 urban centre, Kasaragod. This is primarily due to poor resource base of the area where midland and highland are characterised by bare laterite surfaces and wastelands.

RESOURCE BASE OF THE URBAN CENTRES

Discussion of resource base by analysing manufactured and marketed commodities handled by the urban centres will provide another dimension to understand the relationship between urban centres and environment. It is learned from the historical records that a number of small ports had developed all along the coast to handle the products like pepper, ginger, coconut, coconut products, rope,timber, and forest products. Kerala had a tradition of trading with middle east and other countries as far back as 8th century B.C. (Ayyar, 1966 and Menon, 1924). In fact, Kerala was well known as the land of Black Pepper in the historical past. The rise of port cities like Kodangalur, Quilon, Callicut, Cochin, and Alleppy all are related to trade. Cochin, originally developed by the Portuguese during 16th century A.D. had flourished in the British period and still it is one

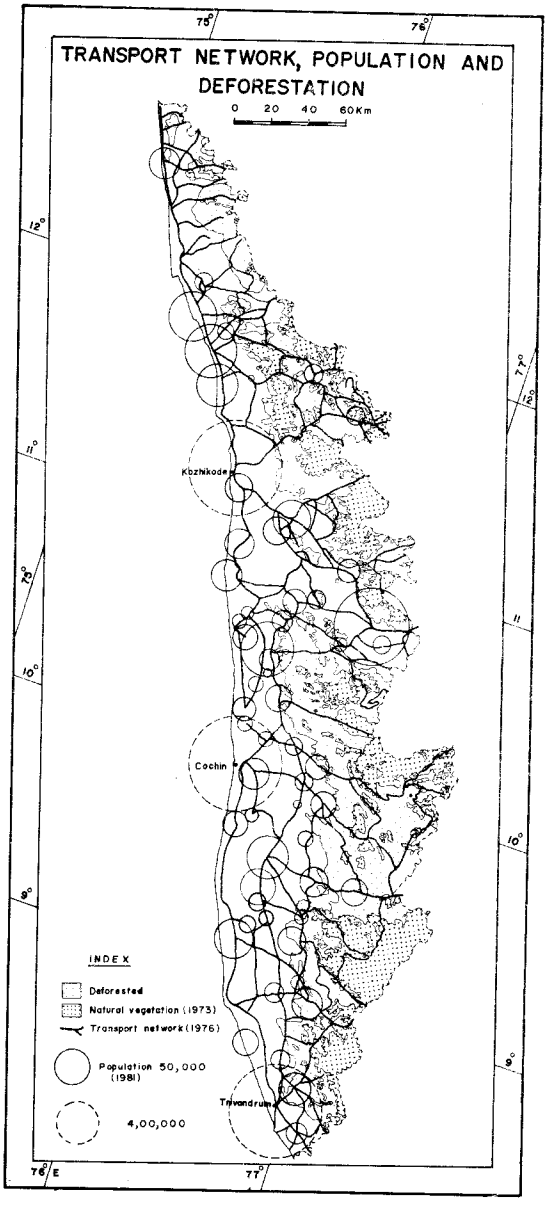

Fig.No. 1

of the major ports in this part of west coast of India. Although during the end of 19th century Cannonore, Tellicherry, Calicut, and Cochin were main urban centres for trading, as many as 33 minor and medium ports also developed in a stretch of 300 km. to the north of Cochin to handle trade.It is not that the British had developed these centres to decentralise the trade; it was the most cost effective as hinterlands of these ports supported the same type of product, and, also, materials can be brought to the coast straightway through rivers or roads. Almost all these trade centres are subsequently identified as urban centres.

Still today plantations and forest products are the major commodities handled by these urban centres. However, export to other countries is totally centralised through Cochin port. Concentration of export oriented trade and also modern industries relying on import and export (inland trade) are primarily located in and around Cochin urban agglomeration. Ernakulam district, in which Cochin port is located, is the only district in the state where workers in other than household indstry is more in urban areas than the rural areas. This district is also the most developed district in Kerala. There is hardly any difference between rural and urban areas in this region. Around 60% of the urban centres manufacture one or more of the commodities related to plantation based products, such as, tea, coffee, rubber, coir, coir products, bidi, coconut oil, copra, pepper, cashewnut, plywood, vegetable oil, paper, hard board, tapioca starch, thread, and fibre as sole or major important products. Industries related to coir products and cashewnut are significantly important even for the Class I towns, like, Alleppy, Cochin, and Quilon. Tiles, textile goods, and wooden furnitures are the three most important commodities manufactured in Calicut. Trivandrum handles ivory, horn products, and titanium dioxide. Palghat is

another Class I town which manufactures plywood, rubber foam, matches, palmyra fibre, bidi, and coir rope.

Around 90% of the urban centres market plantation based products. Pepper is supplied by 14 towns as the major commodity followed by coir yarn and coir goods by 10 towns; however, if all coir goods are considered the number of towns will be 23. Rubber is the principal commodity of trade for 6 towns. Fish, as the principal commodity, is handled by 9 towns along the coast. There appears to exist a good relation between location of towns and trading commodity. Almost all the urban centres are multi-funcitonal and function as service centres.

A series of small centres have developed along the middland all through the state as initial procurement centres for local products. These small centres are connected with the large urban centres in the coastal plain either through roadways or railways or both. Some of the

Table 4 :

Rural Urban Differentiation (Amenities)

District	Score		Population/Amenities		Ratio	
	Urban (U.A.)	Rural (R.A.)	Urban (U.P./U.A.)	Rural (R.P./R.A.)	Urban	Rural
Cannanore	134.17	565.83	2421.58	2421.58	24	36
Kozhikode	265.42	434.58	2115.78	3554.42	21	36
Malapuram	101.76	598.24	1226.93	2894.34	12	29
Palghat	181.93	518.07	1176.71	2839.89	12	28
Trichur	158.03	541.97	1580.43	3467.06	16	35
Ernakulam	216.34	483.66	2939.86	3158.55	29	31
Idukki	86.42	613.58	292.32	1206.60	3	12
Kottayam	177.07	522.93	1178.98	2543.87	12	25
Alleppey	185.47	514.53	1939.38	3432.31	19	34
Quilon	72.02	627.98	2636.81	3539.79	26	35
Trivandrum	238.08	461.92	2400.73	3522.34	24	35

Note : *Group of Amenities*

1. School Education
2. College Education
3. Technical Education
4. Health Facilities Allopathic
5. Health Homeo
6. Health Ayurvedic
7. Recreational Facilities (including sports)

Note 2 : Following procedure has been followed to workout population amenities ratio. Let the total number of a particular amenity in a district equal T. Number of same amenities in urban areas of the district equals X_1. Score value for urban area will be (x_1 / T) 100

For seven groups of amenities total value is 700 for each district. District to district variation is not considered at this stage.

towns also enjoy water route connection. Main roads running north south connect these urban centres both in coastal plain and midland. Perpendicular to these arterial roads have developed east-west running roads, which connect the eastern hinterlands (Fig.1). Most of these roads are along the lateritic ridges. Road density in Kerala is significantly high - 3 km/sq. km. Well developed tansport network supported by waterways facilitates movement of goods and people from the hinterland and also from one town to the other. Goods from the procurement centres are subsequently routed to the main market centre either for trading or manufacturing. Considering the industrial establishments, it is observed that 45% of total Industrial units are based on agro-forestry resources. These 45% units accomodate 65% of total industrial workers. Overwhelming dependence of the state on these industries can be well gauged from the fact that these industries have recorded more than 100% growth during the period, 1972-1981. The point to note is that these agro-forestry based inustries are dispersed in nature, in response to, the dispersed resource base and are located both in rural and urban areas. Thus they promote co-existence of agricultural and non-agricultural activities. However, modern and tertiary industries are more location specific and hence directly contributes to conentrated or nucleated urbanisation as can be observed in any industrial city.

AMENITIES AND LINKAGE

Apart from job opportunities, availability of services in urban areas acts as pull factor.Higher is the difference between rural and urban areas, higher is the chance of migration.Distribution of some selected essential amenities in rural and urban areas has been investigated and availability in terms of population has been worked out (Table 4). Availability of amenities in rural areas does not differ significantly from urban areas in Kerala. The ratio between value of amenities and population is 1:1810 for urban areas and 1:3070 for rural areas. In other words population pressure on amenities is less than 2 times in rural areas compared to urban areas.District wise figure reveals that rural urban difference is marginal in Ernakulam district while it is 4 times in the case of Idukki district. Economically backward, Idukki district is located in the hilly mountainous region.It hosts the biggest hydel power project in the state. The urban functions, developed here, are more of imposed one with which the surrounding under developed rural areas have the least reciprocity.Where as, in other districts, urban centres grew up as a result of regional economic demand. Another point to note is that the economically backward districts show higher differences in the matter of amenities available compared to the developed districts. Considering the urban centres alone, the distribution of amenities are quite unique. Three corporation cities are almost of equal status by offering same type of services except legislation - Legislative Assembly is in Trivandrum and the High court is in Cochin. More over as the width of the state is smaller and transport service is well developed, people from the hinterlands of these cities can commute to the respective cities within a day. As a result, people do not find it necessary to migrate to the urban centres unless compelled by some other reasons.

Lower order towns also offer good services. Some of the class III towns can even compete with the Class II towns in terms of availability of various services. In case of some specialised services, like, technical education, special medical facilities, banking, and marketing nearby Class III towns are mutually dependent. Some what uniform distribution of all categories of towns, easy accessibility and their capacity to offer parallel services have generated a

situation of decentralised urbanisation and rural urban co-existence.

CONCLUDING REMARKS

The foregoing discussion highlights the basic facets of urbanisation pattern in Kerala. Transformation of a rural settlement to urban settlement is primarily a shift in labour participation i.e. proportion of labour in non-agricultural sector. As this shift of labour participation from agricultural to non-agricultural sector is computed on the basis of administrative boundary it becomes complicated in the areas where settlement boundaries are ill defined due to continuous and dispersed settlement pattern as observed in Kerala. If urbanisation is considered as a mode of living, then, it appears to spread over along the ridges while the valleys are given for agriculture. Due to scarcity of land, suitable for paddy cultivation, people do not intend to transform it for non-agricultural purposes. Government also discourages land conversion for other than agricultural activities. So along with environmental condition, institutional forces are also contributing in moulding the Kerala scenerio. High density of population (655 persons per sq. km.) and people's attitude to live quiet life have resulted in horizontal expansion of towns along habitable areas without disturbing the agricultural land significantly. Due to low demand, the land price is also not a stimulating factor for land conversion. All these factors are needed to be considered together to understand the unique rural urban co-existence exhibited by Kerala. However, it is undeniable, that, the basic structure is laid down by the very environmental set up of Kerala.In view of this, it is suggested that environmental conditions of parts of other Asian countries, where similar features are reported, should be analysed to understand this phenonmenon of rural urban coexistence.

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