CHAPTER - V

INDUSTRIAL SET-UP OF THE STUDY AREA

A short essay on the growth of modern industries - an overview on industrial base.

The area can claim the distinction of having the very first of the organised factory in the country built by the Portuguese in 1540, followed by the East India Company's factory in 1751 and the Dutch Tobacco Factory in 1836. Even in the field of jute fabrics, the very first mill was set up at Rishra in 1855, initially as a spinning mill and later developed into a weaving mill in 1859. Then came jute mills at Serampore in 1866, the Champdani Jute Mill started work in 1873 and by 1888 the Victoria and Hasting Jute Mill were added. In the years that followed, a thick chain of jute and cotton mills sprang up on the river side of Bhadreswar, Champdani, Serampore in the middle reach of the study area. Similarly, the jute mills were also established in the southern municipalities in the Bally and Howrah, and in the extreme north in Bansberia Municipality respectively.

The industries of modern forms were started in a somewhat later dates. Among the leading industries in the area are : Dunlop Rubber Co. (India) Ltd. at Sahagunj; Tribeni Tissues Ltd.; Ganges Jute Manufacturing Co. at Bansberia; Kesoram Rayon Ltd. at Tribeni Baikunthapore; the premier power generation station- The Bandel Thermal Power Station

(B.T.P.S.) at Tribeni near Bandel; Standard Pharmaceutical Works at Serampore; Braithwaite Engineering Works at Bhadreswar; Jayshree Textiles at Rishra; Rishra Rolling Mill (formerly known as J.K. Steel); The Alkali Chemical Corporation of India Ltd. at Rishra; National Textiles Corporation (N.T.C.) at Rishra; Hindustan Automobiles at Hindmotor; National Iron and Steel Co. at Belur; Bridge and Roof at Howrah; and host of others, produces at these industrial plants present a broad spectrum, covering besides jute and cotton textiles, art silk fabrices, cotton belting, heavy and light engineering goods, paper, rubber-tyres, foundries, foam rubber cusion, heavy and light chemicals, Pharmaceuticals etc. These big mills stimulated the growth of a large number of feeder or ancillary industries in an around the linear belt of this industrial complex between the Eastern Railway Mainline on the west and the river Hooghly on the east from Howrah in the south to Bansberia in the north.

The industries of this linear belt felt numerous positive and negative propulsions and depressions during their different stages of development. And especially, the Word War I gave a positive impetus to the growth of industries in particular. But all the industries were badly hit by the world-wide trade depression of the 1930's. The outbreak of the World War II in 1939 made the wheels of the industries run and hum again in full steam. Despite the strong impetus of

of our five year plans since 50's, the industries again felt adverse recession during the years 1966-1968; and in late 1980's the industrial complex shows very adverse symptoms of industrial stagnation.

The study area comprising the eastern parts of the Howrah and Hooghly districts respectively, has a rich and ripen economic and social life and heritage. Throughout the ages, finding mention in the AIN-I-AKBARI, the literature of the East India Co. and all the All India Gazetteers. No doubt, trade and commerce and agriculture score marginally over industries, in the point of the contribution to the areas income. Nevertheless, industrial sector has always played rather an important and significant role, and will continue to do so, in the economy of the area. The spinning and weaving of cotton and silk fabrics in rural sector of the area is a piece of old history. In the 17th and 18th centuries, before the organised jute mill industry came into being, spinning and weaving of jute textile and cotton textile were practised in the area as a cottage industry on quite large scale.

In this historico-geographic perspective, the locational advantages enjoyed by the industrial complex are analysed here in brief.

The area in between the historic Grand Trunk Road (G.T.Road) on the west and the chief means of transport up and down the River Hooghly on the east, the proximity of the city and the port of Calcutta attracted the foreign traders to set up industries and trade in this linear belt long before the steam-engine age. The opening of the first railway lines between Calcutta and Raniganj in 1853, now running on the fast electric traction system, opened a new arena in the industrial growth of the area.

But specifically, the foremost and important locational consideration of these industries is the port of Calcutta. The cost of production is considerably influenced by the cost of haulage, warehousing and transport. The port of Calcutta, however, is well-linked to its agriculturally and industrially rich umland in West Bengal, Bihar, Orissa, Eastern Uttar Pradesh, Eastern Madhya Pradesh, which not only supply raw materials but also provide good market for the produces of the industrial complex. More recently, due to the decaying conditions of the Calcutta port, the industrial complex is also supported and supplemented by the Haldia Port at Haldia.

The river Hooghly itself is a prime regulator of industrial decisions and locations. The growth and development of industrial economy of the area is closely tied with the physical conditions of the river. The river is navigable

for barges and touring crafts only up to Tribeni on the right bank and Mulajore and Kanchrapara on the left bank. The navigability of the river delimits the industrial complex and checks further expansion. The river Hooghly is rightly regarded as the second great single factor that determined the location of the jute mill industry and host of other industries on both sides of the river Hooghly.

The industries in the area get electric power supply at a cheap price, mainly from W.B.S.E.B. and C.E.S.C. The power plants of the area get the raw materials supply from the Ranigunj field. Power is generated at different stations in the industrial belt, viz., at Mulajore, Cossipore, Shyamnagar, Gouripore, Kasba and Bandel. At present according to arrangement, the C.E.S.C. also obtains water power from the Damodar Valley Corporation (D.V.C.) and thermal power from the Kolaghat Power Station of Midnapore for meeting partly the domestic and industrial needs of the Greater Calcutta Industrial Complex.

Furthermore, the large scale-factories in the area have been developed within the municipal limits, so that they obtain the benefits and amenities of municipal administration, such as, facilities of roads, water supply, street lighting, markets for vegetables, etc., for themselves and for the work of the people. In recent years, there is a high

tendency for the entrepreneurs to choose to establish their factory sites outside the municipal and urban jurisdiction, because of tax evasion.

Due to the proximity of the premier metropolis - the Calcutta, a ready and steady supply of labour is easily available. The labourers also choose to work in the industrial belt in as much as they can find alternative employment in another factory or any other pursuits for sustaining life when one factory or source closes down. Thus, the ready-made market for vast pool of labour is a major consideration for the heavy concentration of industries in the Hooghly Industrial Belt.

The area is also excellently served by the wide trunk roads and railways running through its entire length on either sides of the river Hooghly. Urban and suburban transit services and trains running at regular intervals enable the workers to attend their work places at minimum costs.

These locational advantages, in general, have attracted industrial activities on both sides of the river Hooghly. There are, however, special advantages for particular sets of industries, in addition to the above mentioned facilities. The jute industry for instance was started by the Scotish businessmen because of the administrative importance of Calcutta at that time. The humid climate of the area also influenced the development of jute and cotton textiles.

In general, however, it remains truism to say that the economies to be secured from concentration of industry are very real, and it is not surprising that industries show a marked tendency to be attracted to establish in the already established industrial region to reap the economies of agglomeration. On the production side, the factors of labour, technological skill, and capital form powerful magnetic forces, while on the marketing side economies of transport, the existence of a wide market, and the prestige value conferred by the association with an industrial region of proven reputation are no less powerful, as for example, the chemical industry requires glass apparatus and chemicals like soda ash is necessary for the manufacture of glass. Similarly, the cotton and jute textiles industries have a close nexus locational orientations. These sets of industries are thus mutually dependent on each other. The development of one has influenced the development of another is essentially due to a compulsive aggregating force-commonly referred to as "industrial symbiosis". And these tendency for the industry to develop symbiotically may ultimately lead to a big regional concentration of industries of this kind, a process commonly referred to as "con-industrialisation".

AN ANALYSIS OF THE ACTIVITY COMPONENTS OF ECONOMIC GEOGRAPHY

An analysis of the activity components of an economic system plays a significant role to the economic base studies to understand its present positions and future potentials. It is truism to say that the area has emerged recently from a rural agrarian economy to a preponderantly urban mode of life and living, depicts a multi-layered and varied occupational structure, with industrial supremacy.

The municipal level study of the area shows some consistencies as well as some incongruities among the inter-municipal distribution of occupational classes. But regionally, the area can be recognised as an industrial character, as the economy of the area is dominated by its manufacturing activities. The great importance of the industrial activity of the area may be understood from the fact that, according to 1981 census, out of the total working force of 521113, about 260584 persons, or over 50 per cent of the strength are engaged in industrial activities.

DATA SOURCES AND METHODOLOGY

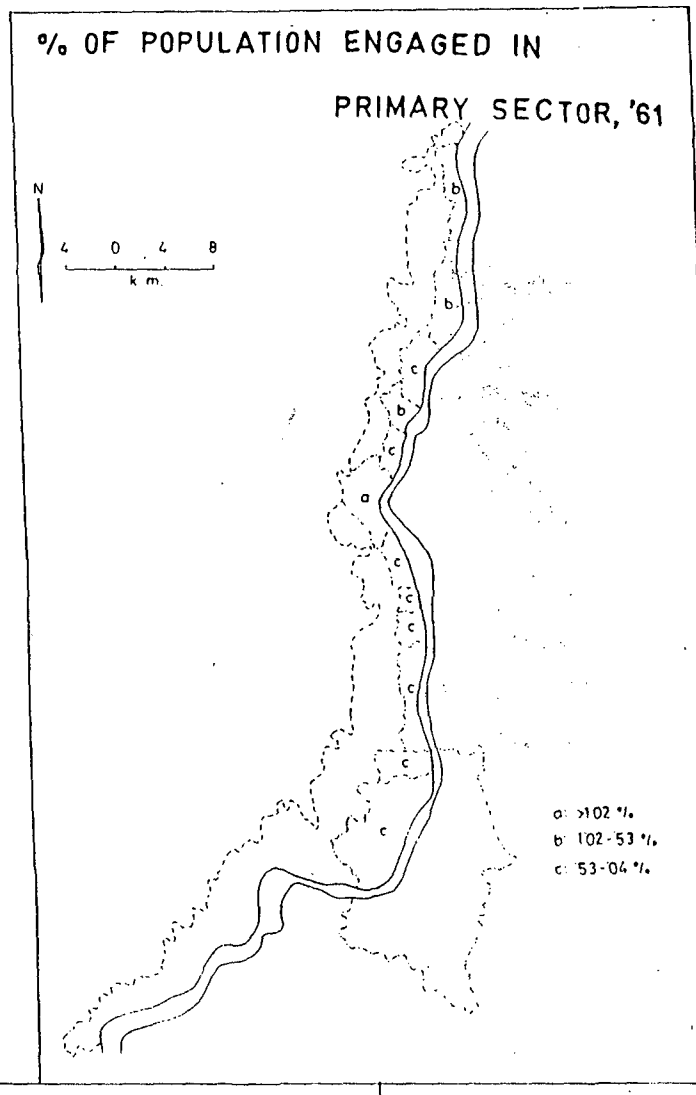
This section deals with the spatial distribution of the economic activity in the area under consideration, at the municipal base. A series of indices have been worked out based on the information obtained in a set of disaggregated

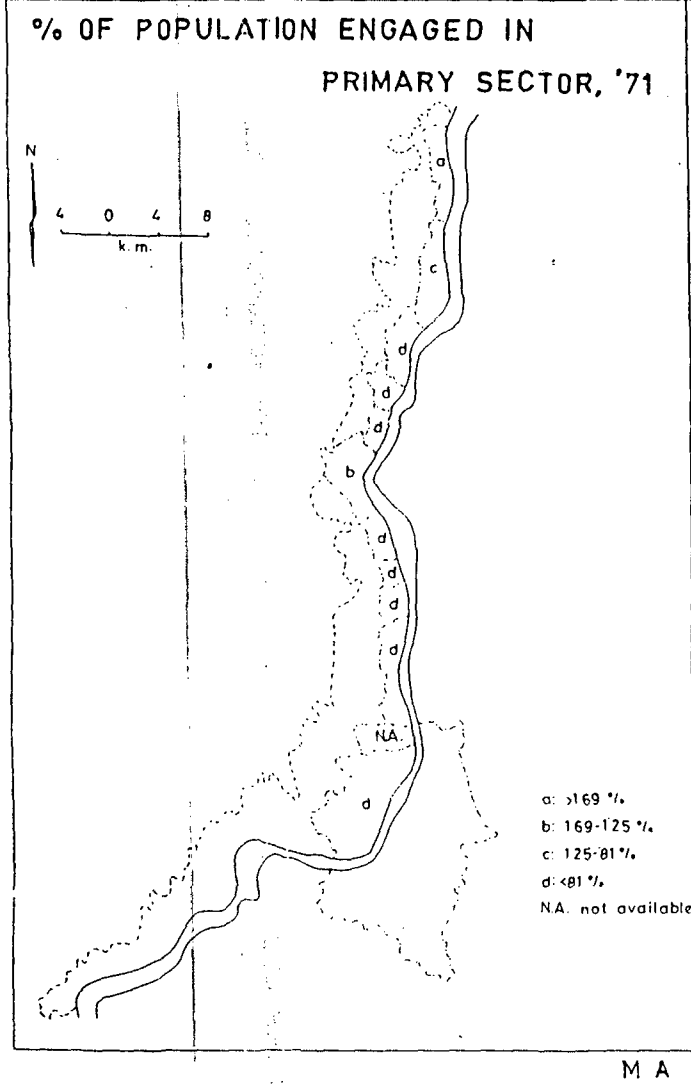
employment accounts. In the main, the sources of data that are used for the analysis of the structure and spatial distribution of economic activities, are the Census of Population economic activity and the Department of Labour, Government of West Bengal.

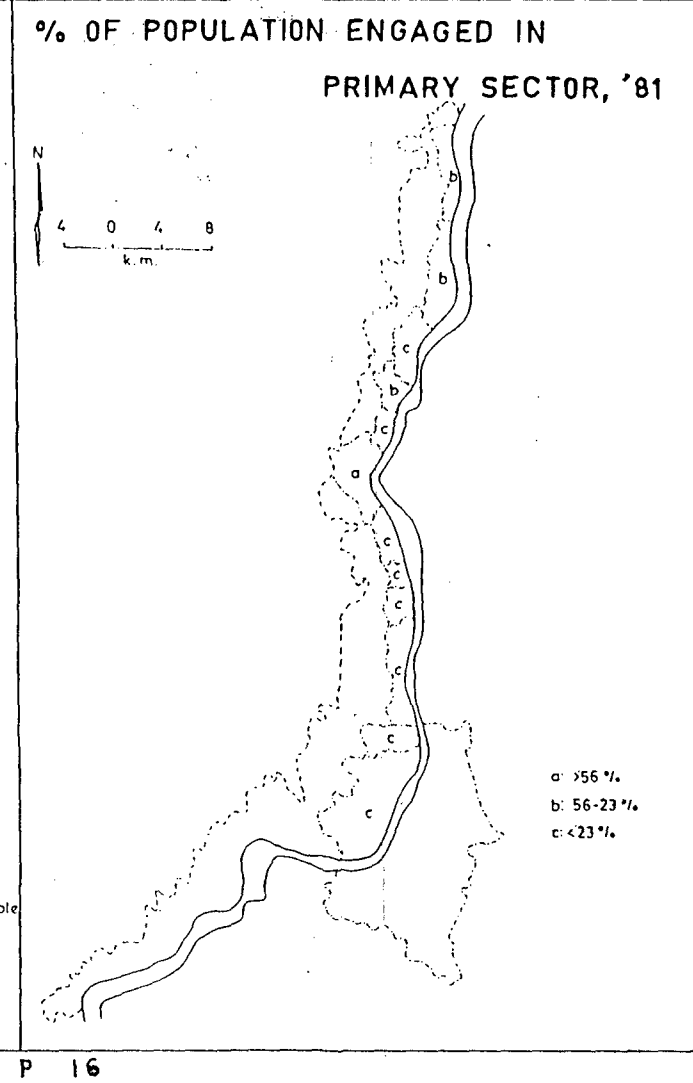
Some simple deductive indices and methods are used to analyse the spatial pattern of economic activity, with special references to the industrial activity in the area under consideration. The important methods used in this section, are Location Quotient, Co-efficient of localisation, Co-efficient of geographical association, index of surplus workers, analysis of the base ratios, Spearman's rank correlation co-efficient, index of concentration and index of deconcentration.

ANALYSIS

In Tables 13, 14 and 15, basic three-layered classification of occupational groups and the respective percentages of workers engaged in each group, for the four consecutive census years are depicted. Table 13 shows the intercensal percentage distribution of workers engaged in the first component of the economic geography, i.e., in the primary sector (Map. 16).


% OF POPULATION ENGAGED IN
PRIMARY SECTOR, '61
N
4 0 4 8
k.m.
a: >102 %
b: 102-53 %
c: 53-04 %


% OF POPULATION ENGAGED IN
PRIMARY SECTOR, '71
N
4 0 4 8
k.m.
N.A.
a: >169 %
b: 169-125 %
c: 125-81 %
d: <81 %
N.A. not available


% OF POPULATION ENGAGED IN
PRIMARY SECTOR, '81
N
4 0 4 8
k.m.
a: >56 %
b: 56-23 %
c: <23 %

MAP 16

Table 13

Showing the percentage of population engaged in primary activities, 1951-1981.

Municipality or Municipal Corporation	Census Periods			
	1951[a]	1961	1971	1981
1. Howrah M.C.	1.10	0.14	0.61*	0.03
2. Bally M	3.14	0.52	-	0.10
3. Uttarpara-Kotrung M.C.	2.48	0.18	0.45	0.11
4. Konnagar M	1.30	0.13	0.75	0.02
5. Rishra M.	3.26	0.13	0.55	0.04
6. Serampore M	1.39	0.33	0.40	0.10
7. Baidyabati M	6.62	1.94	1.59	1.28
8. Champdani M	0.83	0.26	0.71	0.15
9. Bhadreswar M	1.99	0.61	0.49	0.24
10. Chandernagore M.C.	0.72	0.52	0.66	0.12
11. Hooghly-Chinsurah M	3.77	0.65	0.87	0.25
12. Bansberia M	1.68	0.90	1.79	0.32

Note : a = including dependants;
* = Census operation declassified the towns in 1971 census and enumeration taken together with Bally M.
M = Municipality
M.C. Municipal Corporation

Source : District Census Handbooks - Howrah and Hooghly, 1951-1981.

Regionally, the primary sector scores least significance in the overall economic fabrics of the area.

In the main, two urban units, viz., Baidyabati and Bansberia show only marginally over 1 per cent of the total population engaged in the primary sector. The table also depicts that this sector of the economy has a declining tendency. In 1981 Census, all the municipalities show far below 0.50 per cent of the total population engaged in this sector.

Table 14 shows the second component, i.e. the secondary sector of the economy, for the four consecutive census years 1951-81.

Table 14

Showing the percentage of population engaged in secondary activities, 1951-1981

Municipality or Municipal Corporation	Census Periods 1951[a]	1961	1971	1981
1. Howrah M.C.	33.19	16.20	14.43*	13.57
2. Bally M	47.64	28.03	-	22.57
3. Uttarpara-Kotrung M	28.57	12.82	10.69	10.43
4. Konnagar M	40.61	23.29	12.31	13.34
5. Rishra M	62.39	31.60	27.01	24.02
6. Serampore M	44.43	19.67	16.23	15.97
7. Baidyabati M	23.38	10.09	6.40	6.75
8. Champdani M	68.16	30.18	29.37	25.12
9. Bhadreswar M	72.73	27.95	27.36	22.73
10. Chandernagore M.C.	31.82	10.34	11.86	12.18
11. Hooghly-Chinsurah M	18.76	6.72	6.19	6.30
12. Bansberia M	67.74	25.60	19.47	18.78
AVERAGE (Percentage) -	38.90	18.06	15.10	14.97

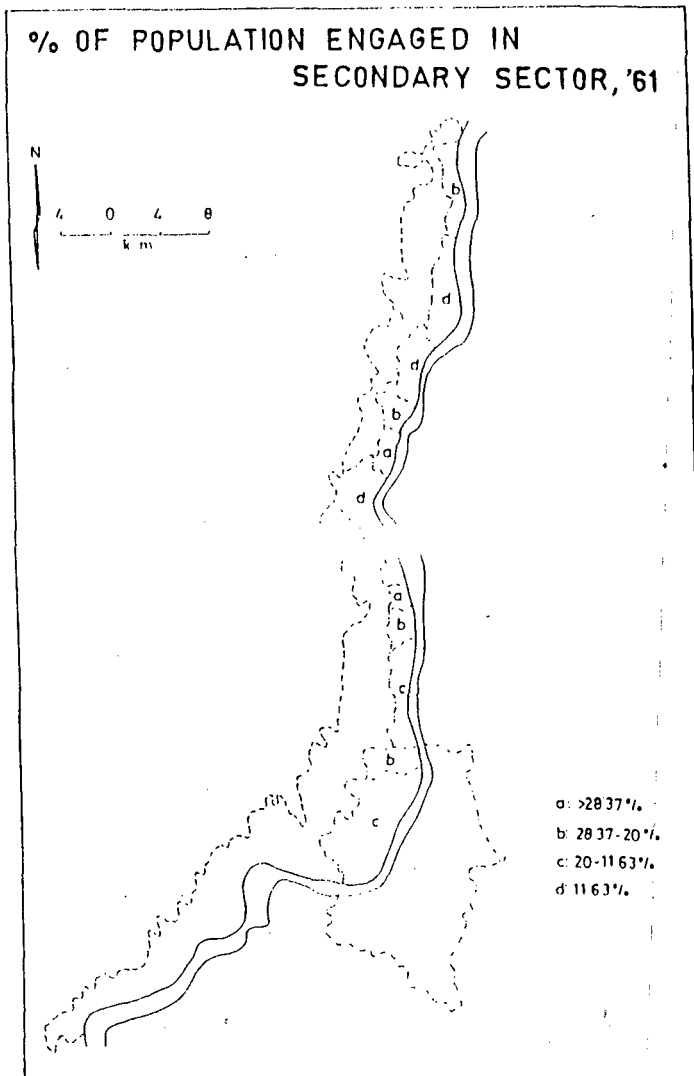
Note : a = including dependants; * = census operations dislassified the towns in 1971 census and enumerated taken together with Bally M.
M = Municipality; M.C. = Municipal Corporation.

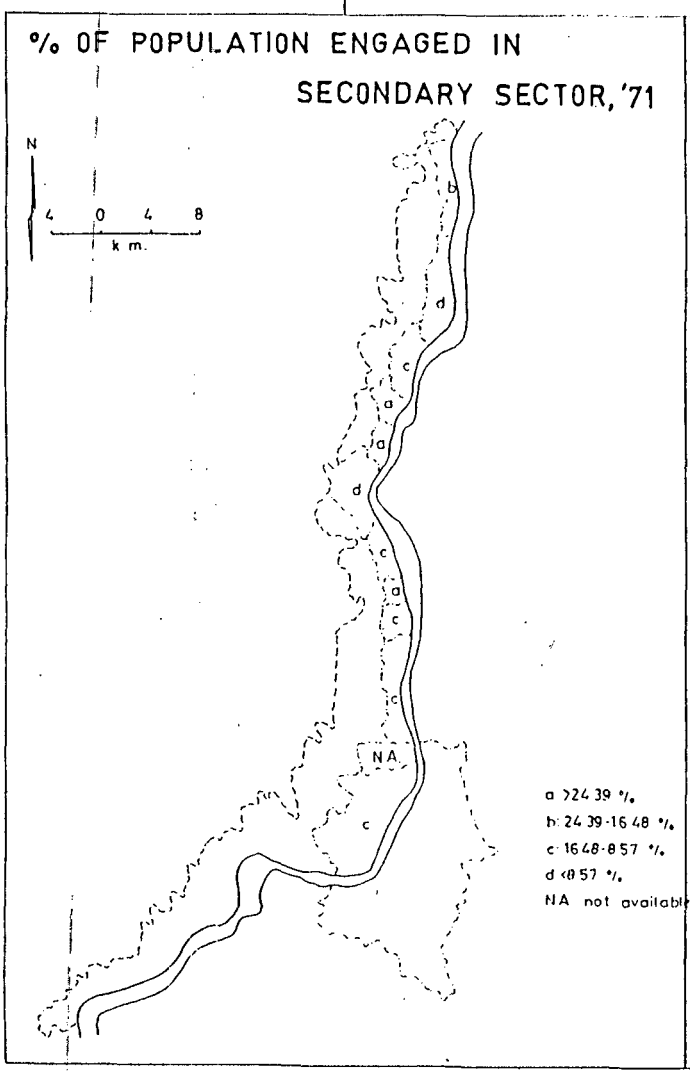
Source : District Census Handbooks - Howrah and Hooghly, 1951-1981.

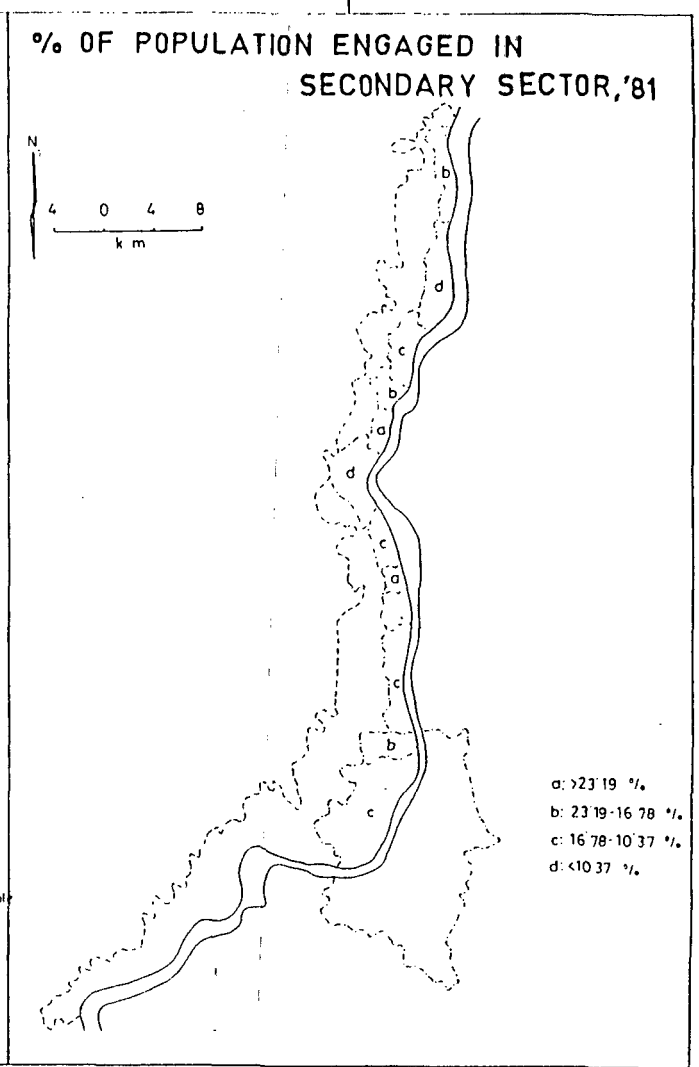
The secondary sector scores high ratios in different intercensal years (Map. 17). The industrial activities are noteworthy in the municipalities, viz. Howrah, Bally, Rishra, Serampore, Champdani, Bhadreswar and in Bansberia Municipalities respectively. In these municipalities, 10-25 per cent of the total population is engaged in the secondary sector. But the table also shows some noticeable intercensal decline of the secondary activities. In 1951 census, more than 38 per cent (including dependants) were engaged in the secondary sector, while in the last census, i.e. in 1981 census, the figure has gone down to about 15 per cent.

The Census of India disaggregates the employment in the third component, i.e. the tertiary sector into three occupational categories : Transport, storage and communication; trade and commerce and services including government and semi-governmental activities. The tertiary activities are rampant in the municipalities of Howrah, Bally, Konnagar, Serampore-Baidyabati and in Chandernagore-Hooghly-Chinsurah areas. These areas score on an average from 10-18 per cent of the total population engaged in this sector (1981 census).

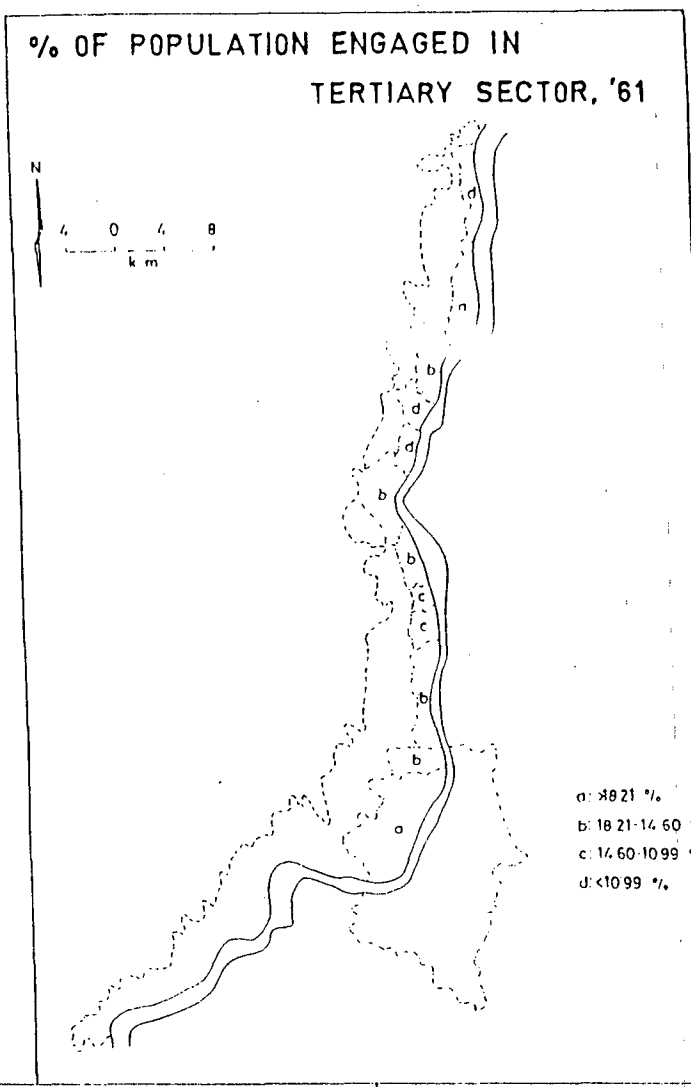
Table 15 depicts the third component of economic activity, i.e. percentage of population engaged in the tertiary sector (Map 18).

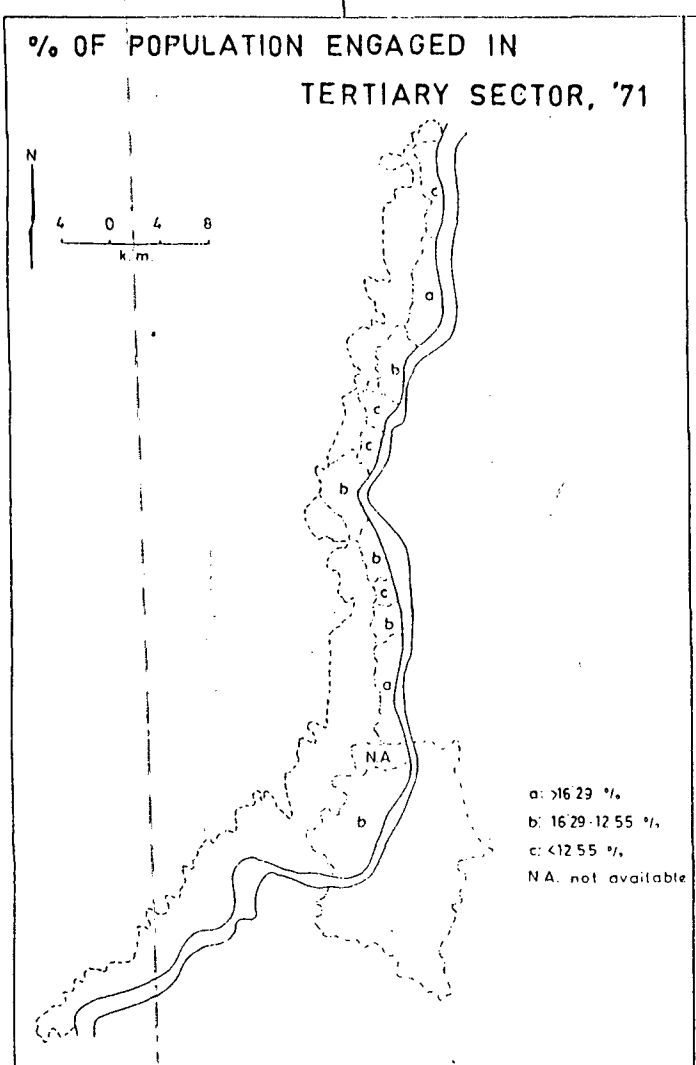

% OF POPULATION ENGAGED IN
SECONDARY SECTOR, '61
N
4 0 4 8
k m
a: >28 37 %
b: 28 37-20 %
c: 20-11 63 %
d: 11 63 %

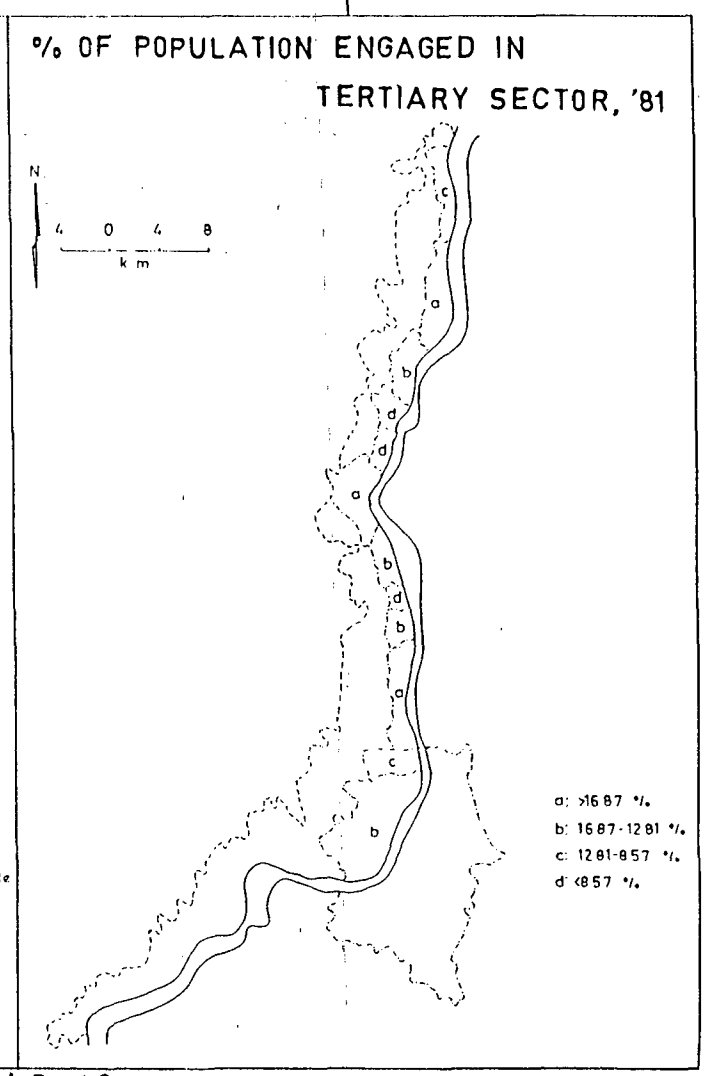

% OF POPULATION ENGAGED IN
SECONDARY SECTOR, '71
N
4 0 4 8
k m.
NA
a: >24 39 %
b: 24 39-16 48 %
c: 16 48-8 57 %
d: <8 57 %
NA not available


% OF POPULATION ENGAGED IN
SECONDARY SECTOR, '81
N
4 0 4 8
k m
a: >23 19 %
b: 23 19-16 78 %
c: 16 78-10 37 %
d: <10 37 %

MAP 17


% OF POPULATION ENGAGED IN
TERTIARY SECTOR, '61
N
4 0 4 8
k m
a: >18 21 %
b: 18 21-14 60 %
c: 14 60-10 99 %
d: <10 99 %


% OF POPULATION ENGAGED IN
TERTIARY SECTOR, '71
N
4 0 4 8
k m
N.A.
a: >16 29 %
b: 16 29-12 55 %
c: <12 55 %
N.A. not available


% OF POPULATION ENGAGED IN
TERTIARY SECTOR, '81
N
4 0 4 8
k m
a: >16 87 %
b: 16 87-12 81 %
c: 12 81-8 57 %
d: <8 57 %

MAP 18

Table 15

Showing the percentage of population engaged in the tertiary sector during 1951 - 1981

Municipality or Municipal Corporation	Census Years 1951[a]	1961	1971	1981
1. Howrah M.C.	65.71	20.63	16.25*	16.85
2. Bally M	49.22	15.16	-	12.39
3. Uttarpara-Kotrung M	68.61	17.79	16.68	16.92
4. Konnagar M	58.09	13.15	12.64	13.72
5. Rishra M	34.34	11.41	8.43	7.87
6. Serampore M	54.18	15.22	13.02	13.37
7. Baidyabati M	70.02	16.00	15.72	16.97
8. Champdani M	31.00	8.90	7.09	6.65
9. Bhadreswar M	25.28	9.88	7.86	6.65
10. Chandernagore M.C.	67.46	17.31	14.08	14.90
11. Hooghly-Chinsurah M	77.94	18.94	17.67	18.16
12. Bansberia M	30.58	10.81	8.59	9.31

Note : a = including dependants;

* = Census operations declassified the towns in 1971 census and enumerated taken together with Bally M.

M = Municipality, M.C. = Municipal Corporation.

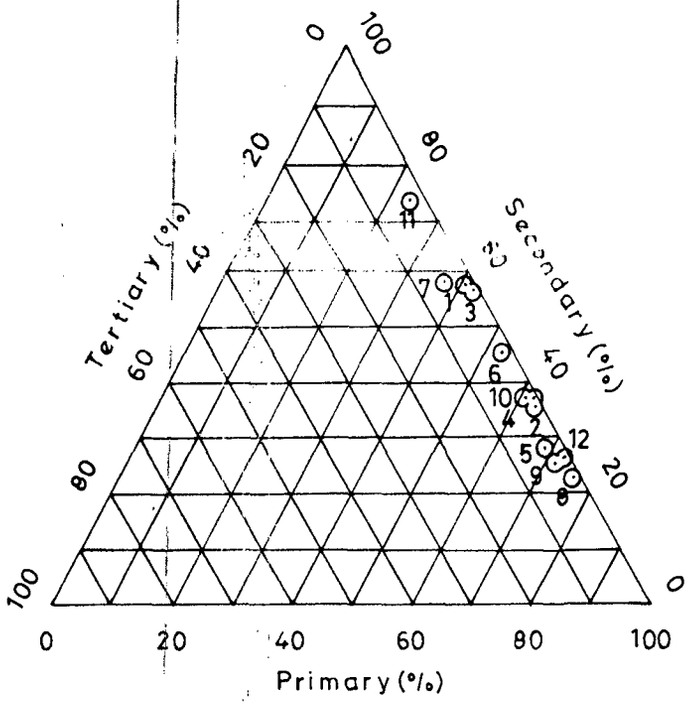
Source : District Census Handbooks - Howrah and Hooghly, 1951 - 1981.

It is in fact that the tertiary sector is the biggest employment-provider in Calcutta Metropolitan District. When we consider the city alone, the dominance of the tertiary sector is all the more overwhelming. When we consider the Metropolitan Complex, the secondary sector's share in the total employment is observed to be somewhat larger, though still, it lags behind the tertiary sector (Map 19).

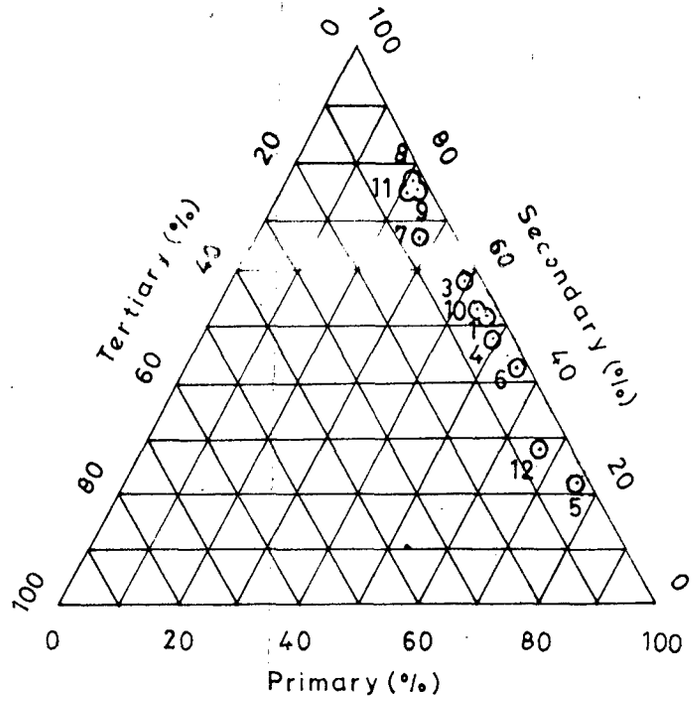
Actually, region's uniqueness lies not in the specialised wholesale trade, the financial activities, dock works, warehouses and godowns of the Port Authority on the west bank of the river Hooghly, but in the overcrowded tertiary sector and the hundreds and thousands of low-income pavement shops and peripatetic peddlars.

According to 1981 census, the area has a total population of 1741985, out of which 521113 (29.93 per cent) are workers and 1219872 (70.07 per cent) are non-workers. Almost all the municipalities have higher proportions of non-working population and lesser quantum of working population. The successive tables 16 and 17, showing the percentage of main workers and non-workers to the total population for the different years, starting from 1961 to 1981.

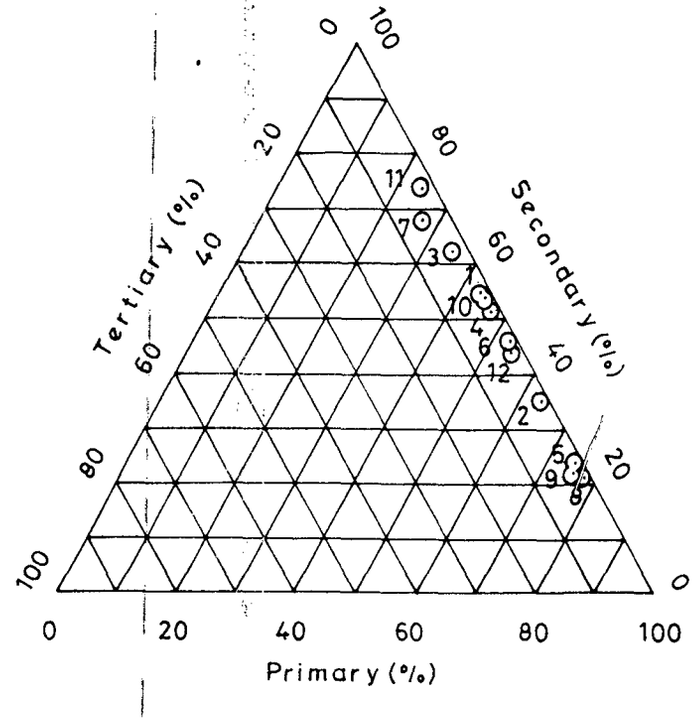
TERNARY DIAGRAM SHOWING THE SECTORAL DISTRIBUTION OF WORKERS, 1961



TERNARY DIAGRAM SHOWING THE SECTORAL DISTRIBUTION OF WORKERS, 1971



TERNARY DIAGRAM SHOWING THE SECTORAL DISTRIBUTION OF WORKERS, 1981



1. Howrah
2. Bally
3. Uttarpara-Kotrung
4. Konnagar
5. Rishra
6. Serampore
7. Baidyabati
8. Champdani
9. Bhadreswar
10. Chandernagore
11. Hooghly-Chinsurah
12. Bansberia

FIG. 19

Table 16

Showing the percentage of main workers to the total population, 1961 - 1981.

Municipality or Municipal Corporation	Census years 1961	1971	1981[b]
1. Howrah M.C.	36.97	31.29*	30.63
2. Bally M	43.44	-	34.53
3. Uttarpara-Kotrung M	30.79	27.83	27.47
4. Konnagar M	36.45	25.70	27.09
5. Rishra M	43.15	35.99	31.93
6. Serampore M	35.23	29.65	29.44
7. Baidyabati M	28.04	23.71	25.00
8. Champdani M	39.34	37.17	31.92
9. Bhadreswar M	38.44	35.71	29.61
10. Chandernagore M.C.	28.18	26.60	27.20
11. Hooghly-Chinsurah M	26.31	24.73	24.72
12. Bansberia M	37.31	29.85	32.39
Average	35.83	30.37	29.93

b = including marginal workers;

* = Census operations declassified the towns in 1971 census and enumerated taken together with Bally M.

M = Municipality; M.C. = Municipal Corporation

Source : District Census Handbooks - Howrah and Hooghly, 1961-1981.

Table 17

Showing the percentage of non-workers to the total population, 1961 - 1981.

Municipality or Municipal Corporation	Census Years 1961	1971	1981[b]
1. Howrah M.C.	63.03	68.71*	69.37
2. Bally M	56.56	-	65.47
3. Uttarpara-Kotrung M	69.21	72.17	72.53
4. Konnagar M	63.55	74.30	72.91
5. Rishra M	56.85	64.01	68.07
6. Serampore M	64.77	70.35	70.56
7. Baidyabati M	71.96	76.29	75.00
8. Champdani M	60.66	62.83	68.08
9. Bhadreswar M	61.56	64.29	70.39
10. Chandernagore M.C.	71.82	73.40	72.80
11. Hooghly-Chinsurah M	73.69	75.27	75.28
12. Bansberia M	62.69	70.15	67.61
Average	64.17	69.63	70.07

Note : b = including marginal workers;

* Census operations declassified the towns in 1971 census and enumerated taken together with Bally M.

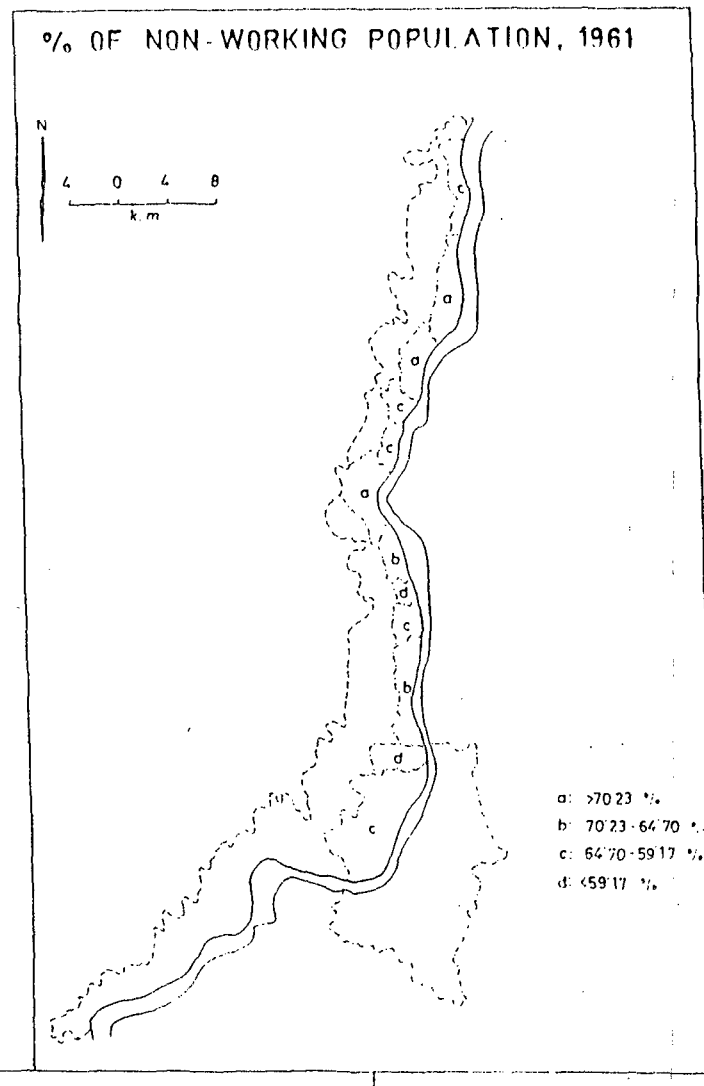
M = Municipality; M.C. = Municipal Corporation

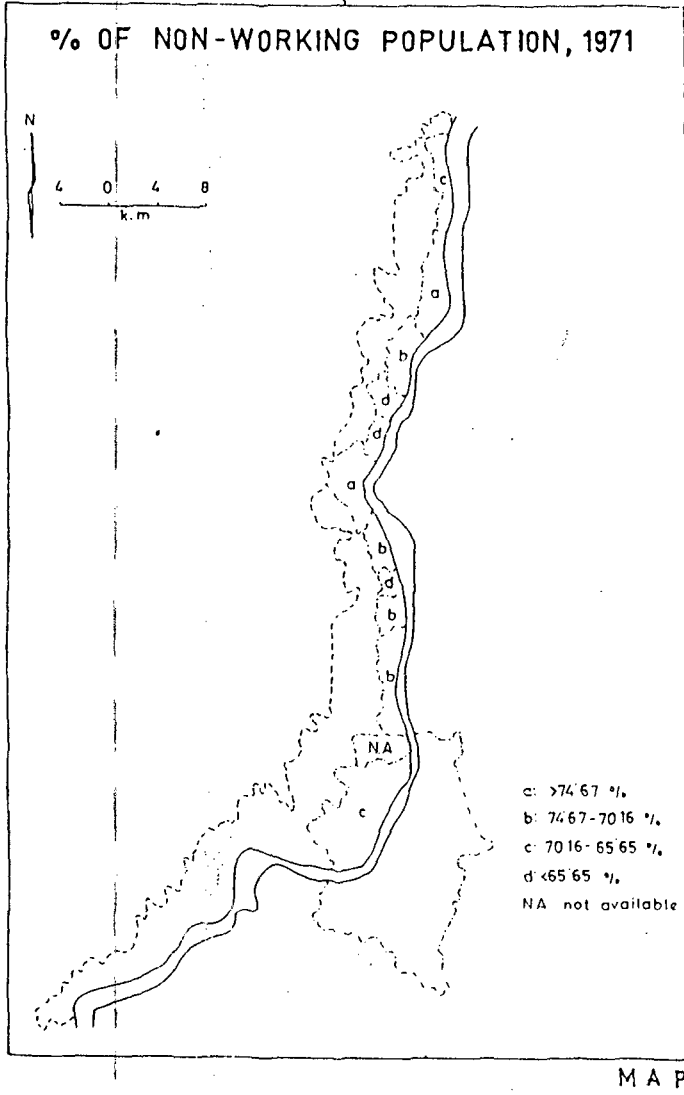
Source : District Census Handbooks - Howrah and Hooghly, 1961 - 1981.

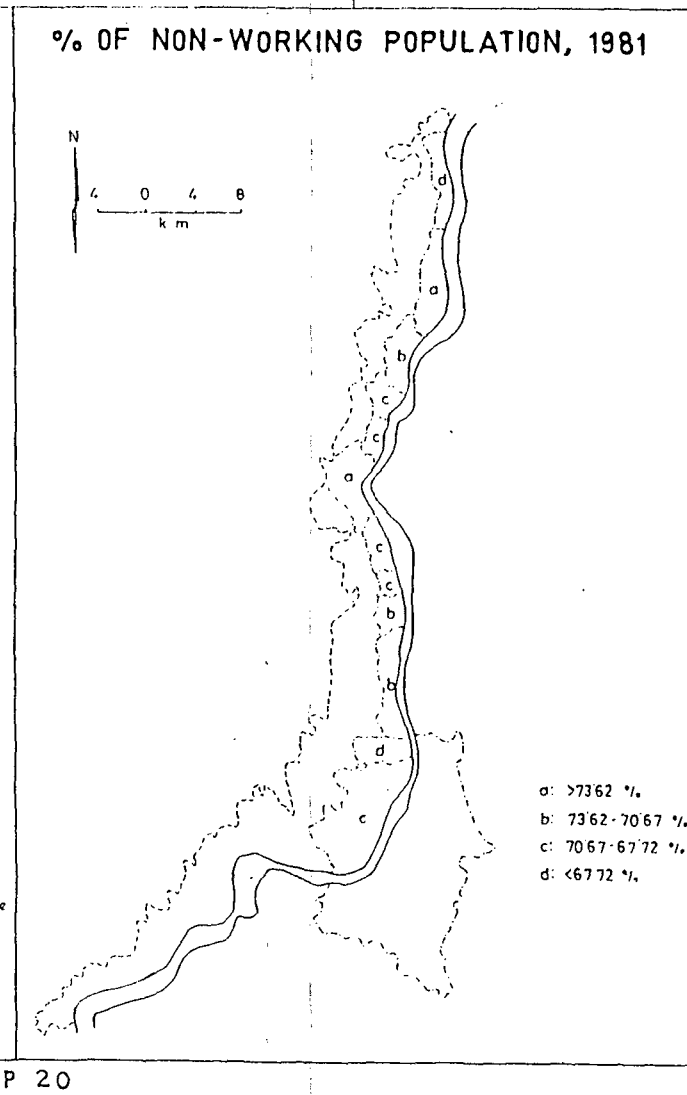
The tables above do not signify that the area has less labour potentials. This may be interpreted that the major portion of the population of the area are commuters. Similarly, the people from the other parts of the area finds employment in the study area is concerned.

In aggregated manner, almost all the municipalities show high labour potentials, with more than 25 per cent of the population actively engaged in the economic activity. Howrah M.C. ranks highest in the supply of main workers, having 228009, i.e. about 31 per cent of the total population, while other municipalities, viz., Bally, Rishra, Serampore, Champdani, Bhadreswar and Bansberia are worthmentioning.

The tables 16 and 17 also indicate some of the notable features of demographic attributes. The ratios of the workers and non-workers are appreciably low, indicating high dependency of population (Map 20). The average ratio of workers to non-workers, for different census years of 1951 to 1981 are, 0.55, 0.44 and 0.43 respectively. It also indicates, in aggregated sense or in disaggregated sense that the parameters of population, a declining tendency.


% OF NON-WORKING POPULATION, 1961
N
4 0 4 8
k.m
a: >70·23 %
b: 70·23-64·70 %
c: 64·70-59·17 %
d: <59·17 %


% OF NON-WORKING POPULATION, 1971
N
4 0 4 8
k.m
NA
a: >74·67 %
b: 74·67-70·16 %
c: 70·16-65·65 %
d: <65·65 %
NA not available


% OF NON-WORKING POPULATION, 1981
N
4 0 4 8
k.m
a: >73·62 %
b: 73·62-70·67 %
c: 70·67-67·72 %
d: <67·72 %

MAP 20

Table 18

Showing the percentage of industrial workers to the total main workers of each municipalities for the consecutive census years of 1961, 1971 and 1981.

Municipality or Municipal Corporation	Census Years 1961	1971	1981[b]
1. Howrah M.C.	43.81	46.11*	44.32
2. Bally M	64.54	-	63.84
3. Uttarpara-Kotrung M	41.64	38.42	37.98
4. Konnagar M	63.91	47.91	49.26
5. Rishra M	73.24	25.04	75.22
6. Serampore M	55.84	54.73	54.25
7. Baidyabati M	36.00	27.00	27.00
8. Champdani M	76.72	79.02	78.69
9. Bhadreswar M	72.70	76.63	76.75
10. Chandernagore M.C.	36.70	45.59	44.77
11. Hooghly-Chinsurah M	25.54	25.02	25.49
12. Bansberia M	68.61	65.22	57.97
Average	50.40	49.70	50.00

b = including marginal workers;

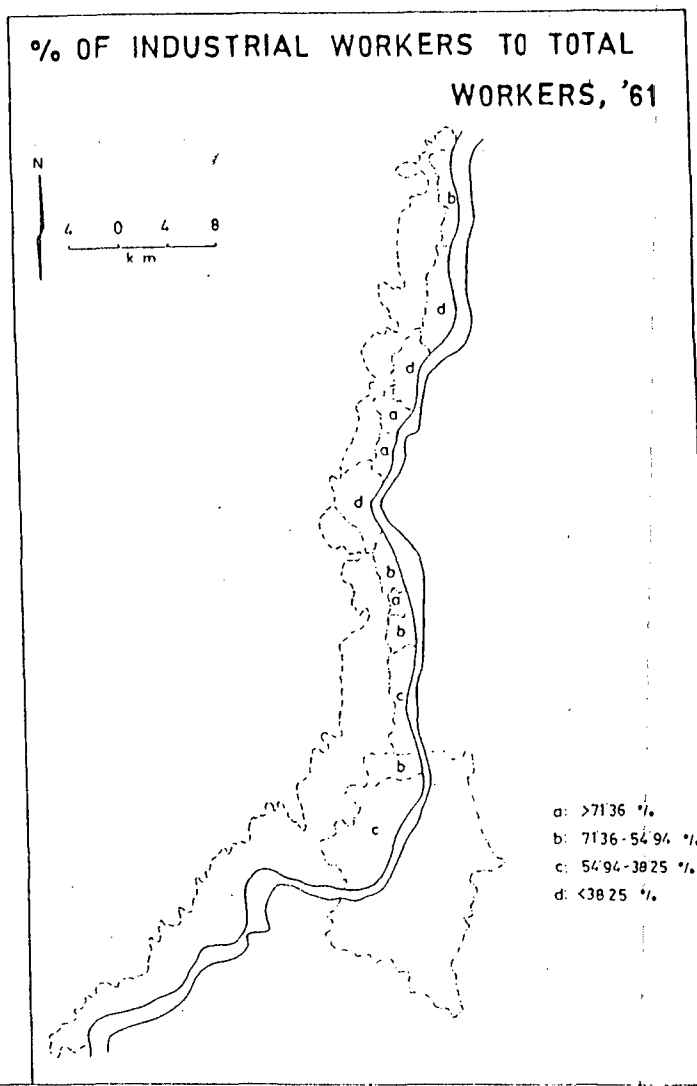
* Census operations declassified the towns in 1971 census and enumerated taken together with Bally M.

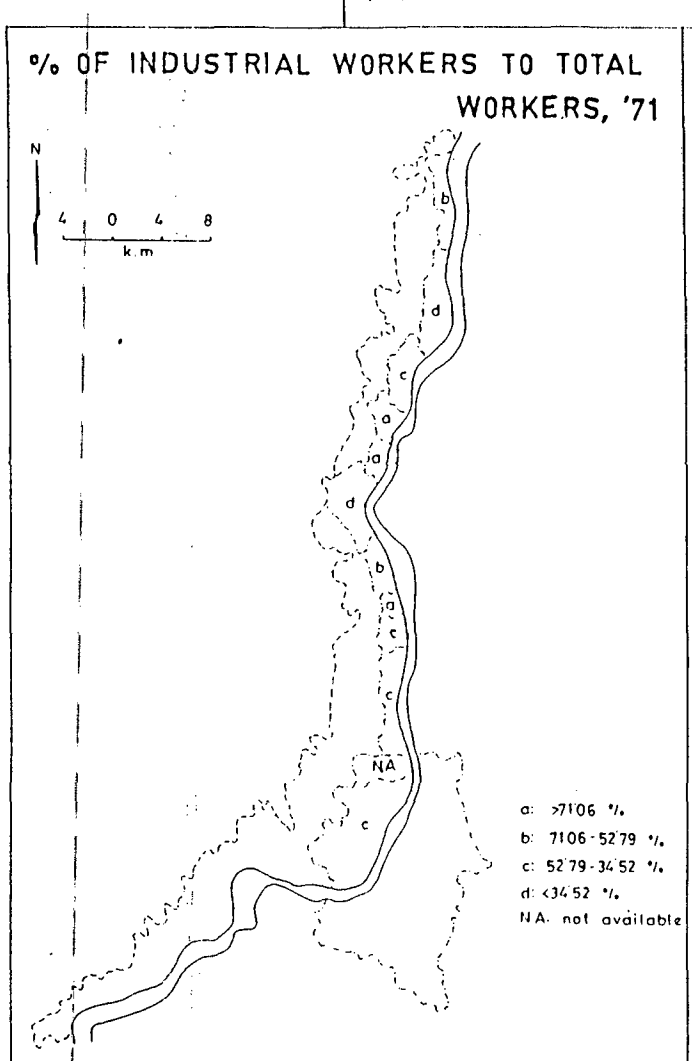
M = Municipality; M.C. = Municipal Corporation.

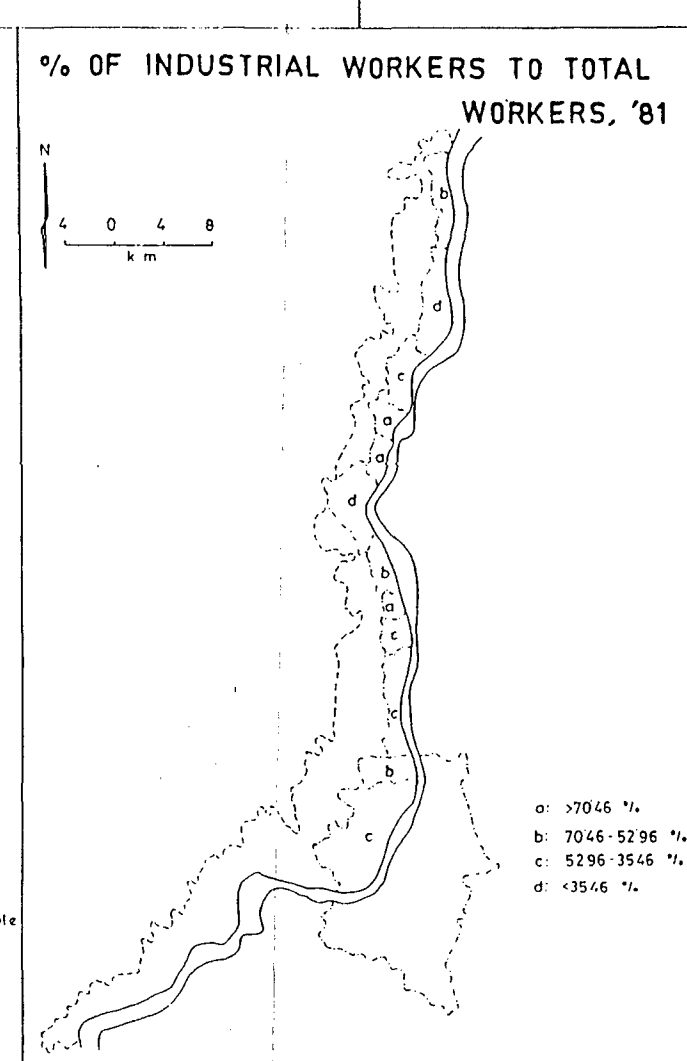
Source : District Census Handbooks - Howrah and Hooghly, 1961-81.

The table 18, shows that the industrial activities are rampant in the municipalities, viz., Howrah, Bally, Rishra, Serampore, Champdani, Bhadreswar and in Bansberia. Amongst the municipalities, Rishra, Champdani and Bhadreswar, show characteristic ratios of industrial workers to total main workers of over about 75 per cent. But, the region as a whole, shows on an average of about 50 per cent of the main workers engaged in the secondary sector of the economy showing really a parallel trends for the consecutive census years (Map 21).

The spatio-temporal variation of the workers engaged in the secondary sector, is also worth to mention. Table 19 showing the percentage rate of growth of workers engaged in the secondary sector, 1961-1981.


% OF INDUSTRIAL WORKERS TO TOTAL WORKERS, '61
N
4 0 4 8
k m
a: >71·36 %
b: 71·36 - 54·94 %
c: 54·94 - 38·25 %
d: <38·25 %


% OF INDUSTRIAL WORKERS TO TOTAL WORKERS, '71
N
4 0 4 8
k m
NA
a: >71·06 %
b: 71·06 - 52·79 %
c: 52·79 - 34·52 %
d: <34·52 %
NA. not available


% OF INDUSTRIAL WORKERS TO TOTAL WORKERS, '81
N
4 0 4 8
k m
a: >70·46 %
b: 70·46 - 52·96 %
c: 52·96 - 35·46 %
d: <35·46 %

MAP 21

Table 19

Showing the percentage of rate growth of workers engaged in the secondary sector, 1961-1981.

Municipality or Municipal Corporation	Percentage rate of growth per annum (P.P.A.)	
	1961-71	1971-81
1. Howrah M.C.	2.82	-0.51
2. Bally M	-	0.74[a]
3. Uttarpara-Kotrung M	0.80	1.50
4. Konnagar M	-3.82	6.12
5. Rishra M	4.02	1.35
6. Serampore M	-0.80	2.28
7. Baidyabati M	-2.25	3.75
8. Champdani M	3.53	1.11
9. Bhadreswar M	2.58	0.72
10. Chandernagore M.C.	2.86	3.91
11. Hooghly-Chinsurah M	1.66	2.11
12. Bansberia M	0.33	2.03
Total	0.28	2.28

Note : a. figures indicates the average of 1961 to 1981.

M = Municipality; M.C. = Municipal Corporation.

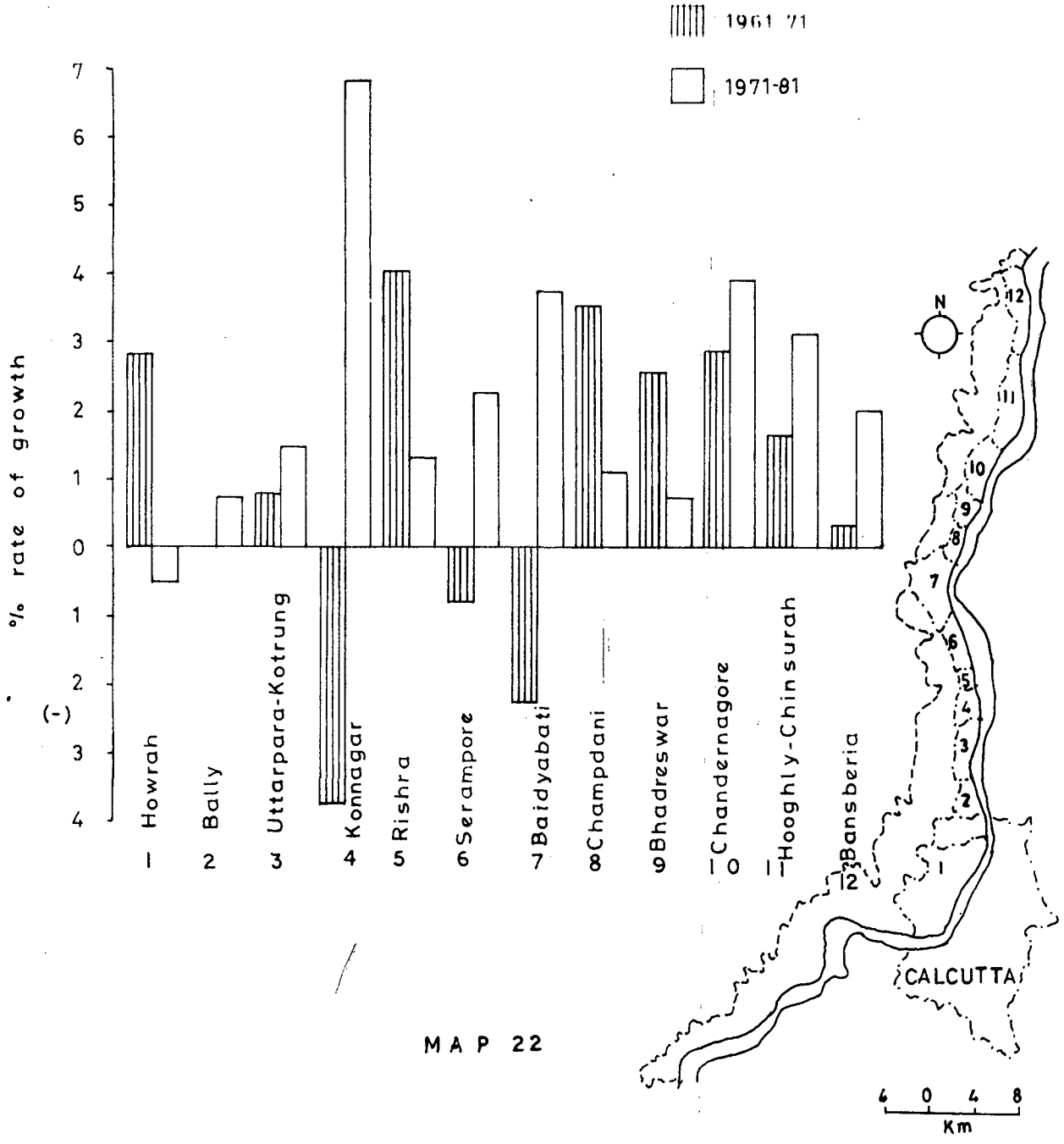
Source : District Census Handbooks - Howrah and Hooghly, 1961-81.

The negative growth rates are observable in the municipalities, viz., in Konnagar, Serampore and Baidyabati, during the intercensal periods between 1961 to 1971. The growth rate per annum ranges in between - 0.80 to -3.82. While in between 1971-81, only Howrah M.C., a solitary municipality shows negative growth rate of -0.51 p.p.a. Regionally, the area as a whole shows a growth rate of 2.28 p.p.a.,during the years in between 1971-81. The positive scores are coincident with the municipalities, especially in Konnagar, Rishra, Serampore, Baidyabati, and almost all the northern municipalities (Map 22).

In disaggregated manner, the household sector of the industrial geography plays a very negligible role (Appendix - 6), as only 4 per cent of the industrial labour force is engaged in this sector. The remaining 96 per cent of the labour force, on an average, is engaged in the sector which are characterised by other than household industries (Appendix 7), i.e. pure manufacturing activities. Almost all the municipalities show the percentage of above 90 per cent engaged in industries other than household sector. Thus, it is conceived from the Appendix - 6 and 7, that the pure manufacturing sector has a predominating role in the industrial geography of the area under consideration.

In table 20, the relative concentration of industrial workers have been worked out based on location quotient (LQ_i), 1961-1981.

% GROWTH RATE OF WORKERS IN THE SECONDARY SECTOR



MAP 22

Table 20

Showing the relative concentration of industrial workers based on location quotient (LQ_i) during 1961 - 1981.

Municipality or Municipal Corporation	1961	1971	1981
1. Howrah M.C.	0.87	0.93*	0.89
2. Bally M	1.28	-	1.28
3. Uttarpara-Kotrung M	0.82	0.77	0.76
4. Konnagar M	1.27	0.97	0.99
5. Rishra M	1.45	1.51	1.50
6. Serampore M	1.11	1.10	1.08
7. Baidyabati M	0.72	0.54	0.54
8. Champdani M	1.52	1.59	1.57
9. Bhadreswar M	1.44	1.54	1.53
10. Chandernagore M.C.	0.73	0.90	0.89
11. Hooghly-Chinsurah M	0.50	0.50	0.51
12. Bansberia M	1.36	1.31	1.16

* Census operations declassified the towns in 1971 census and enumerated taken together with Bally M.;

M = Municipality; M.C. Municipal Corporation.

Source : District Census Handbooks - Howrah and Hooghly 1961-1981.

Of the various techniques and indices that have been devised to carry somewhat further the analysis of the economic structure of an area, the simplest is the LQ_i. This conventionally takes the employment as a measure of economic activity and compares the proportion of an area's total labour force in industries, in aggregated form, with the proportion of total workers engaged in all economic functions. The equation adopted form the calculation of LQ_i is of the form :

$$LQ_i = \left[E_i^r \Big/ \sum_{i=1}^{i=m} E_i^r \right] \Big/ \left[E_i^n \Big/ \sum_{i=1}^{i=m} E_i^n \right], \quad \ldots\ldots \quad (2)$$

Where, E_i^r and E_i^n are the employment levels in industries in the area (subregion) and the region respectively, $\sum_{i=1}^{i=m} E_i^r$ and $\sum_{i=1}^{i=m} E_i^n$ are the total workers engaged in all economic functions in the subregion and region respectively.

The rationale behind the LQ_i is that a similar proportion of employment in industries, in an aggregated manner, in the municipalities to that of all workers in the region would indicate a measure of "self-sufficiency". LQ_i below unity express deficiency in characteristic, i.e. the region is net "importer" or otherwise suggests that the industrial activity is less developed in that locality than in all economic functions in general. Whilst the LQ_i those above unity show a surplus, or otherwise may be interpreted that

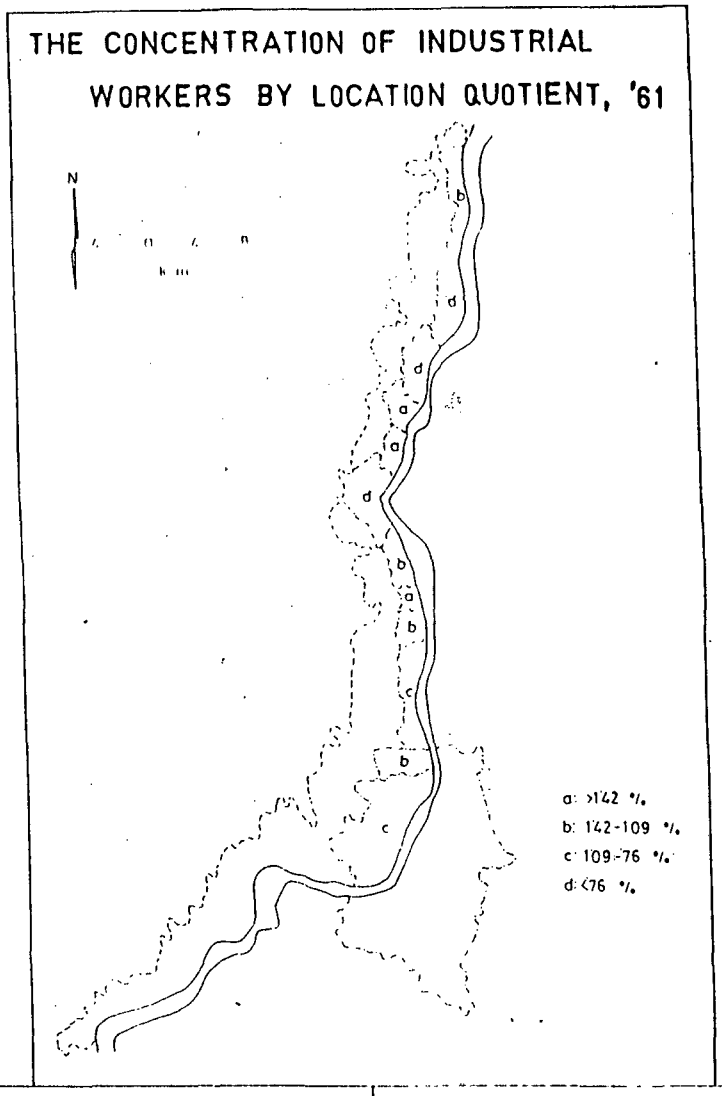
the sector is a net "exporter" of the produces manufactured in that locality, or an indicator of the industrial surplus workers in relation to the local industrial development. Based on LQ_i, choropleth maps have been drawn (Map 23), showing a spatial discrepency of the concentration of industrial employment in the area under study. The LQ_i table shows that Bally, Rishra, Serampore, Champdani, Bhadreswar and Bansberia municipalities respectively for the different census years, have the high values of above unity, indicating high industrial concentration and development. Except the municipalities, viz., Uttarpara-Kotrung, Baidyabati and Hooghly-Chinsurah municipalities, the region as whole, shows high degrees of concentration and industrial development.

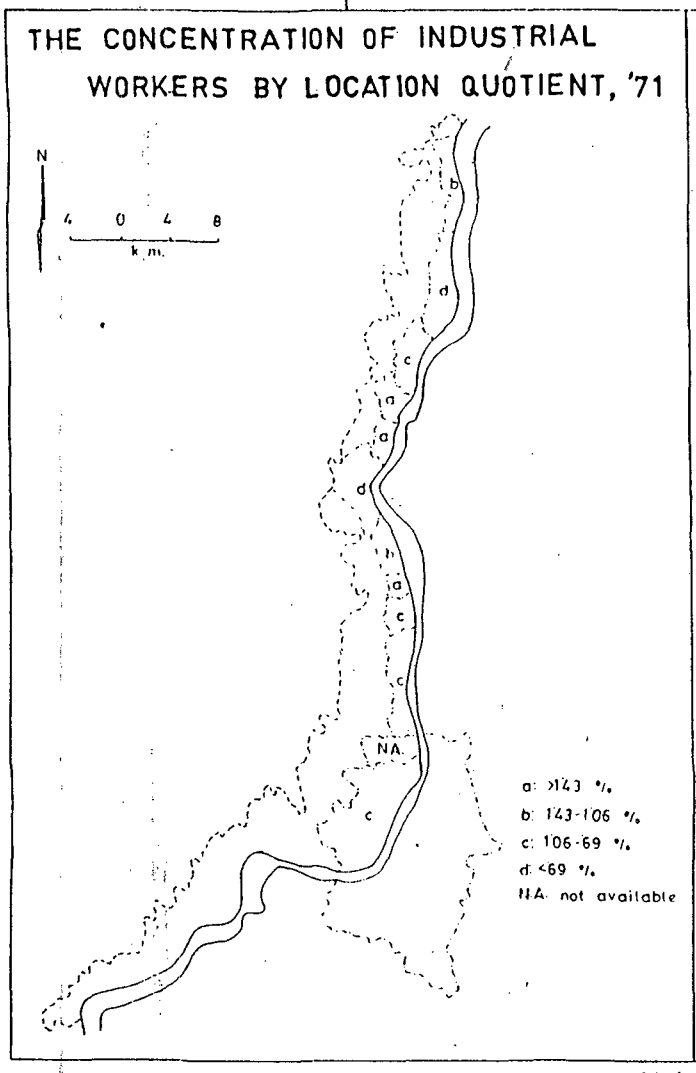
Similarly, the "Co-efficient of Localisation" (CL_i) of the industrial workers, have been worked out for the different census years (1961-81). The formula used for the calculation of the Co-efficient of localisation is as follows :

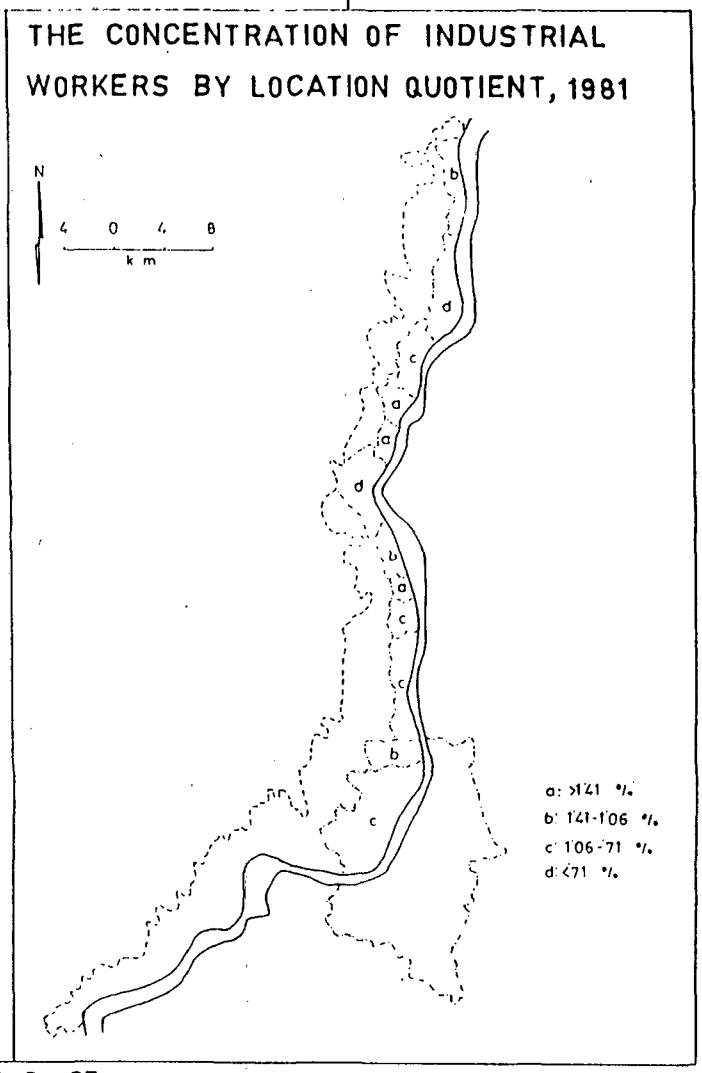
$$(CL_i) \quad \text{Co-efficient of localisation} = \frac{\sum d}{100}, \quad \ldots\ldots \quad (3)$$

where, d represents the difference between the percentage of main workers and percentage of industrial workers as a percentage of regional totals; 100, represents a constant.

Actually, the CL_i is obtained by summing either the positive or the negative deviations of the percentage of industrial workers and the main workers in all economic


THE CONCENTRATION OF INDUSTRIAL WORKERS BY LOCATION QUOTIENT, '61
N
a: >142 %
b: 142-109 %
c: 109-76 %
d: <76 %


THE CONCENTRATION OF INDUSTRIAL WORKERS BY LOCATION QUOTIENT, '71
N
4 0 4 8
k m
NA
a: >143 %
b: 143-106 %
c: 106-69 %
d: <69 %
NA. not available


THE CONCENTRATION OF INDUSTRIAL WORKERS BY LOCATION QUOTIENT, 1981
N
4 0 4 8
k m
a: >141 %
b: 141-106 %
c: 106-71 %
d: <71 %

MAP 23

functions as a percentage of the regional totals. A co-efficient of localisation of 0.0 represents complete coincidence of industrial activities in association with all other occupations and 1.00 represents extreme differentiation. Here, the computed values of the co-efficient of localisationsare 0.11, 0.09 and 0.11 for 1961, 1971 and 1981 respectively, which signify a high coincidence of industrial activities.

Based on the same data sets for the calculation of the "Co-efficient of Localisation", the "Co-efficient of Geographical Association", or "the index of similarity", or rather commonly referred to as the "Co-efficient of Linkage" (G_i), have been computed for industrial activities in general. It is a more general measure than the LQ_i since it does not measure anomalies at individual locations but deals rather with the total study area as a unit. The formula used for the calculations of the Co-efficient of Linkage is of the form :

$$(G_i) \text{ Co-efficient of Linkage} = 1 - \frac{\sum d}{100} , \ldots\ldots\ldots (4)$$

where, d, same as the notation represented in the calculation of the co-efficient of localisation; 1 and 100 represent constants.

The higher, is the computed value, the closer the correlation between the industrial working force and the total working force. Here, the computed values of the index are 0.89, 0.90 and 0.89, i.e., on an average of 0.90, represents a closer association between industrial activities and the all other economic activities in general.

These locational indices are, in turn, justified by the formulation of the "Spearman's rank correlation Co-efficient" (r_k). The co-efficients are, for the different census years, 0.63, 0.63, and 0.67 for the years 1961, 1971 and 1981 respectively. The hypothesis testing (Student's testings) also suggest that the levels of significance of these parameters are 95-98 per cent.

In contemporary spatial science, the empirical and dynamic study of the economic base of the employments in industrial sector, have a profound significance. Most methods proposed have aimed at simplification and have fallen back on the idea of comparing local with the region or the national level, particularly with mean or some other conditions. The regional proportion employed in any occupation is obtained and the number expected to be so employed in a local area of any size is calculated. If the actual employment when compared with the expected total shows a surplus, then this represent the basic employment. This is the principle used in the clearest statement of the concept by

J.M. Mattila and N.R.Thompson (1955), who proposed an "index of surplus workers". Following the same principle, we can write the formula for the computation of the index of surplus workers :

$$(S_i) \text{ Index of surplus workers} = e_i - \frac{e_t}{E_t} \cdot E_i \quad \ldots (5)$$

Where, e_i = local municipal employment in industry,

e_t = total employment of the local municipal unit in all activities,

E_i = total industrial working force in the study area,

E_t = total employment of the study area in all activities.

Table 21, showing the industrial surplus workers, 1961-81 :

Table 21

Showing the industrial surplus workers, 1961-81

Municipality or Municipal Corporation	Census Years 1961	1971	1981
1. Howrah M.C.	-12487	-8300 *	-12966
2. Bally M	6212	-	7057
3. Uttarpara-Kotrung M	- 1407	-2121	- 2629
4. Konnagar M	1450	- 158	- 103
5. Rishra M	3799	5789	6522
6. Serampore M	1753	1522	1591
7. Baidyabati M	- 1789	-2914	- 4058
8. Champdani M	4363	6385	6973
9. Bhadreswar M	3042	4383	4662
10. Chandernagore M.C.	- 2590	-1024	- 1451
11. Hooghly-Chinsurah M	- 5436	-6422	- 7586
12. Bansberia M	3088	2860	1988
Total Surplus	+23709	+20939	+ 28983

Note : M = Municipality; M.C. Municipal Corporation,

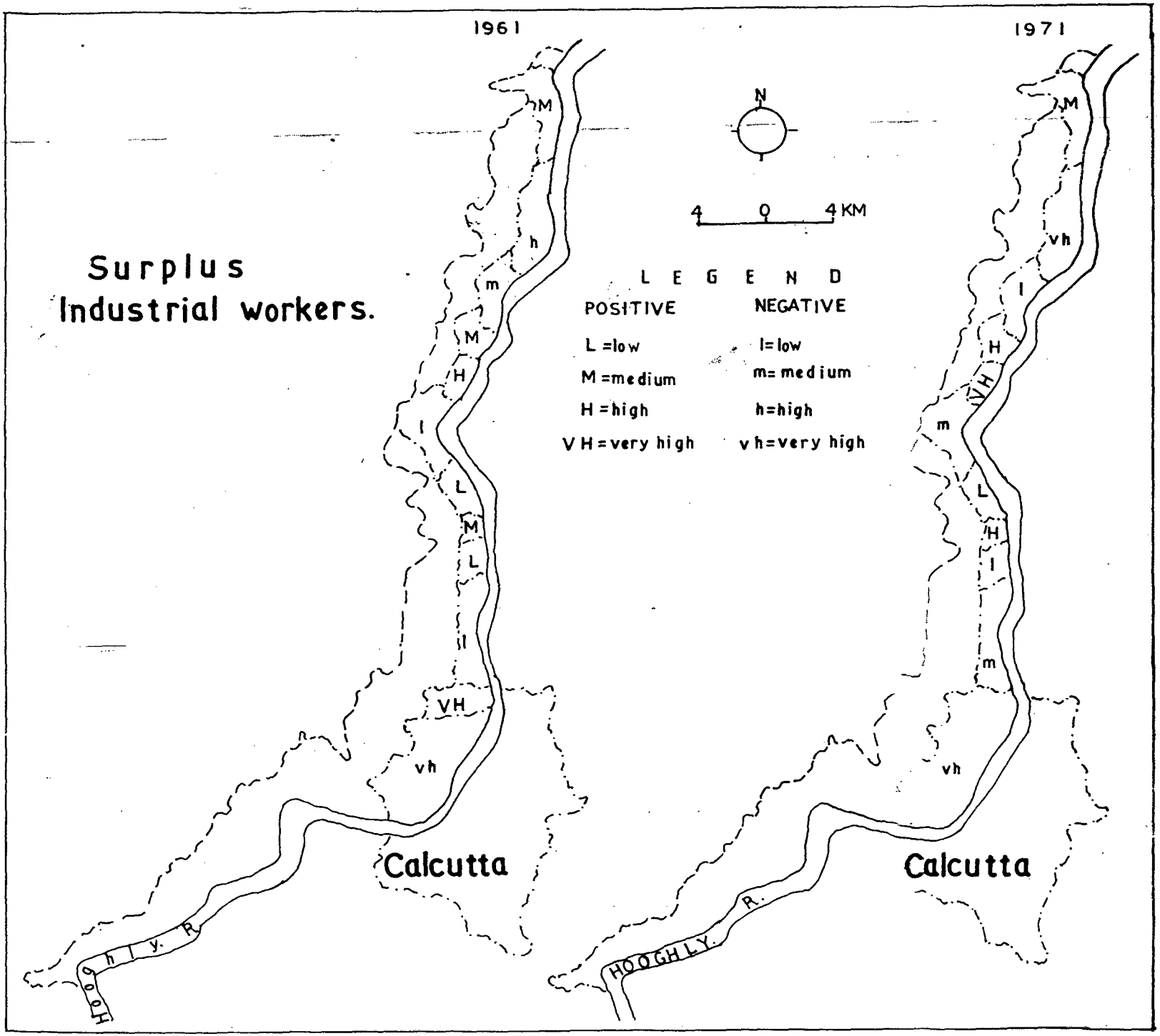
* Census operations declassified the towns in 1971 census and enumerated taken together with Bally M.

Source : District Census Handbooks-Howrah and Hooghly, 1961-81.

It is rather a modified form of the LQ_i technique employed in earlier section. The technique is also referred to as the "minimum requirements analysis" (Ullman and Dacey, 1960). In order to determine which activities are most significant to the economy of an area, an attempt is made to separate out that part of the economic activity which serves only the area itself. This is done by calculating the number of workers in all industries, in aggregated form, who are surplus to those necessary to produce the goods and services in question for consumption - this latter ratio is generally assumed to be the share of that activity in the total employment of the region.

Alternatively, a number of places of similar population size may be examined in order to establish a "norm" of employment, or a "minimum requirement" (Ullman and Dacey, 1960) for each activity group.

This type of index can be used as a system of industrial classification of towns by using the positive and negative values. The positive values have the higher industrial potentials and the negative values have the opposite. By using the positive and negative values choropleth maps have been constructed (Fig.24-a). From the maps and computed values of the index of industrial surplus workers, we can easily demarcate the municipalities, viz., Bally, Rishra, Serampore, Champdani, Bhadreswar and Bansberia, as industrial ones as


1961
1971
Surplus
Industrial workers.
N
4 0 4 KM
L E G E N D
POSITIVE
NEGATIVE
L =low
l= low
M =medium
m= medium
H =high
h=high
V H =very high
v h=very high
Calcutta
Calcutta
HOOGHLY R.
HOOGHLY R.

F I G. 24-a

these municipalities possess higher indices of surplus industrial workers. In 1981, Bally Municipality ranks first in the levels of surplus industrial workers with a surplus employment of 7057; and the Champdani Municipality ranks second with 6973. But the region as a whole accounts for about 29,000 surplus industrial workers. Thus, it is conceived from the table that nearly 50 per cent of the surplus workers are supported by the two first ranking Municipalities, i.e. Bally and Champdani (Map 24-b).

The study of economic base (Aurosseau, 1921; Ullman & Decey, 1960) has immense significance and in practical purposes a host of methods may be adopted to identify the economic bases of the study area. Essentially, this base theory remains a standard and respected element in the repertoire of the economic geographers and regional economists. Because of its relatively simple logic, the economic base concept has found a place in most texts dealing with regional economic system. The use of the theory has accelerated in recent years, because of the widespread use and increasing demand for environmental impact analysis. Applied researchers have utilised the base concept, because it provides them with a fast, simple and inexpensive means of evaluating the existing economic structure and composition of employment in any region.

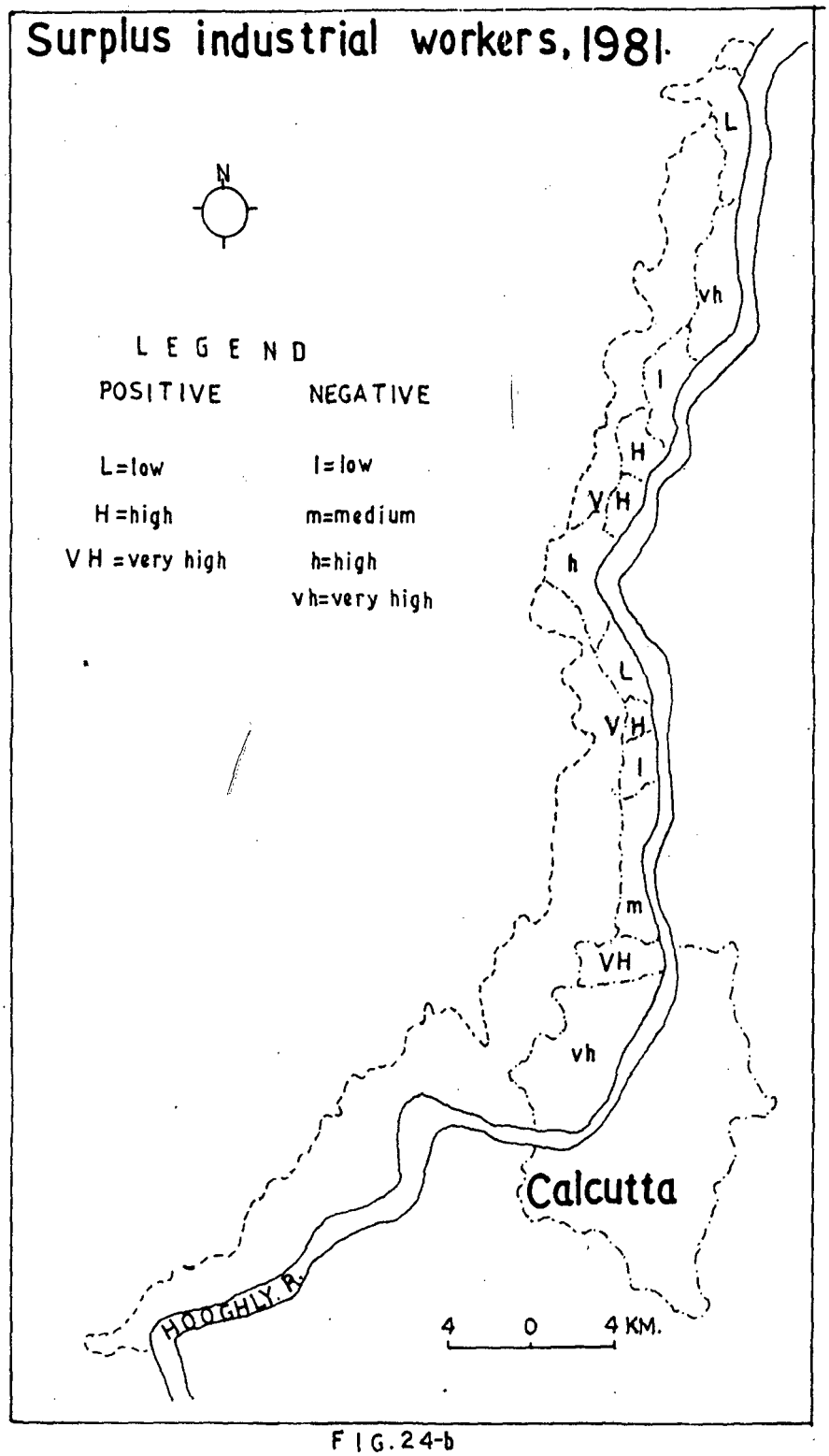

Surplus industrial workers, 1981.
N
LEGEND
POSITIVE
NEGATIVE
L=low
H=high
VH=very high
l=low
m=medium
h=high
vh=very high
L
vh
l
H
VH
h
L
VH
l
m
VH
vh
Calcutta
HOOGHLY R.
4 0 4 KM.

FIG.24-b

In fact, the notion of the economic base model is to identify, either in income or employment terms, that the proportion of activity components existing in a region, i.e. dependent upon area outside the region in question and the proportion, i.e. dependent upon intraregional markets or areas. The former has been referred to variously as basic, autonomous, exogenous or city-forming activity; while the latter, as non-basic, local, endogenous, city-filling and occasionally as residentiary activity. The basic activity is assumed to be the driving mechanism without which the city or region would not prosper. The region derives its major stimuli externally and is seen to grow or decline according to the nature and size of the basic activity. The non-basic, in turn, depends upon the basic sectors. Non-basic functions are, thus "localised". Their nature, structure and size depends upon : (i) the levels of activity in the basic sector; and (ii) the size of the region. Dynamisms in the levels of activity in the basic sector will result in the changes in the non-basic sector. The magnitude of these changes will be determined by the basic-non-basic ratio (B/N ratio) and regional multiplier.

The classical method of determining the B/N ratio was due to Homer Hoyt (1944), who using employment on a national basis, developed a method of comparing the employment pattern of the area under study with that of the region or nation.

Substituting Hoyt's formula, we can write the formula as below :

$$E^b_{ic} = E_{ic} - \frac{P_c}{P_n} \cdot E_{in}, \text{ OR, } e_i - \frac{e_t}{E_t} \cdot E_i \quad \ldots\ldots \quad (6)$$

Where, E^b_{ic} = basic employment in all industries i in city c,

e_i or, E_{ic} = total employment in industrial activities i in the particular city c

E_i or, E_{in} = total employment in industrial activities i in the whole region,

P_c or, e_t = local total employment in all activities,

P_n or, E_t = regional total employment in all activities.

The basic employment in the city is then calculated from the preceding equation by adding all the basic employment in all activity components of economic functions, viz.:

$$E^b_c = \sum_{i=1}^{n=12} E^b_c \quad , \qquad \ldots\ldots \qquad \ldots\ldots \qquad (7)$$

Now, if E^s_c represents the non-basic component of the employment, then the basic-non-basic ratio (B/N ratio) is given by :

$$E^b_{ic} \; / \; E^s_{ic}, \qquad \ldots\ldots \qquad \ldots\ldots \qquad (8)$$

and the accounting identity

$$E^b_{ic} + E^s_{ic} = E^t_n \quad \text{(total of both the basic and non-basic employment)} \quad \ldots \quad (9)$$

holds.

Based on the above formulation and notion, the table 22, has been worked out, representing the B/N ratio (in percentage form) for the years 1961, 1971 and 1981 respectively (Map 25) :

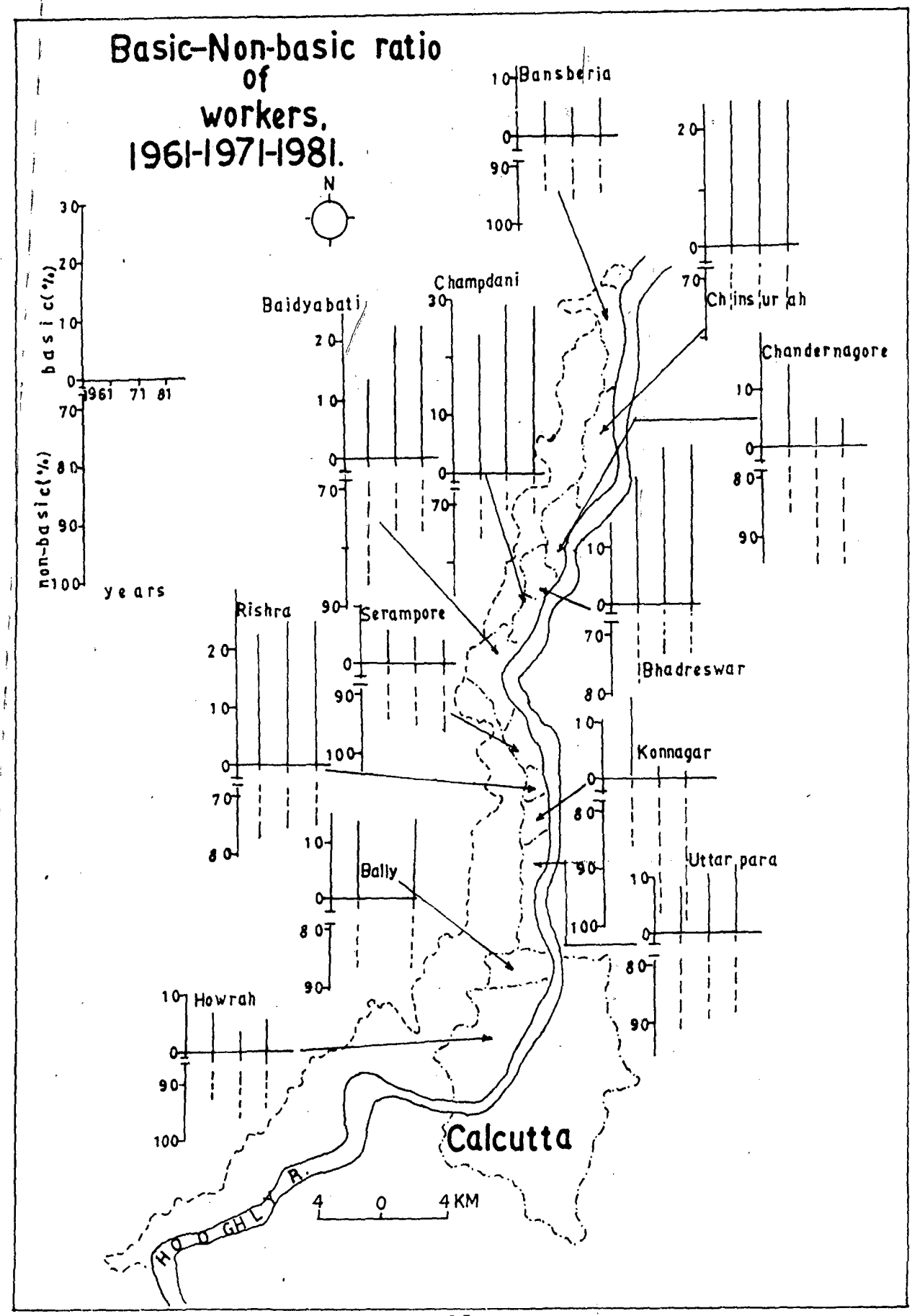
Table 22

Showing the B/N ratio (in percentage form) for the years 1961,1971 and 1981.

Municipality or Municipal Corporation	Census Years		
	1961	1971	1981[b]
1. Howrah M.C.	7:93	4:96*	6:94
2. Bally M	14:86	-	14:86
3. Uttarpara-Kotrung M	9:91	11.89	12:88
4. Konnagar M	14:86	2.98	1:99
5. Rishra M	23:77	25:75	25:75
6. Serampore M	6:94	5:95	4:96
7. Baidyabati M	14:86	23:77	23:77
8. Champdani M	24:76	29:71	29:71
9. Bhadreswar M	22:88	27:73	27:73
10.Chandernagore M.C.	14:86	5:95	5:95
11.Hooghly-Chinsurah M	25:75	25:75	25:75
12.Bansberia M	18.82	16:84	8.92
Total	6:94	5:95	6:94

b = including marginal workers;
M = Municipality; M.C. Municipal Corporation.
* Census operations declassified the town in 1971 census and enumerated taken together with Bally M.

Source : District Census Handbooks - Howrah and Hooghly, 1961-81.


Basic-Non-basic ratio
of
workers,
1961-1971-1981.
N
basic(%)
non-basic(%)
1961 71 81
years
Bansberia
Baidyabati
Champdani
Chinsurah
Chandernagore
Rishra
Serampore
Bhadreswar
Konnagar
Uttarpara
Bally
Howrah
Calcutta
HOOGHLY R.
4 0 4 KM

MAP 25

An alternative approach of B/N ratio is commonly referred to as the "minimum requirement approach" (Ullman and Decey, 1960). It is based on the notion that there is a minimum percentage of the labour force of an urban area, i.e. required in each sector (here applied in the industrial sector) to maintain its viability, and that any employment beyond this minimum called the "excess employment" (Mattila and Thompson, 1955), is the basic component, while the minimum requirement is the non-basic component.

Actually, the minimum requirement technique is the modified form of the location quotient (LQ_i) technique. In order to determine the magnitude of the activity to the economy, an attempt is made to separate out that part of the economic activity which serves only the area itself.

The diagnostic study of economic base of the area shows some rudimentary knowledge of the basic economic structure and composition of the employment. Table 22 shows that the municipalities, viz., Bhadreswar, Champdani, Rishra and Bally have high B/N ratio, indicating self-sufficiency in industrial employment supply. While, the others, viz., Hooghly-Chinsurah, Chandernagore, Konnagar and Howrah show low ratios, because of the preponderance of other types of activities, such as administration, trade and commerce, transport and communication and other services. Amongst the municipalities, Hooghly-Chinsurah Municipality

shows an exceptional feature of high B/N ratio, and this particular case may be interpreted that in Hooghly-Chinsurah the census sector residential population of that locality is engaged in the basic sector of the economy somewhere-else in the region. Similarly, Baidyabati Municipality shows a remarkable high B/N ratio.

The region, as a whole, shows a B/N ratio of 6:94 i.e. only 6 per cent of the total employment are engaged in city-forming activities, while the remaining 94 per cent are engaged in some other type of economic activities which are by nature indigenous in type.

Thus, the area has only 6 per cent of the additional labour force, are engaged in industrial activities. This figure of B/N ratio indicates some kind of imbalances in the development of economic activities. Some localities show high economic relationships between the basic and non-basic sectors, while other areas show low relationships, indicating inequal proportions of B/N employment. Thus, the region requires some sort of readjustments in the basic composition and structure of employment distribution.

Index of Concentration (C_i) has also been worked out to measure the relative concentration of industrial workers in the area under study. It is one of the tools

which indicate the amount of population involved in inter-urban movement to achieve an equitable distribution of population in different municipalities at a given point of time. Hence, this indicates the amount of concentration in a particular area or region at a given point of time. The formula is of the form :

$$C_i = \sum_{i=1}^{n=12} (A) \sim (P)/2, \quad .... \quad .... \quad (10)$$

Where, C_i represents the index of concentration of any study area at a given point of time,

A, represents the area of the each municipality as percentage of the study area.

P, represents the population engaged in industrial activities in each municipality as percentage of the study area.

Following the above device, the index of concentration of industrial population has been computed in the table 23 ,(1961-1981).

Table 23

Concentration of industrial population
(1961 - 1981)

Municipality or Municipal Corporation	Census Years 1961 (A) ~ (P)	1971 (A) ~ (P)	1981 (A) ~ (P)
1. Howrah M.C.	15.72	5.75	2.92
2. Bally M	3.69	-	4.32
3. Uttarpara-Kotrung M	2.93	1.84	1.84
4. Konnagar M	0.36	1.13	0.37
5. Rishra M	3.16	5.74	2.97
6. Serampore M	3.72	3.55	4.45
7. Baidyabati M	5.53	4.91	4.45
8. Champdani M	0.66	3.44	2.86
9. Bhadreswar M	0.69	1.21	0.64
10. Chandernagore M.C.	4.86	2.77	1.93
11. Hooghly-Chinsurah M	10.51	8.15	8.11
12. Bansberia M	2.07	0.89	0.73
Total	53.09	39.38	34.86

Source : District Census Handbooks - Hooghly and Howrah, 1961-1981.

The value of C_i may vary from a fixed minimum of 0.0 to a maximum of 100.00, and they are mathematically independent of the number of divisions, the areal size of the urban area, and the number of inhabitants. A high value of C_i is indicative of an skewed distribution of population, which is manifested in a considerable amount of variability among the territorial divisions as to the population density, but it does not provide a basis for any inference about the absolute levels of density in either the divisions or the urban area as a whole.

Higher the value of C_i, the greater is the imbalance in regional concentration of industrial population. The index, in aggregated form, for the years 1961 and 1971 were 26.54, 19.69 per cent respectively. In 1981, the index has gone down to 17.43 per cent. At present, to achieve uniformity in industrial population distribution in all the municipalities, only 17 per cent of the population will be involved in inter-municipal movement or redistribution. Hence, a very slight imbalances in industrial population distribution is observed. Based on the parameters used, i.e. percentage of area and percentage of industrial population in each municipality, concentration coefficient diagram (Diagram 26) have been constructed to depict the departure of spatial variations of areal quantity and population distribution.

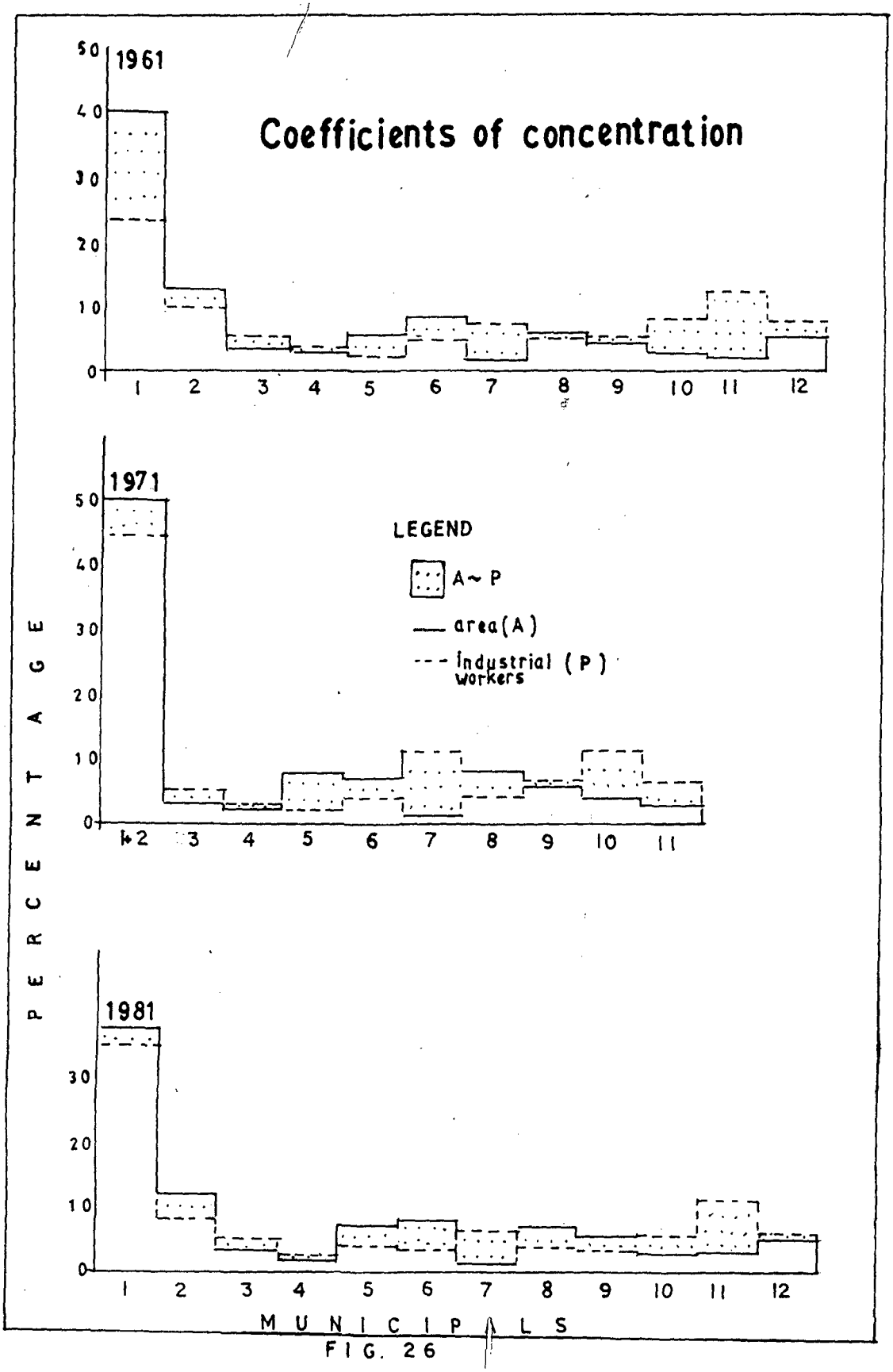

Coefficients of concentration
1961
1971
1981
LEGEND
A~P
area(A)
industrial (P) workers
PERCENTAGE
MUNICIPALS
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12

FIG. 26

While, the term "deconcentration" refers to the process in which the units of observation become more evenly distributed in space. Given two or more C_i values absolute deconcentration (D_a) may be expressed :

$$D_a = C_1-C_2 \ldots\ldots\ldots C_n, \quad \ldots\ldots \quad \ldots\ldots \quad (11)$$

Where, D_a, represents absolute deconcentration of population in between two specified time periods.

C_1, represents the degree to which the population was concentrated at one time (1961),

C_2, represents the condition at a later time,

C_n, represents the condition at the end or terminal period.

This formula expresses the magnitude of deconcentration in absolute terms, but it may be modified to express C_1 as a ratio to C_2 :

$$D_r = C_1/C_2 \ldots\ldots\ldots C_n, \quad \ldots\ldots \quad \ldots\ldots \quad (12)$$

Where, D_r, represents the deconcentration index in ratio term.

The absolute values for D_a ranges between -100.00 and

+100.00 with those above 0.0 (positive) indicating deconcentration and those below 0.0 (negative) indicating concentration. When it is expressed as a ratio (D_r) of C_1 and C_2, values above 1.00 reflect deconcentration and those less than 1.00 reflect concentration.

In absolute sense (D_a), the computed values for the years in between 1961-71 and 1971-81, are 6.85 and 2.26 per cent respectively. While,in the ratio term (D_r) the values are 1.35 and 1.13 per cent for those same years respectively. In both the cases, empiricisms of the indices show very low imbalances and very slight positive skewnessin the distribution of industrial employment in the study area.

From the application and exposition of several sets of methodology and intricate diagnosis of population data, it is obvious that the study area shows or holds a marked industrial development. But it is also observed that the spatial concentration and allocation of industrial activities are not in a state of perfect balance.

Industrial Structure : an analysis of present industrial base

The present study attempts an empirical examination of the traditional descriptive propositions of the modern industrial base. The main attempt is to disentagle the present industrial structure and composition of the area under study. In the main, some of the basic elements of industrial structure are analysed.

In the first set, are the major industries, classified on the basis of entrepreneurships; either the public sectors or the private sectors. In the second set, the industries are classified on the basis of products, in accordance with that of National Industrial Classification. In fine, some deductive examinations have been made on the size distribution and industrial characteristics.

The study represents unique characteristics of industrial structure. Industrial structure of the area is as diverse as the C.M.D. industrial complex. The study area; i.e. the western part of the Calcutta Metropolitan Industrial Complex, is the most important producers of a number of industrial products, like cotton and jute textiles, rubber and rubber products, heavy basic chemicals - both organic and inorganic, metal casting and forging. The area contributes a high proportions of industrial commodities to the metropolitan complex as well as, the State.

The study area, in general, contributes approximately 34 per cent of the total employment engaged in registered factories in the CMD (1982 base). There are approximately 1295 industrial units, having diverse sizes, employing more than 240790 souls in 1982.

The industrial structure of the region have a varitable character with complex mosaic. The major industrial groups like textiles, engineering, chemicals and metal based industries form a very nice spatial setting with their feeder and auxilary industries. The major contributors are the textile groups - both jute and cotton, accounting more than 45 per cent of the total employment in the registered factories. The other important contributors are casting and forging with the sister concerns of engineering items.

The table 24 depicts the employments and units of some specific industries in the area under study :

Table 24

Showing the employments and units of some specific industries in the area under study

Sl. No.	Industrial Groups	Employment in registered factories	Per cent	Units registered	Per cent
1.	Cotton textiles	23270	9.66	78	6.02
2.	Jute textiles	86933	36.10	26	2.01
3.	Wool and silk textiles	6435	2.67	5	0.39
4.	Agro-based industries	3294	1.33	57	4.40
5.	Wood and Wood products	792	0.33	16	1.24
6.	Paper and Paper Products	1877	0.78	7	0.54
7.	Printing and publishing	2990	1.24	8	0.62
8.	Rubber and rubber products	7523	3.12	20	1.54
9.	Heavy basic chemicals	4290	1.78	29	2.24
10.	Glass and ceramics	3034	1.26	10	0.77
11.	Casting and forging	20650	8.57	238	18.38
12.	Manufacturing of structural items	5042	2.09	111	8.57
13.	Manufacturing of structural metals	3766	1.56	20	1.54
14.	Machinery items	1634	0.68	34	2.63
15.	Electrical Engineering	3466	1.44	29	2.24
16.	Ship buildings and repairing	2879	1.19	13	1.00
17.	Manufacturing of locomotives, wagons and motor cars	18735	7.78	29	2.24
18.	Repairs not elsewhere classified	9710	4.03	7	0.54
19.	Power generation*	-	-	-	-
20.	Others	34570	14.36	558	43.09
TOTALS		240790	100.00	1295	100.00

* Separately discussed.
Source : Chief Inspector of Factories, West Bengal, 1982.

The area holds an important position in the total CMD industrial base. In the earlier section, it has already been mentioned that the area contributes more than 34 per cent of the employment to the metropolitan base. The region also represent a high proportion of the industrial units now in operation. The figure is appreciably high, accounting about 22 per cent of the CMD totals.

In disaggregated manner, the industries of the area contribute high proportions in the CMD's industrial panorama. In particular, the textile groups contribute more than 78 per cent of the CMD's totals. The other important contributors are the rubber, heavy basic chemicals, casting-forging and engineering items, accounting 69,48,56 and 30 percentages respectively in employment composition.

In the table (Table 25) a comparison of the employment participation of the region to the CMD has been made (Diagram 27).

Table 25, showing the employment participation in eleven selected industries to the CMD, 1982.

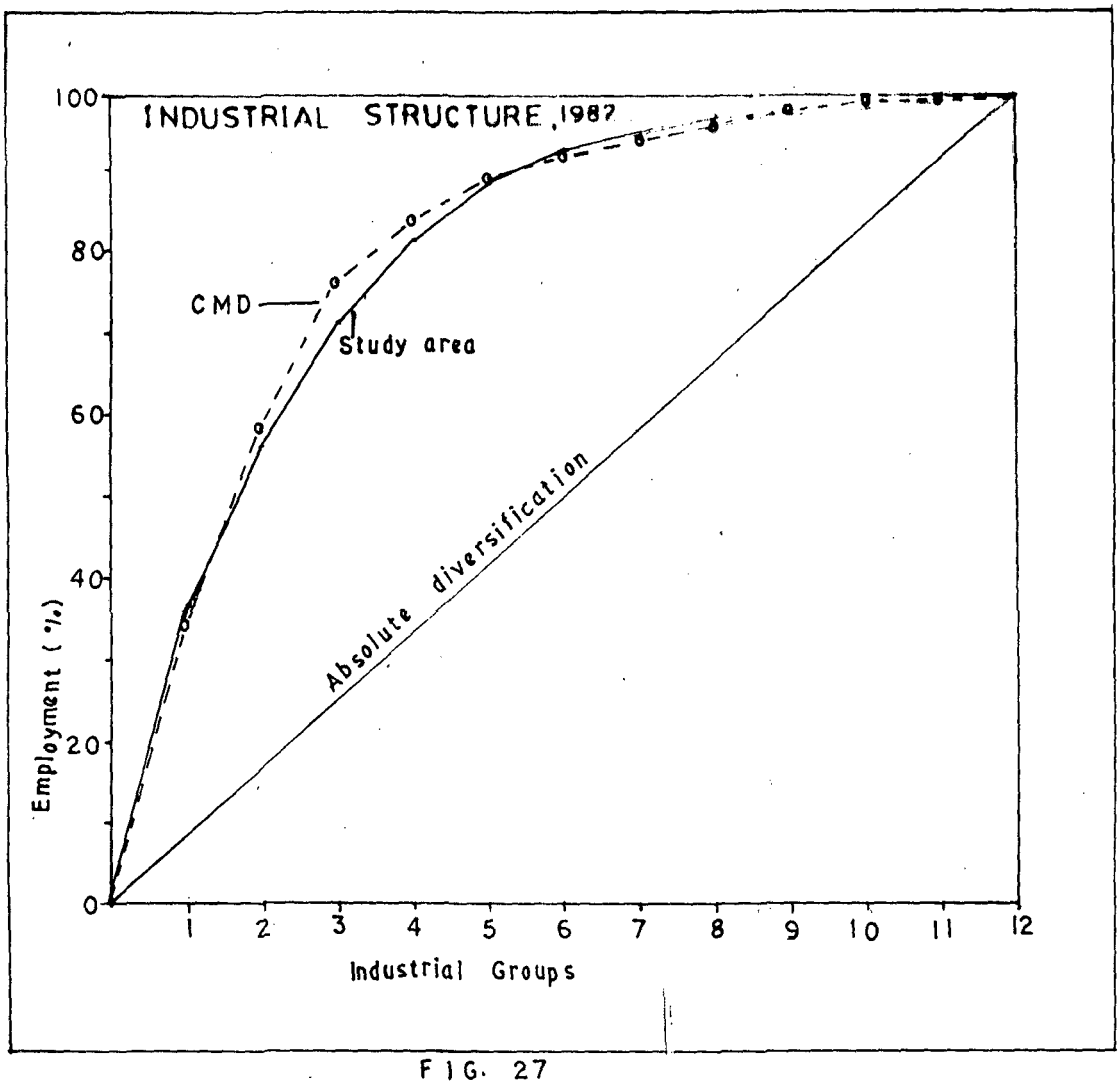

INDUSTRIAL STRUCTURE, 1987
100
80
60
40
20
0
CMD
Study area
Absolute diversification
Employment (%)
1
2
3
4
5
6
7
8
9
10
11
12
Industrial Groups

FIG. 27

Table 25

Showing the employment participation in eleven selected industries to the CMD, 1982.

Sl. No.	Industrial Groups	Average daily employment in the study area in selected industries	Employment participation to the CMD (per cent)
1.	Cotton textiles	23270	43.23
2.	Jute textiles	86933	35.25
3.	Paper and Paper products	1877	17.65
4.	Rubber and rubber products	7523	69.00
5.	Heavy basic chemicals	4290	47.64
6.	Glass and Ceramics	3034	25.82
7.	Casting and forging	20650	56.55
8.	Manufacturing of structural metals	3766	18.97
9.	Ship building and repairing	2879	20.24
10.	Power generation*	1105	32.76
11.	Engineering	37568	30.50
12.	Others	47895	28.21
TOTALS		240790	33.93

* exclusively of public sector.

Source : Chief Inspector of Factories, West Bengal, 1982.

From the organisational points of view, the industries are of two types; public sectors and private sectors. The organisational capacities of both the private and public sectors concerns show disproportionate ratios. The public sectors contributing only 20 per cent of the total labour force employed in registered factories in 1982. Paradoxically, the private sectors contributing more than 80 per cent of the labour force in the region. The public sector undertakings show a markedly narrow ranged industrial base.

In our recent national planning strategies, the planners have invoked the provinces in direct and active coordination and participation in the regional industrial development. This type of policy adoptation in socialistic platform as the national objective, as well as the need for equitable and rapid development, required that all industries of basic and strategic importance, or in the nature of the public utility services, should be managed by the public sectors. Still then, the contribution of the public sectors in the industrial sphere in the area is not at all appreciable. The major contributers in public sector undertakings are textile groups, printing and publishing, structural metal items, ship building and repairing, and power generations, contributing 58, 86, 72, 55, and 100 percentages respectively. But the units and employment ratios are quite very low, and not in harmony with the present industrial situation of the

region. In the recent past, the State's intervention in the area is not undeniable. But, in product-mix the State sector covers a very narrow range of variance. While in the private sector, the employment and units have a well balanced distribution. In some cases, the private sectors contribution are 100 per cent of the commodities produced here. The industrial items worth-mentioning are wool and silk textiles, paper and paper products, heavy basic organic and inorganic chemicals, glass and ceramics produces, manufacturing of structural items and electrical engineering goods. In general, the area have 1265 (more than 98 per cent) private enterprises, giving employment to about 193619; approximately 80 per cent of the total employments engaged in registered factories in the area under considerations. The following tables representing the distribution of employments and units in private and public sector registered factories in 1982 (Diagram 28).

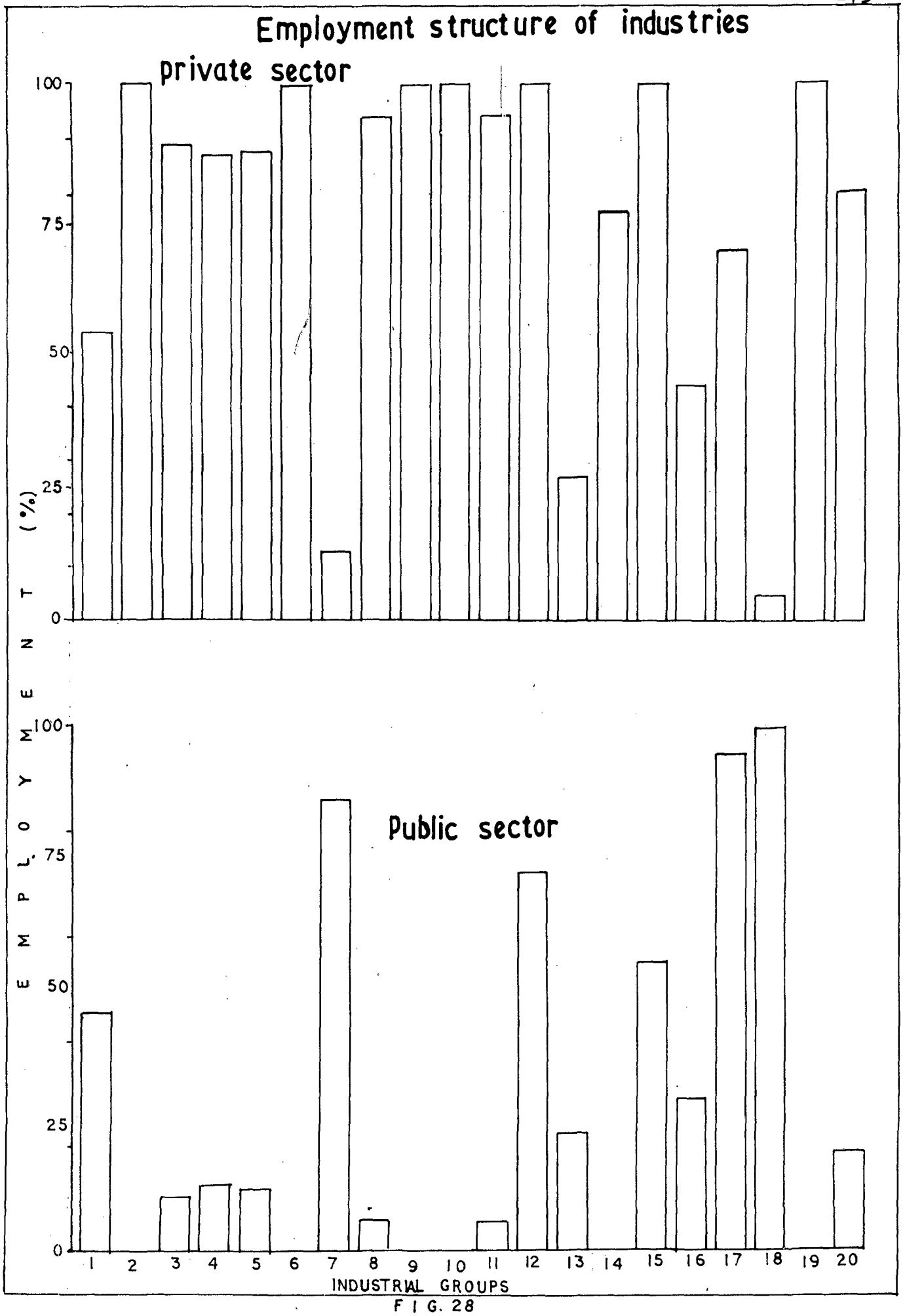

Employment structure of industries
private sector
100
75
50
25
0
EMPLOYMENT (%)
Public sector
100
75
50
25
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
INDUSTRIAL GROUPS

FIG. 28

Table 26(a)

Showing the distribution of employment and units in private sector registered factories, 1982.

Sl. No.	Industrial Groups	Employment	Per cent	Units	Per cent
1.	Cotton textiles	12600	54.15	69	88.46
2.	Wool and silk textiles	6435	100.00	5	100.00
3.	Agro-based industries	2860	89.54	55	96.49
4.	Jute textiles	75739	87.12	24	92.31
5.	Wooden products	696	87.88	15	93.75
6.	Paper and paper products	1877	100.00	7	100.00
7.	Printing and publishing	401	13.41	5	62.50
8.	Rubber and rubber products	7075	94.04	19	95.00
9.	Heavy basic chemicals	4290	100.00	29	100.00
10.	Glass and ceramic products	3034	100.00	10	100.00
11.	Casting and forging	19410	94.00	236	99.16
12.	Manufacturing of structural items	5042	100.00	111	100.00
13.	Manufacturing of structural metals	1039	27.59	18	90.00
14.	Machinery items	1259	77.05	33	97.06
15.	Electrical engineering	3466	100.00	29	100.00
16.	Ship building and repairing	1281	44.49	11	84.62
17.	Manufacturing of locomotives,wagons,motor cars etc.	13177	70.33	27	93.10
18.	Repairs elsewhere not classified	475	4.89	5	71.43
19.	Power generation*	-	-	-	-
20.	Others	34570	100.00	558	100.00
TOTALS	...	193619	80.41	1265	97.68

* Separately discussed in the public sector.

Source : Chief Inspector of Factories, West Bengal, 1982.

Table 26(b)

Showing the distribution of employment and units in public sector registered factories, 1982.

Sl. No.	Industrial Groups	Employment	Per cent	Units	Per cent
1.	Cotton textiles	10670	45.85	9	11.54
2.	Wool and silk textiles	-	-	-	-
3.	Agro-based industries	344	10.45	2	3.51
4.	Jute textiles	11194	12.88	2	7.69
5.	Wooden products	96	12.12	1	6.25
6.	Paper and paper products	-	-	-	-
7.	Printing and publishing	2589	86.59	3	37.50
8.	Rubber and rubber products	448	5.96	1	5.00
9.	Heavy basic chemicals	-	-	-	-
10.	Glass and Ceramics	-	-	-	-
11.	Casting and forging	1240	6.00	2	0.84
12.	Manufacturing of structural items	-	-	-	-
13.	Manufacturing of structural metals	2727	72.41	2	10.00
14.	Machinery items	375	22.95	1	2.94
15.	Electrical Engineering	-	-	-	-
16.	Ship building and repairing	1598	55.51	2	15.38
17.	Manufacturing of locomotives, wagon, motor cars etc.	5558	29.67	2	6.90
18.	Repairs elsewhere not classified	9235	95.11	2	28.57
19.	Power generations	1105	100.00	1	100.00
20.	Others	-	-	-	-
TOTALS	...	47171	19.59	30	2.32

Source : Chief Inspector of Factories, West Bengal, 1982.

The consideration of size is one of the important elements determining the industrial structure and composition. The size of the industrial units of the area under study show a wide variations.

It varies from 5 to more than 8000 average daily employments. The size distribution of the industries are in good correlation with the nature of production of commodities. The average employment size of the industrial units of the area is 195 souls. The table 27, showing some notable characteristics of the employment size distribution of registered factories, 1982 (Diagram 29).

Table 27

Showing some notable characteristics of the employment size distribution of registered factories, 1982.

Employment class size	Frequency	Relative frequency (in per cent)	Propensity of the industries to belong
100 and below 100	1109	85.64	Food processing;cotton weaving; other jute products of diversified nature; wood, paper; printing and publishing; plastic and PVC; heavy basic chemicals; paints & varnishes; medicines, glass; casting and forging; steel structures; machinery; spare parts of vehicles
101 to 500	114	8.80	Food processing; other jute products not elsewhere classified; rope; other jute products of diversified nature;wood; printing and publishing; paper; heavy basic chemicals; glass;medicines; casting and forging; steel structural; machinery etc.

... Contd...

Table 27 (contd.)

Employment class size	Freqnency	Relative frequency (in per cent)	Propensity of the industries to belong
501 to 1000	25	1.93	Cotton spinning and weaving; wood;paper; printing & publishing; medicines; glass; structural items; casting and forging etc.
1001 to 1500	9	0.69	Cotton spinning and weaving; jute spinning and weaving; printing; Heavy basic chemicals; casting and forging; structural metals; machinery etc.
1501 to 2000	7	0.54	-do-
2001 to 2500	6	0.46	Cotton and jute spinning and weaving; Electrical engineering.
2501 to 3000	Nil	Nil	Nil
3001 to 3500	3	0.23	Jute weaving and spinning
3501 to 4000	6	0.46	-do-
4001 to 4500	5	0.39	Jute and cotton weaving.
4501 to 5000	7	0.54	Jute weaving; Railway wagons and accessories etc.
Above 5000	4	0.32	Rubber tyres and tubes; automobiles; carriage and railway wagons.
Totals	1295	100.00	-

Source : Chief Inspector of Factories, West Bengal, 1982.

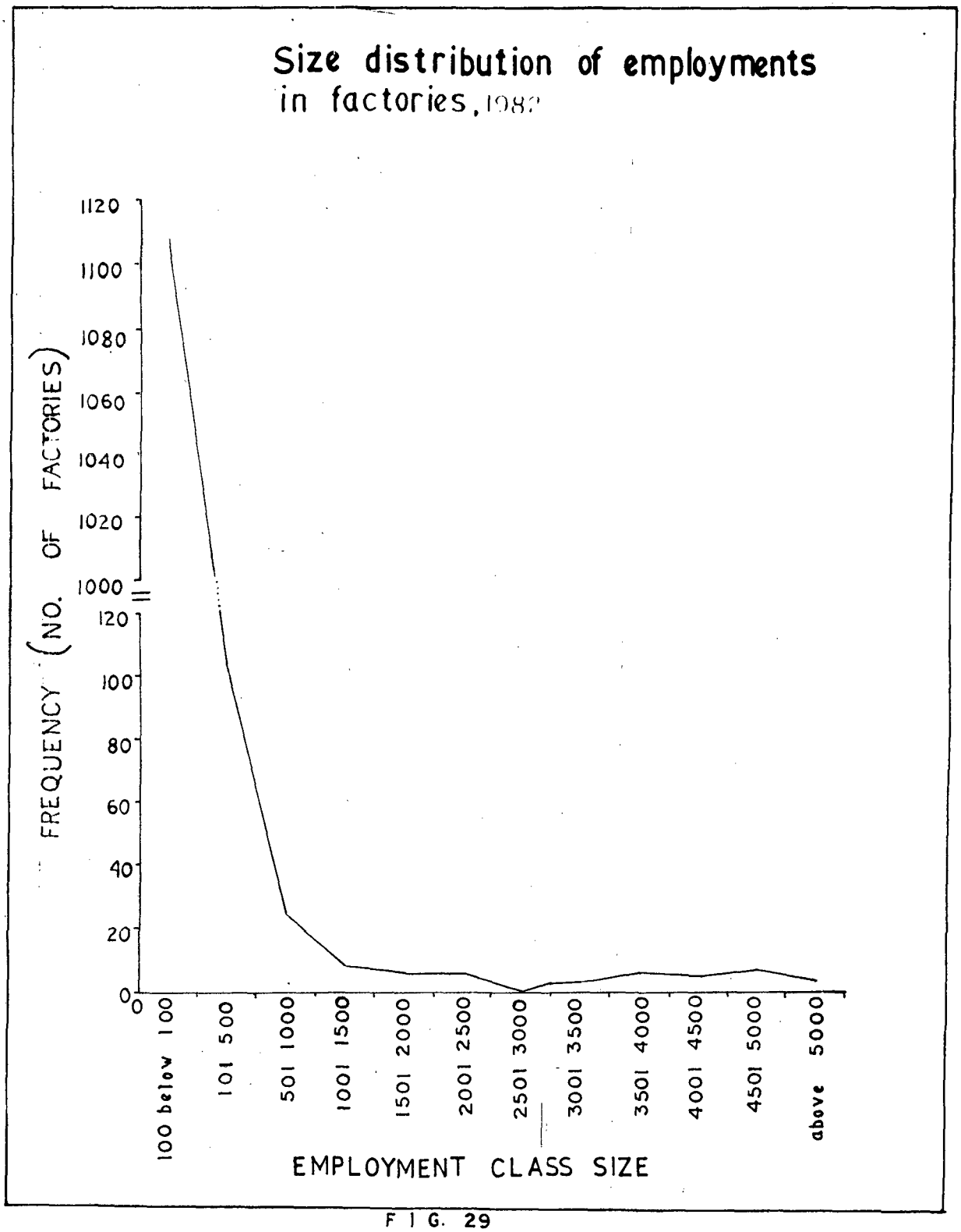

Size distribution of employments
in factories, 1982
FREQUENCY (NO. OF FACTORIES)
1120
1100
1080
1060
1040
1020
1000
120
100
80
60
40
20
0
0
100 below 100
101 500
501 1000
1001 1500
1501 2000
2001 2500
2501 3000
3001 3500
3501 4000
4001 4500
4501 5000
above 5000
EMPLOYMENT CLASS SIZE

FIG. 29

The area represents a very diverse nature of industrial size distribution and industrial characteristics. There are approximately 1109 units with an employment class size of 100 and below 100, representing more than 85 per cent of the units now in operation. In the second class size, i.e. 101 to 500, there are about 114 units. It is observed that the frequency of the units, in general, varies inversely with the class size of the employment. There are only 4 units having employment of above 5000. The product moment correlation coefficient has been instrumented to establish the relationship between class size of the organisation and the units now are in operation. The correlation coefficient is 0.50, indicating a moderate relationship. The hypothesis testing also shows that the relationship is significant at 90 to 95 per cent levels. While, other notable characteristic is that, the employment class sizes have a highly positively skewed distribution. The units with lower employment status are engaged especially in food processing (agro-based), cotton spinning, rope making, wood workings, plastic and P.V.C., other diversified jute commodities. The medium class-sized units are engaged in cotton weaving and spinning, casting and forging, structural metal production, machinery and electrical engineering operations. The high ranged class sized units are specialising in jute weaving and spinning, manufacture of railway wagons and accessories, automobiles

and in the manufacture of rubber and rubber products, especially tyres and tubes of different vehicles.

Thus, the study exposes a very basic enquiries of industrial character. The industrial structure is well diversified in nature as to nature of sizes and product ranges are concerned. The study also reveals that the industrial dynamism is supremely governed by the private sector enterprises with their small operational units. The discussion concludes that the area has an uneven distribution of industrial units and diversified nature of industrial structure and composition. The growth of balanced industrial structure can be accelerated by diversifying the existing industrial patterns, by investing adequate plan outlays, proper and direct State interventions, balanced sectoral and areal planning, setting propulsive industries as well as adequate and regular infrastructural facilities - all these maintaining a balance in ecodevelopment.

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