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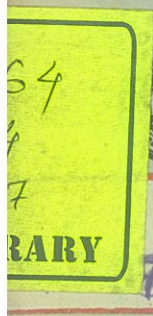
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ASPECTS OF GOODSFLOW IN CALCUTTA METROPOLITAN AREA

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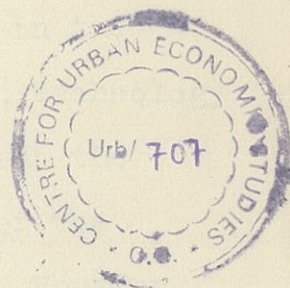


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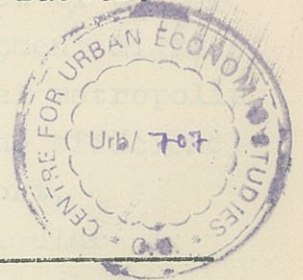


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ABSTRACT

This paper analyses the trend and pattern of goodsflow to and from the Calcutta Metropolitan Area from the perspective of city-hinterland relationship. It has been observed that, over the period 1960-61 to 1980-81 on the whole there was a declining trend of goodsflow in Calcutta. Various factors, including the change in the trade pattern, the changes in the transportation technology and network, consequent weakening of linkages with the hinterland had been identified as responsible for the decline on the basis of commodity-wise analysis. However, at the macro-level the slow and stagnating growth of the hinterland of Calcutta is also a major contributing factor.



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ASPECTS OF GOODS FLOWS IN CALCUTTA METROPOLITAN AREA

Pabitra Giri

I. Introduction

Goods flows to and from a metropolis are related to the production, consumption and distribution activities for which it serves as a centre. While flows connected with consumption and production are determined largely by the growth of the metropolitan economy itself, flows related to the distributive trade depend mainly on factors which are exogenous to the metropolis, e.g., the pattern of development of the transport network in the country, the freight rate policy, inter-regional consumption and production pattern, the pattern of foreign trade, the size and prosperity of the hinterland and its integration with the national market. There is room for conflict between national and regional interest : a transport network, which is efficient from the national point of view or a freight system aimed at balanced regional development might effect a decline in the goods flow in the regional metropolis. Obviously, metropolitan level factors, such as the efficiency of the intra-city transportation system or the port, determines the relative attractiveness of a particular distribution centre vis-a-vis other distribution centres in the country; however, these are more likely to influence the flow of goods indirectly, by influencing the location decisions of the industries. In this context it should be noted that there are important interlinkages between the distributive flows and flows related to consumption and production. The decline of a metropolitan centre adversely affects employment and income in the metropolitan economy, which, in turn, would have an adverse multiplier impact on production and consumption related flows.

The trends and patterns of goods flow in a metropolitan economy provide a good insight into the functioning of the metropolitan economy and its link with its hinterland. It should be admitted, however, that goods flow relates only one aspect of the city-hinterland relationship; the other important aspects, viz., the flow of services and the flow of funds are not considered here.

In a colonial set-up, a metropolitan city, usually a port city, received supply of wage goods and raw materials from the hinterland, which were then exported to the colonising country. On the other hand, the city supplied the manufactured products, usually imported from the colonising country, to the hinterland.¹ The trade was controlled by the traders of the metropolitan city and the city maintained an import surplus (an excess of inflow over outflow) vis-a-vis the hinterland. In the colonial context, development of hinterland would have a direct bearing on the goods flow of the metropolitan city - there would be more of exportable surplus and more imports - and its prosperity.

In the context of post colonial development, however, the possible pattern of city-hinterland relationship should be analysed with care. It may be noted here that the connotation of the term 'hinterland' varies according to context. While 'hinterland' of a metropolitan city refers to the vast backward surrounding of a metropolitan city, 'hinterland' of a port is the inland trade region served by it.² For a port city like Calcutta, both of the two concepts are relevant, but they are not coterminous in terms of geographical area. Further, in the context of development, hinterland, defined by either concept, is

not fixed over time. The opening up of a new port, or a change in transportation arrangement, may lead to a shrinking of the hinterland, at any rate, with respect to some commodities.³ Also, such development of the hinterland may result in direct integration of the area to the national economy bypassing the regional metropolitan city - particularly if the country is vast and the city concerned is situated at a corner of the country with a large hinterland.

The integration of the hinterland with the national market is supported by two related developments. One, is the development of road transport technology, and the other, is the demographic change in the form of the emergence of many small and medium urban centres. Development of road transport brought about flexibility in goods movement which was not possible with the railway transport alone. The road transport linked cities and towns directly with the national market and, consequently, trading links because relatively dispersed, compared to the concentration in the metropolitan cities observed in the colonial period. The development of the hinterland may, thus, result in its direct integration with the national economy and increasing transaction of goods with the extra-regional economy rather than the metropolitan city of the region. In the perspective of national development, the relationship between the growth of the hinterland and goods flow in the metropolitan city is not necessarily a positive one.⁴

A Historical View of Goods Flow in Calcutta

Historically, Calcutta developed as a port city, and become a major centre of colonial trade in British India. During the British period, Calcutta port's hinterland consisted

of undivided Bengal, Bihar, Assam, Orissa, almost the whole of Uttar Pradesh, a part of Madhya Pradesh; Nepal, Bhutan and Sikkim. While in the pre-industrial revolution period Calcutta's hinterland supplied exportables like saltpetre, cotton piece-goods and manufactured silk, after industrial revolution it became primarily a supplier of raw-materials, like indigo and cotton, to the industrialised countries. Subsequently, the growth of cultivation of crops like opium, jute, and tea added new importance to Calcutta's hinterland. In the late nineteenth century, after the introduction of steam navigation and railways, jute and coal industry developed in the region; jute manufactures and coal became important export items of Calcutta port.⁵

The partition of India in 1947 resulted in the loss of a sizeable part of Calcutta's hinterland, comprising mostly of the rich jute-growing districts of East Bengal (now Bangladesh). However, the role of Calcutta, vis-a-vis the rest of its hinterland, remained unchanged. Even in the fifties, Calcutta was a net importer with respect to its hinterland, so far as inland trade by rail and river⁶ and coastal trade⁷ were concerned. Further, when decomposed in terms of raw materials and manufactured goods, Calcutta was seen to be a net importer of raw materials and net exporter of manufactured items.⁸

Calcutta vis-a-vis Other Metropolises of India

The role of Calcutta in the context of the region may be compared with that of the other metropolitan cities of India, viz., Bombay, Madras (both are port cities like Calcutta) and Delhi. Hasim⁹ studied the inter-regional pattern of trade using data on inter-trade block (a state or a port city) goods flows by rail and river, for the period

1950-51 to 1960-61. He grouped the state trade blocks in such a way that within a group states had stronger trade links with each other, than with those outside the group. Calcutta played a leading role in the group which included Assam, West Bengal, Bihar and Orissa. Similarly, Bombay (state) played a leading role for the group consisting of Bombay, Western region and Central region. In contrast to this pattern, in the group consisting of Madras, Southern region and Hyderabad, it was the Southern region, not Madras (state), which played the leading role. Similarly, Punjab, rather than Delhi, had the prime position in the group which included, apart from Punjab and Delhi, Uttar Pradesh and Rajasthan.¹⁰ In fine, Madras and Delhi did not have the same predominance that Calcutta and Bombay had in the trade network of their respective hinterlands.¹¹

Another important aspect, brought out in the Hasim's study, was the nature of linkage of the metropolis with their immediate surrounding areas. While, in the cases of Bombay and Madras, the strongest connections (in terms of volume of exports and imports) were with the immediate hinterland, in the case of Calcutta, it was Assam, and not the rest of West Bengal, which accounted for the highest percentage of Calcutta's imports by rail and river.¹² Though there was a high degree of interdependence between Calcutta and Assam (which is possibly because of the location of Assam) the highest percentage of Calcutta's export went to West Bengal (Table 1). There were also important trade links between Bihar and West Bengal. Calcutta, though lacked advantage in distance (in the sense of proximity to many other regions) because of its location, had the advantage of having a developed and highly diversified economy and, therefore, had more diversified trade connections.¹³

Moreover, it was found that the pattern of trade link was guided most by the distance factor; though the degree of interrelation was influenced by the factors like complementarity and level of development. For Calcutta, a net exporter of manufactured items, the relation between distance and importance of outflow (measured by the correlation between distance rank and rank in terms of importance of outflow) is relatively strong (0.72). But, with respect to inflow, which consisted mostly of bulky raw materials like coal and iron ore, the relationship is weak. Moreover, the relationship between distance and trade flow weakened over time during the period 1950-51 to 1959-60.¹⁴

Apart from Hasim's study, there were two other important studies on the commodity flows in India. The commodity flow study made by Berry¹⁵ in the mid-sixties also indicated the strong connections of the metropolitan centres, viz. Calcutta, Bombay, Delhi and Madras, with their respective regions.

The other important study of goods flow by rail and river was done by Moonis Raza and Yash Agarwal,¹⁶ by using, as we have mentioned elsewhere, point-to-point railway data for 1973-74. The study revealed some interesting features of goods movement to and from the metropolitan cities.

Firstly, the four metropolitan cities showed concentration of goods flow by railway consisting mostly of the long distance bulk movement. The study revealed that, of the 6775 nodes of the railway network, four metropolitan nodes accounted for about 6 per cent of the originating traffic and 14 per cent of the terminating traffic. Calcutta had a major share (30 per cent) of the traffic terminating at the metropolises and Bombay accounted for

more than half of the tonnage originating from the metropolises (Table 2). Higher share of Calcutta in terminating tonnage was due to inflow of bulky high density items like coal, iron, and steel from Bihar and West Bengal. This was evident from the relatively short average distance (598 km.) and relatively high average weight (400 tonnes) of terminating flows in Calcutta (Table 2).

Secondly, each of the four metropolitan cities were net importers of food products, raw material from primary sources, coal and other fuel, and construction materials. The metropolises had a relatively higher share in the terminating flows of these items than in the originating flows. In the case of agricultural inputs and other industrial products, the share of the metropolitan centres was greater in the originating flows than in the terminating flows, except in the case of Delhi, which possibly played a role different from these of the port cities (Table 3). As metropolises were major centres of both production and consumption of manufactured articles, they had relatively large shares in the originating (17 per cent) and terminating (25 per cent) flows of industrial products (Table 3).

It may be pointed out here that goods flow by railway is only a part of the overall goods movement, and goods imported (exported) by railway may be exported (imported) by other modes, particularly by road transport. However, assuming that road transport is used mostly for intra-regional distribution, difference in originating and terminating flows (expressed as percentage of total flows; see Table 4) can be an indicator of trade pattern. Thus, it has been observed that, while Calcutta is a net importer of coal and fuel, Bombay is a net exporter of fuel (mainly petroleum) and agricultural inputs (primarily fertilisers).

Thirdly, another important aspect of goods flow in the metropolitan cities is the nature of their linkage with other urban and rural areas. So far as rail movement is concerned, Calcutta has links with the highest number of nodes - with 3076 nodes by outflows and with 2442 nodes by inflows (Table 2). However, Calcutta's link with rural areas is relatively weak. In the flows of raw materials and industrial products to and from Calcutta, the share of rural areas is less than the average for the four metropolitan cities (Table 5). Calcutta, as also the other metropolitan cities, have stronger links with the Class I cities than with the medium sized and small towns.

Scope of the Present Study

One major limitation, common to these goods flow studies, is that they are all based on the goods flow data by rail and river only. The movement of goods by road transport has not been taken into account. This limitation is more significant for the recent period; because, before the 1960s, the significance of road transport, particularly in long-distance inter-regional trade, was not much; but, thereafter, it has increased considerably because of the improved national highway network.¹⁷ Besides, the studies differ in terms of their framework of analysis and data base. Therefore, it is not possible to infer from them about the trends of the flows over time.

In view of these limitations, we aim, in this paper, to analyse the patterns and trends of goods flow to and from Calcutta, by taking into consideration various modes of transportation, including rail, road and port and, also, the relationship of Calcutta with its hinterland.

The analysis of trends has an added importance, because, since independence, goods flow through Calcutta has been influenced by a number of factors. Firstly, the effect of partition, which not only reduced the hinterland of Calcutta, but also truncated the transportation network in north-eastern India.¹⁸ Further, the water-route through Pakistan was closed after the mid-1960s.¹⁹

Secondly, the structural change since the independence of the country has brought about changes in the pattern of production and trade and has induced the growth of the small and medium-sized towns. This has influenced the goods flow in the existing centres. The penetration of national level traders in the smaller settlements played a significant role in integrating the hinterland to the national market.

Thirdly, many of the bottlenecks in the growth of road transport to and from Calcutta were eliminated during the 1960s.²⁰ For example, the construction of the Farakka barrage established direct road link between Calcutta and the tea growing region of eastern India.

Fourthly, since the mid-sixties, there has been a relative stagnation in the industrial sector in eastern India,²¹ which has also affected the goods flow in the metropolis.

Fifthly, during this period the Calcutta port faced serious problems due to both the bottlenecks constraining the navigability of the Hooghly river and the rapid development of the shipping technology with which the Calcutta Port failed to keep pace.

Lastly, the freight equalisation policy introduced has affected West Bengal industries.²²

Before analysing the trends, it will be worthwhile to have an overview of the goods transport network around Calcutta and an introduction to the various data sources used here.

Goods Transportation Network Around Calcutta

Calcutta has the unique feature of having all types of goods transportation facilities: railway, highway, inland waterway, port and airport. While rail, road and river transport are related primarily to inland cargo,²³ the port and airport deal with both inland and overseas traffic.

Calcutta Port

This riverine port, situated on the east bank of the river Hooghly near the city core is the most important focus of goods movement centreing Calcutta, particularly with respect to the distributive flows of goods. Calcutta port is linked with its hinterland by rail, road and inland waterway. In 1969-70 a major share of the export consignments (62 per cent) come by road, followed by inland waterway (31 per cent) and railway (7 per cent).²⁴ However, as most of the Indian territory is on the west side of the river, the road link between the port and its hinterland is strained by the inadequate crossing facilities on Hooghly. Besides, the road traffic to and from the port suffers from another bottleneck, as it must cross the congested city core area. The other important bottleneck for the Calcutta port, which has already been noted, is the navigability problem of Hooghly river, which has led to the establishment of a subsidiary port at Haldia with a deep water modern dock system, about 104.24 km. downstream on the west bank.²⁵ A sizeable part of goods traffic, both foreign and coastal,

now move through the Haldia dock, particularly, bulky items like coal, salt, fertiliser etc.

Railway

Calcutta is connected with the rest of India by Eastern and South-Eastern railways; the former providing link with upper India, including north-eastern India, and the latter with southern, central and western India. The major commodities handled by eastern railways include coal, coke and patent fuel (constituting about 80 per cent of tonnage in 1974-75), iron and steel (4 per cent) and cement (2 per cent).²⁶ In case of Southeastern railway the major items are coal, coke and patent fuel (43 per cent), iron ore (19 per cent), iron and steel (10 per cent), limestone (4 per cent), cement (3 per cent) and dolomite (3 per cent).²⁷ While these figures are not indicative of the commodity-composition of the railway traffic to and from Calcutta, they indicate, however, the importance of bulky raw materials in the goods traffic carried by these two railways.

Roadway

The road network connecting Calcutta with rest of India consists of National Highway 2 (connecting northern India), National Highway 6 (connecting central and western India), National Highway 34 (which, at Siliguri, connects NH 37, running upto Gauhati, and, thus, provides road link with north-eastern India), and National Highway 35 (connecting Calcutta with Bongaon on Bangladesh border).²⁸ Highway density, measured by highway length per 100 sq. km. area, in West Bengal is 1.78 km/'00 sq. km. which is higher than that in Maharashtra (0.93) and Gujarat (0.71),

and is also above the all-India average (0.95).²⁹ However, till the early seventies, the highway network had a number of deficiencies in terms of missing links and bridges, absence of double lanes and inadequate pavement thickness (with respect to heavy duty trucks), which impeded the growth of goods transportation by road.³⁰

Inland Waterways

Inland water transport is the cheapest mode for bulky low-valued traffic, both over long and short distance, provided the points of origin and destination are located on water front, and no transshipment is involved.³¹ Calcutta is situated on the most important inland water transport route in the country, namely, Hooghly-Bhagirathi-Ganga, which runs from Calcutta to Patna in Bihar and has been recently declared as a National Waterway.³² Besides, Hooghly-Brahmaputra network provides an important channel for goods flow between Calcutta and Assam and some parts of Bangladesh. In the early 1960s, water transport carried a substantial percentage of traffic between Calcutta and Assam in both directions; however, traffic in this route came to a halt after the Indo-Pak conflict in 1965. After the independence of Bangladesh, there has been a revival of the route in recent years.³³

Air Port

Calcutta airport situated 20 km. away from the city, handles both inland and international goods traffic.³⁴ As expected, the volume of air-borne trade is small relative to the flows by other modes of transportation. The air-borne trade through Calcutta (Dum Dum) airport has assumed importance in internal trade because of inadequate road and rail communication in the north-eastern frontier areas.

The sources of goods flow data for these modes are discussed below.

Data Source and the Limitations

Since goods flow data for various modes of transport are obtained from separate sources, we should first examine the coverage and limitations of these data before using them.

To consider the railway transport first, the source of data is the Accounts of Inland (Rail and River Borne) Trade of India.³⁵ It provides inter-trade block (usually a state or an important port) goods movement data by the railways and two navigation companies operating in the river routes between Calcutta and Assam.³⁶ In case the state is a trade-block, intra-state goods flow data are not available. However, Calcutta and the rest of West Bengal being treated as two separate trade blocks,³⁷ we are fortunate to have data on goods movement between Calcutta and rest of West Bengal. But this is only a part, though possibly the major part, of the intra-state goods flow; and we do not get data, for example, about movement of goods between Durgapur and Haldia. Railway and river data published in the Accounts of Inland Trade report a selected number of commodity groups which are important at the aggregate level; hence, it is not unlikely that a locally important commodity might be omitted.³⁸ So far as river traffic is concerned, the goods carried by the country boats are not included. Another important limitation of the inland trade data is the absence of value figures.

Coming to road transport, it may be noted that though in terms of total goods traffic the importance of road transport is next to railway, there is no systematic

collection of data on goods movement by road transport, which is predominantly in the private sector.³⁹ Whatever meagre data exist, are obtained through various surveys, namely,

- (i) road survey conducted by the Committee on Transport Policy and Coordination (1959);
- (ii) road survey conducted by the Ministry of Transport (1963);
- (iii) road survey by Calcutta Metropolitan Planning Organisation, Government of West Bengal (1965);
- (iv) Goods Transportation Survey on National Highways in Calcutta Metropolitan District by Calcutta Metropolitan Planning Organisation (1974); and
- (v) road survey by Rail India Techno-economic Services (RITES) (1978-79).

As these surveys differ in their scope and purpose, as well as in survey method,⁴⁰ the data obtained are neither comprehensive nor strictly comparable. Nevertheless, we have put together these data to see what come out of them. Of these surveys, one done by the Calcutta Metropolitan Planning Organisation for the Calcutta Metropolitan Area, during 1973-74, provides some useful information about the role of road transportation in the Calcutta Metropolis. The survey by the Rail India Techno-Economic Services (RITES), during 1977-78, provides inter-state goods movement data for several major cities of India.

So far as coastal trade is concerned, the data are obtained from the Statistics of Coasting Trade of India.⁴¹ The coastal goods flow data are available by 'meritime blocks', of which West Bengal, consisting of Calcutta and Haldia port, is one. Inter-block flows are

reported commodity-wise, both in value terms as also in quantities for some items. Apart from these sources, we have used various government publications to collect data on port and airport.

The outline of the study in this paper is as follows. In section II, we will discuss trends and patterns of goods flow in Calcutta, with particular reference to inter-regional trade and also the changing relationship of Calcutta and eastern India in terms of goods flow. In section III we will analyse the causes of change in the movement pattern of some important commodities like, coal, iron and steel, jute, tea, foodgrains, etc., which account for the major share of the goods flow to and from Calcutta. In view of the growing importance of the road transport, in section IV, we will discuss the problems relating to intra-city goods movement. In the concluding section (V), the implications of the trends of goods flow will be discussed.

II. Trends and Patterns of Goods Flow in Calcutta

Goods flows measure movement of goods classified by origin and destination. Since a part of the goods which enter the metropolitan area is reexported, the sum total of all flows is greater than the actual amount of goods transacted. Besides, in goods flow analysis, the origin-destination of the flows and the modes of transportation used are as important as the volume of flows. Goods flow may be measured on the weight basis as well as on the value basis. Although flows measured in value terms are amenable to wider interpretation of resource flow, here we would analyse flows on weight basis.⁴²

Patterns of Goods Flow

Before we discuss the trends in goods flow centering Calcutta, it would be useful to have an overall view of goods flow movement in the city. For this we consider the year 1973-74, for which data for all the modes of transportation are available.

In 1973-74, the flow of goods by all modes of transportation was about 23.3 million tonnes, of which 60 per cent was inward flows. The road transport accounted for the largest share, about 10.9 million tonnes, or, about 47 per cent. Rail and river carried 6 million tonnes (26 per cent), while Calcutta Port handled 1.8 million tonnes (8 per cent) of coastal cargo and 4.5 million tonnes of overseas cargo (19 per cent). Calcutta airport handled only a small amount of goods flow; about 10.8 thousand tonnes of inland cargo and 6.6 thousand tonnes of foreign cargo (Table 6).

While in the overall goods flow road transport plays an important role, the relative share of the various modes of transport is not symmetric with respect to inflow and outflow. Calcutta, as we will see below, is a net importer of raw materials and food items; the inflows are carried mainly by railways (37 per cent) and roads (also 35 per cent). In the case of outward flows, the share of road transportation was about 64 per cent and that of the port was the second highest, 26 per cent, with railways as the poor third.

To consider the breakdown of the aggregate flow by various streams of flows, namely, intra-state, inter-state, and overseas flows, we see that the share of inter-state flows is the largest, about 50 per cent, while

the intra-state flows accounts for about 30 per cent and overseas flow for the remaining 20 per cent. The pattern is more or less the same for both the inflows and outflows.

Since road transport has cost advantage over railways for short distance (upto 300 miles) for almost all the commodities, in the intra-state goods flow - for inflow as well as outflow - road transport was most important. In the inter-state flows, the share of road transport in the outward flows consisting primarily of the manufactured items is much higher than that of railways; however, in the inward flows, consisting mostly of raw material and foodgrains, (Table 14) the share of railway is higher. In fact, about 84 per cent of the goods flow by railway consisted of inward flows compared to 45 per cent in the case of roadways (Table 7).

To analyse the product composition of the goods flow we consider the following broad commodity groups : foodgrains, other food products, raw materials, iron and steel, coal and coke (including other minerals), petroleum and petroleum products and manufactured non-food items. It could be observed from Table 8, which shows flows relating to inland trade by rail, river, road and coastal shipping, that Calcutta is a net importer of food-grains and other food products. Railways and coastal shipping together play an important role in bringing in food items, particularly food grains. Roadways also carry foodgrains, but, mostly, within the region, and the net inflow by road is not very significant.

The predominance of Calcutta as a manufacturing centre is evident from the fact that Calcutta is a net importer of raw materials, including iron and steel, coal and coke, but a net exporter of manufactured (non-food)

products. Further, with respect to iron and steel and coal, Calcutta is a net importer by rail and road flows, but net exporter by coastal flows.

As regards petroleum and petroleum products, upto the early 1970s most of the items came to Calcutta either from foreign countries by way of overseas shipping, or from Assam by railway and then distributed to various parts of the eastern region either by rail or by road. Therefore, in the context of inland trade, Calcutta appears as a net exporter of petroleum and petroleum products, although, in overall terms, Calcutta was a net importer.

While net import figures are useful to characterise Calcutta's position as a centre of consumption and production, these however do not provide any idea about its role as a centre of distribution. The ratio of twice the outflow to total flow (taking into account all modes of transportation), for the commodity or commodity group which is not produced in Calcutta or stocked over the year, can be used as an indicator of the importance of distributive flows in the total flows. From Table 9 we see that in 1960-61 the role of Calcutta as a distributive centre was quite significant with respect to commodities like, coal, wheat, iron and steel and salt.

Trends in Goods Flow

Coming to the analysis of trends, it can be observed from Table 10 that the goods flow to and from Calcutta have suffered a relative stagnation compared to the all-India trends. Thus, the share of Calcutta in rail and river borne inland trade (computed as a ratio

of the sum of inward flows and outward flows to and from Calcutta to twice the all-India inter-state consignments by rail-and-river) had declined during the period from 1950-51 to 1980-81 (Table 11). The share of the Calcutta port in the overseas cargo declined steadily.⁴³ In fact, from the sixties onwards, overseas exports through Calcutta port has declined steadily while overseas import, largely oil import through Haldia, has increased. Further, during the sixties and seventies, goods flow by coastal shipping (both inflow and outflow) dropped in absolute terms. The improvement observed in the early eighties is partly due to the movement of coal through Haldia.⁴⁴ In terms of volume, goods flow through Calcutta airport was small; and its share in all-India air cargo traffic, also diminished over time.

Road transport appears to be an exception to this declining trend; available evidence (Table 12) indicate that goods flow to and from Calcutta by road had increased over time. In the early sixties, goods movement on the highways connecting Calcutta increased at a faster rate than that on many other highways. However, nothing can be said about the relative share of Calcutta in the all-India goods movement by road for the subsequent period, because of non-availability of data.

From Table 13 it could be seen that the goods movement by railway declined heavily so far as intra-state movement is concerned: from about 4 million tonnes in 1960-61 to only 0.7 million tonnes in 1980-81. However, whether intra-state goods movement to and from Calcutta has declined over time can not be asserted in the absence of firm data on the intra-state goods flow to and from Calcutta by road. From Table 14 it can be observed that

while between 1960-61 and 1973-74 the volume of interstate flow increased slowly from 11.2 million tonnes to about 11.8 million tonnes, it increased to 14 million tonnes in 1980-81. While the flow by road increased from 3.3 million tonnes in 1960-61 to 6.7 million tonnes in 1980-81, goods movement by railway and coastal shipping declined. In the case of railway the outflow declined sharply, mainly because of the discontinuation of wheat import. This is evident from the commodity composition of inflow and outflow by rail and river (Table 15). While the outflow of manufactured items increased, those of all other items, including food articles, raw materials, iron and steel, and coal and coke, declined. While the inflow of food grains had increased substantially, that of coal and coke had decreased, primarily because the railway stopped moving coal by rail-cum-sea route via Calcutta port. This also affected the volume of coastal movement of goods. Some of these factors will be discussed in detail in the course of commodity-specific analysis.

At present let us now consider the nature of goods flow between Calcutta and eastern India.

Calcutta City's Trade with Eastern India

Table 16 shows the share of the eastern region states in inward and outward flow of goods to and from Calcutta by rail and river, which are mostly long-distance flows. It can be observed that, in the early 1950s, Eastern region's share in Calcutta's goods flow was more than 80 per cent, indicating a strong link. However, over time, this share has declined. In 1980-81, the share of eastern region states was 21 per cent in the inward flows and 48 per cent in the outward flows.

So far as goods flow by road is concerned, in 1973-74, the share of the eastern region states other than West Bengal (viz., Assam, Tripura, Bihar, Orissa, and Uttar Pradesh) was 42 per cent of the total flows to and from Calcutta; while that of West Bengal was 46 per cent and the rest of India and Nepal accounted for another 12 per cent (Table 17). Furthermore, the commodity flow study by RITES in 1978-79 shows that in the outward flows from Calcutta to some eastern India cities the highway flows are more than eight times higher than the railway flows (Table 18). The predominance of West Bengal and the eastern region states in the goods flow by road is quite expected since road transport is the cheaper mode (taking into account both operation and user costs) for most of the commodities over shorter distance. It may be mentioned here that the coastal movement of goods does not involve the eastern region states.

So far we have seen the importance of eastern region in the goods flow of Calcutta; and, now we examine how Calcutta is placed in relation to the goods flow to and from the eastern region states. Table 19 shows the share of Calcutta in the inward and outward consignments of the major states in eastern India, namely Assam, Bihar, Orissa, Uttar Pradesh and Tripura, by rail and river. It could be observed that, excepting the case of Assam, the shares of Calcutta were not very impressive. Taking Assam, Bihar, Orissa, Uttar Pradesh, Tripura and West Bengal (excluding Calcutta) together, the share of Calcutta in the total goods flow to and from these states, by rail and river, was only 15.6 per cent in 1950-51, which came down to mere 2 per cent in 1980-81. To consider the records in the cases of individual states, in 1950-51, Calcutta's share was highest with respect to the inward

and outward consignments of Assam (83 per cent and 72 per cent respectively). The next highest share was with respect to West Bengal : for outward consignments it was 51 per cent, and, for inward consignments, 12 per cent. Further, the dominating position that Calcutta had with respect to goods movement to and from Assam, declined sharply over time. In 1980-81, the largest share of Calcutta in the outward flows - 6.5 per cent - was with respect to West Bengal and that in respect of inward flows was 2 per cent in case of Bihar.

The declining share of Calcutta may be contrasted with the rising share of West Bengal (excluding Calcutta) with the states of eastern region. Table 20 shows the share of the rest of West Bengal in the rail and river borne trade of the eastern region states. While, in 1950-51, West Bengal accounted for 23 per cent of railway goods movement of eastern region states, by 1980-81 the share increased to 26 per cent. Moreover, West Bengal's share in the rail and river borne goods flow of Calcutta had declined; which is only partly due to the switch over of goods traffic from rail to road transport.

To sum up, the goods flow by railways indicates an weakening of the link between Calcutta and the eastern region. However, in view of the paucity of data on goods flow by road, we can not make any firm inference about the change in the linkage between Calcutta and its hinterland. Moreover, the link between the rest of West Bengal and the eastern India had improved mainly due to the growth of Asansol-Durgapur industrial belt and the Haldia port complex.

While changes in the goods flow outlined above are the outcome of the combined influences of various factors, it is the railway freight policy, particularly the freight equalisation scheme, which has been a major determining influence - both direct and indirect - on the goods flow. Since this is not the place for a detailed analysis of the policy, we make a brief review of it below.

Freight Equalisation Policy

Freight equalisation scheme was introduced in 1956 for iron and steel and then, subsequently, it was extended to cover cement, nitrogenous fertiliser and petroleum products.⁴⁵ Under this scheme, for the selected commodity freight is charged on the traffic, irrespective of distance travelled, at an uniform rate which is equal to the freight for the average lead distance of the commodity under consideration.⁴⁶ Freight equalisation equated freight at various railheads only; the scheme does not cover the road transportation cost, except for the North-Eastern region and Jammu and Kashmir where no railhead exists.⁴⁷ Apart from the freight equalisation scheme for the commodities mentioned above, a partial freight equalisation has been introduced through the adoption of telescopic structure of railway freight for all commodities, since 1948.⁴⁸ Under the telescopic freight structure the short distance traffic subsidises the long distance traffic. The telescopic scale is more pronounced for coal than for other commodities. In 1955 a better taper of the telescopic scale had been offered by upward adjustment of the short distance (below 300 miles) freight and downward adjustment of long distance (600 miles and above) freight.⁴⁹

So far as the direct impact of the freight equalisation and telescopic freight scale is concerned, it will be seen from the commoditywise analysis given below, that, because of these policies for many of the commodities like salt, coal, iron and steel direct rail movement become cheaper compared to rail-cum-sea movement via Calcutta port. Consequently the movement of these goods through Calcutta has also declined.

However, more crucial has been the indirect effects of these policies on the goods flow as these adversely influence the industrial growth of West Bengal. The impact of freight equalisation on industrial location is of two sorts : When freight equalisation is for intermediate products like iron and steel, it leads to the dispersal of the user industries; but when it is for finished and semi-finished products (such as cement) the industry moves closer to the raw-material sources.⁵⁰ One important factor behind the early concentration of engineering industry in and around Calcutta was the city's proximity to the iron and steel belt. The equalisation of freight for iron and steel robbed the industry in West Bengal of its locational advantage. The freight cost of iron and steel, the essential raw material, increased for the industries located in West Bengal while the same has been subsidised at distant locations like Maharashtra.⁵¹ Further, as we have noted above, the freight equalisation scheme covers only the railway freight. If road transportation is involved, which is the case with many small scale industries in and around Calcutta, the transport cost per tonne of raw material would be higher even at a small distance than at a very long distance with direct rail connection. The increased freight cost on raw material

account has put the existing units in Calcutta at a further disadvantage because their machines are relatively old. Since the mid 1960s the engineering industry in West Bengal suffered a relative decline which has had a multiplier effect on the economy of West Bengal. Moreover, the increased incidence of freight because of the freight equalisation and telescopic rate policy reflects an implicit drain of the resources from the West Bengal economy.

The differential railway freight rates, which are mainly based on commercial principles and differences in cost of transportation,⁵² also put the industries in West Bengal under relative disadvantage vis-a-vis the industries outside. While a raw material like coal, which is exported from West Bengal, has lower and pronouncedly telescopic freight rate, the raw materials imported into West Bengal, like raw rubber, industrial salt, are charged a relatively higher freight rate.⁵³ Therefore, industries located outside West Bengal but dependent on raw materials from West Bengal have to bear less transport charges whereas industries in West Bengal dependent on the raw material from outside have to pay more transport charges for obtaining their raw material. Moreover, it implies that industries requiring raw-material from West Bengal would not find it as much disadvantageous to locate outside West Bengal as industries dependent on the raw material from elsewhere to locate within West Bengal.

In the following section we will discuss the changing pattern of movement of some individual commodities which had significant weights in the total flows to and from Calcutta.

III. Commodity-wise Analysis

Till the early 1960s, the flow of goods to and from Calcutta, particularly the inter-state movements, were by rail and river and coastal and overseas shipping. Furthermore, goods movement through the Calcutta port was interrelated with goods movement by rail and river. Thus, coal despatched by coastal shipping from the Calcutta port was brought to the port by the railways. If we consider the commodity composition of rail and river traffic in 1960-61, in the total inflow (of about 6.8 million tonnes) the important items were coal and coke (55 per cent) iron and steel (8 per cent), rice (6.1 per cent), cement (3.8 per cent) and raw jute (3.3 per cent) while the major items in the total outflow (of 2.2 million tonnes) included wheat (33 per cent), iron and steel (26 per cent) coal and coke (8 per cent), rice (8 per cent), salt (6 per cent), gunny bags (3 per cent) and tea (2 per cent) (See Table 21). To go by absolute amounts, there had been decline in both inflow and outflow of coal, and iron and steel, in outflow of wheat, salt, and kerosene (Table 22). In this section, we take a closer look at some of these goods to illustrate how various factors, including technological development, changes in domestic production and foreign trade and government policies affected the good flow in Calcutta. Commodities considered are : wheat, tea (a major export item), coal, iron and steel, petroleum products, raw jute, jute manufactures, and salt.

Wheat

Calcutta is a net importer of foodgrains. While with respect to rice and pulses the pattern of flows is more or less unchanged over time, for wheat, the most important item in the foodgrain movement in the early 1960s,

the pattern changed dramatically. During 1960-61, to consider the inland flow by rail, Calcutta was a net exporter of wheat, but, by 1973-74, it became a net importer. This change in wheat movement from Calcutta was a reflection of the change in the domestic production of wheat. In the early sixties, the eastern region states, including Uttar Pradesh, were deficit states in foodgrain production and, at the all-India level, food supply was inadequate.⁵⁴ Wheat was therefore, imported and the Calcutta port was the entry point for the overseas wheat imported for eastern India. A part of the imported wheat was required to meet the demand of Calcutta, while the rest was despatched by rail to Assam, Bihar, Orissa and eastern Uttar Pradesh.

By the early 1970s, as a result of the introduction of the 'green revolution' technology, the country as a whole became self-sufficient in food, and the import of wheat from abroad almost stopped. Wheat is now despatched directly to different deficit states from the surplus producing states, namely, Punjab, Haryana and Andhra Pradesh. This has been possible, further, because the Food Corporation of India, entrusted with the inter-state movement of foodgrains, has built adequate storage facilities in each state.⁵⁵ Therefore, Calcutta has ceased to be a centre of the distribution of wheat; and, as a consequence, both the inflow and the outflow of wheat have significantly dropped. Inflow of wheat to Calcutta now consists of primarily the consumption requirement of the metropolis and that of the Andaman and Nicobar Island, which is despatched from Calcutta port by way of coastal shipping.

Tea

Calcutta is the major distribution centre for tea. The north-eastern India, the major tea producing area of the country, accounting for more than 75 per cent of all India tea output,⁵⁶ constituted a significant part of the hinterland of the Calcutta port. Even in the late 1960s, about 55 per cent of the tea output was exported.⁵⁷ Moreover, Calcutta was the most important centre of auction of the tea produced in north-eastern India.

Till the early 1960s, tea from Assam and Tripura was despatched to Calcutta primarily by the river-route through East Pakistan.⁵⁸ During 1963-64, river route carried 56 per cent of tea from Assam, rail-cum-river route 24 per cent and all-rail route through India another 13 per cent. Only a small proportion of tea output was despatched by road (5 per cent) and by air (2 per cent).⁵⁹ Tea from North Bengal was despatched largely by rail (71 per cent) and only 8.5 per cent by road.⁶⁰

From Calcutta, tea is exported through Calcutta port, as coastal or a overseas cargo, or sent to other parts of the country by rail and road. Over time, the share of domestic consumption in total output has increased. Further, the share of ex-garden sale, as against the sale through auction, has increased. The ex-garden sales are now directly routed to the purchaser, bypassing Calcutta. Besides, tea exports to West Asia are often routed through the Bombay port. Further, as a result of the opening of new auction centres Gauhati and Siliguri, tea from the smaller gardens are not sent to the Calcutta auction any more.⁶¹ A part of the containerised tea traffic is handled at the Haldia port and therefore, does not move through Calcutta. All these factors have contributed to the relative

stagnation of tea movement through Calcutta in recent years. If we go by rail-cum-river data, inflow of tea to Calcutta dropped from 165 thousand tonnes in 1960-61 to 51 thousand tonnes in 1973-74, and then to a mere one thousand tonnes in 1980-81. One explanation for this decline is, however, the switch over of tea traffic from rail to road transport. During this period, the outflow by rail remained steady around 34 thousand tonnes (Table 22).

Coal

Coal constituted 55 per cent of inflow to, and about 8 per cent of outflow from, Calcutta by rail and river in 1960-61. By 1980-81, the share of coal dropped sharply, accounting for only 28 per cent of inflow and about 1 per cent of outflow. In the early 1960s, coal was brought to Calcutta primarily by rail from Bihar and West Bengal, and then despatched to Assam and Uttar Pradesh, and various destinations within West Bengal, by rail and river, to southern and western India by way of coastal trade and exported through the port to East Asian countries including Japan and Burma.⁶²

Over time, the pattern of coal movement changed, partly due to changes in interregional production pattern and, more importantly, due to changes in final use and interregional transportation arrangements. In the early 1960s, Bihar and West Bengal together accounted for about 80 per cent of coal production, while by 1981 the share dropped to 58 per cent, as coal production increased substantially in Madhya Pradesh, Andhra Pradesh and Maharashtra.⁶³

Further, there were important changes in Coal consumption. Increasing dieselisation of railway engines and electrification reduced coal consumption by railway; and electricity substituted coal as a source of power in the industries and public utility installations.⁶⁴ The most immediate reason for the decline in coal movement through Calcutta is the change in the transport arrangements for coal. In the 1960s, the requirement of coal by southern railways was met by the rail-sea route via Calcutta. With the increase in the rail-capacity, railway coal is now carried by all the rail routes, directly from the eastern region coal-fields.⁶⁵ Besides, for coal movement to the south and west coast the rail-cum-sea route through Calcutta port is costlier than all-rail-route,⁶⁶ which was partly due to the telescopic freight structure of railway for carrying coal.⁶⁷ The navigability problems of Calcutta port is an added disadvantage. The opening up of the Haldia dock which does not suffer from the navigational limitations of Calcutta port, however, makes rail-cum-sea route cost effective to carry coal from eastern region to Madras, Tuticorin, Kandla, and Goa.⁶⁸ Presently coal required for power plants in Tamilnadu is despatched through Haldia.⁶⁹

Iron and Steel

While the share of iron and steel in the total goods movement through Calcutta by railway has increased, from 12.2 per cent in 1960-61 to 24 per cent in 1973-74, the absolute quantity of iron and steel traffic has declined; from 1.1 million tonnes in 1960-61 to 0.8 million tonnes in 1980-81. Further, if we consider all-India movement of iron and steel products, we note that the share of Calcutta has dropped : from 15 per cent in 1960-61 to only 6 per cent in 1980-81 (Table 11).

The movement of iron and steel depends on the location of the major steel plants, their product composition, location of user industries like rerolling and fabricating units, the stockyard facilities for small consumers and the location of the final users. The metropolitan city of Calcutta is located close to the steel producing belt, comprising of major steel plants at Burnpur and Durgapur in West Bengal, at Jamshedpur in Bihar, at Rourkela in Orissa and at Bhilai in Madhya Pradesh. Calcutta has a sizeable concentration of rerolling industries and foundries which use pig iron for manufacturing cast iron products. Besides, there are many light and heavy engineering units, including wagon and ship-building units, which use rolled steel of different varieties.⁷⁰ The major steel plants supply pig iron and rolled steels of suitable size and quality to the user industries and to the final consumers. While requirements of the big users are despatched directly from the plant, the small requirement (i.e., less than a wagon load) of the informal sector units and households is supplied through producers' stockyard. Calcutta has stockyard facilities for all the major steel producing units providing outlet for about 11 per cent of their output, on an average.⁷¹

Calcutta's share in the all-India iron and steel movement by railway declined for various reasons. While in Calcutta the engineering industry stagnated, it flourished in other parts of the country, particularly in Maharashtra. This was partly because of the central government policy of freight-equalisation as a result of which, as we have already noted, the Calcutta metropolis lost its locational advantage with respect to the engineering industries. Moreover, the casting industry depended largely on railway orders for wagons, cast iron sleepers and other structurals,

but, over time, order from the railways declined as railways gradually switched over to steel and concrete sleepers.⁷² Also, the demand for wagons from the large engineering units declined. Secondly, though the establishment of steel plants Bhilai and Rourkella increased all-India production and movement of iron and steel, major consequences for Calcutta was that it lost its position of eminence as a centre of steel distribution.

Petroleum Products

Decline in the flow of petroleum products to and from Calcutta through port and railway has been due to the development of pipeline technology, which is the cheapest mode of transporting oil over long distance.⁷³ In the 1950s and early 1960s, the requirement of petroleum products, particularly Kerosene, of eastern India was met by supply from Assam refinery and imports. Oil from Assam was brought to Calcutta by railway, and imported petroleum products entered through the Budge-Budge oil jetty of Calcutta port. Oil was then despatched by railway tankers to the eastern states, namely, Bihar, Orissa, and West Bengal and parts of Uttarpradesh and Madhya Pradesh.⁷⁴ By the end of the 1960s, the Haldia oil jetty and Haldia oil refinery became operative, and pipelines connecting Assam-Barauni and Haldia-Barauni were established.⁷⁵ As a consequence, Haldia became the major supply source in place of Calcutta. The imported crude oil now refined at Haldia refinery and supplied to various points by pipeline for distribution in the eastern region (Table 23). Two such supply points in West Bengal are Maurigram and Asansol. Supply for Calcutta is obtained from Mourigram and carried by road. In North Bengal, supply is from Assam through Gauhati-Siliguri pipeline. Thus, Calcutta has ceased to be a major centre of distribution of oil products.

Raw Jute

The Calcutta Metropolitan Area (CMA) is the major jute manufacturing centre of India, where more than 90 per cent of the jute mills are located.⁷⁶ As a result, raw jute movement and the flow of jute products are highly concentrated in Calcutta. Calcutta city is therefore, a net importer of raw jute and net exporter of jute products. Apart from Calcutta, other centres of jute manufacturing are located in Uttar Pradesh, Bihar, Orissa and Andhra Pradesh.

The pattern of raw jute movement depends on the production of raw jute, its quality and the requirements of the mills in various centres. In the pre-independence period, Calcutta mills relied for their requirement of raw jute and supply from Assam and eastern Bengal, which was despatched primarily by the river route. At the time of partition, India lost the bulk of the jute growing areas of Bengal and jute industry in Calcutta had to depend heavily on imported fibres imported from East Pakistan and Thailand through Calcutta port. By the end of the fifties, however, the country was able to produce enough raw jute to meet the mill requirements; jute being produced mainly in West Bengal, Assam, Bihar, Orissa and Andhra Pradesh, West Bengal alone accounting for about 50 per cent of the total raw jute production.⁷⁷

Against this backdrop, we may discuss the pattern of raw jute movement to and from Calcutta. As mentioned above, before independence, jute produced in Assam was transported to Calcutta by river routes. In the post-independence period, with the extension of the rail facilities, a part of the traffic from Assam was diverted to rail and, after the Indo-Pak war in 1965, it was entirely carried by the railways.⁷⁸ Other inter-state raw-jute movements involved the inflow of low-quality

raw jute from Uttar Pradesh and the despatch of higher quality jute to mills in Uttar Pradesh.⁷⁹ In Orissa, Jute is mainly produced in the coastal districts, namely, Cuttack and Balasore, and movement of jute from these areas to Calcutta was, usually, by road, facilitated by the links established by the national highways.⁸⁰

Within West Bengal, the movement of raw jute has been influenced by the improvement in road transport network. The major jute producing districts are West Dinajpur, Maldah, Jalpaiguri, Cooch Behar in North Bengal and, 24-Parganas, Hooghly, Nadia, Murshidabad, Burdwan and Midnapore in South Bengal. While in South Bengal the despatches are generally by road, due to the contiguity of the jute producing areas to jute mills, movement of jute from North Bengal to Calcutta was mostly by rail on account of the absence of direct road link. After the opening up of the Farrakka bridge, the raw jute despatch by road from North Bengal districts to Calcutta has increased.⁸¹

Thus, although the consumption of jute by the mills of Calcutta has increased over the years, the carrying of raw jute by railways has dropped (Table 22) indicating the growing importance of road transport in the raw jute movement.

Jute Manufactures

Calcutta is a major centre of jute manufacturing, and therefore, jute manufactures, which include gunny bags, hessians and other types of jute products are mostly despatched from Calcutta. Since gunny bags are reusable, there is a significant secondary movement of jute goods. In 1950-51, about 78 per cent of total jute manufactures

was exported. Subsequently, in 1960, the share of export in total output declined to 72 per cent, then to 53 per cent in 1970-71 and to 47 per cent in 1980-81. Not only the share but also the absolute magnitude of exports declined. While, in 1952, about 744 thousand tonnes of jute goods were exported, in 1980-81 the volume was only 450 thousand tonnes.⁸³ Correspondingly, internal consumption increased, which resulted in a greater movement of jute goods by railways.

Export of jute products is undertaken primarily through Calcutta port. From the mills jute products are brought to Calcutta port, by the river or road. For the domestic market jute goods are despatched from Calcutta and its surrounding industrial belt by rail, road and coastal shipping. In 1973-74, the share of different modes of transport in the movement of jute products, including secondary movement from Calcutta, was as follows : rail (cum-river) carried about 168.1 thousand tonnes, coastal shipping about 73.6 thousand tonnes and road transport about 65.3 thousand tonnes.⁸⁴

Gunny bags are despatched mostly to the states with surplus foodgrains, e.g., Punjab, Harayana, and Uttar Pradesh and states which are developed or have concentration of cement, salt and fertiliser industry. The coastal movement of jute products is confined between Calcutta and Bombay or Calcutta and Madras.

Salt

Salt movement through Calcutta declined in recent years, primarily due to a change in the transportation arrangement. Production of salt is concentrated in the Western and Southern states of India : Rajasthan, Gujarat

and Maharashtra, taken together, accounted for about 70 per cent of all-India output in 1960-61; while Madras and Andhra accounted for another 21 per cent.⁸⁵ Under the 'zonal scheme' of salt movement, introduced in 1949, the supply of salt to the eastern states of Assam, Bihar and West Bengal was made through the Calcutta port; and salt was despatched from the producing centre by sea-route via Saurashtra and Tuticorin ports.⁸⁶ There were some irrational movements of salt by rail, from Tuticorin to Assam, by private traders, although this involved higher real transport cost.⁸⁷ Further, salt movement from the ports of Saurashtra and Tuticorin was linked to coal movement by coastal shipping.⁸⁸ Coastal vessels, which carried coal for railways and industries in Southern and Western India, carried, on their return trips, salt and cement for the Eastern region. The steady decline in the shipment of coal from Calcutta to the southern and western region, in the late sixties, as mentioned before, created a reciprocal problem with regard to the salt movement, by sea route. Besides, at the prevailing telescopic freight rate, the cost of despatching salt from Tuticorin to Assam and North Bihar by the all-rail route is less compared to sea-cum-rail route via Calcutta.⁸⁹

Thus, over time, the salt-hinterland of Calcutta Port has shrunk. Compared to the early 1970s, salt movement through Calcutta improved in 1980-81, but it was still below the 1960-61 level, primarily due to the inadequacy of coastal shipping. Compared to the earlier decade, more is imported and less exported by the rail network now. Most of the outward flow from Calcutta now consists of shipment to other parts of West Bengal.

To sum up, the commodity-specific analysis shows how goods flow in Calcutta City has been affected by various developments outside the metropolitan boundaries, e.g. changes in domestic production, the movement pattern of wheat; the introduction of the oil pipeline technology. In the case of coal, it is the combination of several factors, like decentralisation of production, switch over from coal to electricity and change in transportation arrangement, that have combined to effect a decline in the inflow and outflow from Calcutta. The government policy in respect of freight rate and transport arrangement has, at least, partly, influenced the movement of iron and steel, coal, and salt. The movement pattern of tea has been influenced by the development of the internal market, the growth of the auction centres in the interior and containerisation. The development of road transport has influenced the movement patterns of raw jute and tea with respect to the modal choice. Highlighting of these exogenous factors, is not meant to minimise the intra-city factors, such as the inefficiency of the intra-city transport system.

VI. Intra-city Goods Movement

Goods traffic on the city roads consists of (a) intra-city movement of goods from wholesalers to retailers, and of raw-materials from one firm to another, and (b) extra-city movement of goods, i.e., goods flow either originating or terminating in the city. In Calcutta, the proportion of the latter type of movement is quite high,⁹⁰ which is because of the location of the whole-sale trading activities in the city and the railway and highway network around the city. Firstly, the Calcutta port, one of the focal points of the truck movement, is

induced to do so by economic (e.g., higher tax in the core city) and extra-economic (e.g., restrictions on parking, relocation of infrastructural facilities like railway goods terminals) measures.

V. Conclusion

In this concluding section, we would highlight only the broad trends of goods flow to and from Calcutta, and then consider the implications of these trends for urban policies and planning for Calcutta.

Firstly, Calcutta suffered a decline in goods flow because of the change in the colonial trade pattern. A relatively broad-based development of the national economy, the growth of large and medium cities, and a consequent readjustment in the trade and transportation network, robbed the unique position that Calcutta held as a centre of distribution in colonial India. With respect to a number of commodities, including wheat, petroleum, iron and steel and salt, Calcutta port's hinterland has shrunk over time.

Secondly, this declining trend of goods flow could have been countered had there been a steady regional growth. Unfortunately, that was not the case; the whole of eastern region, including the Calcutta Metropolitan area, is suffering from a prolonged industrial stagnation since the mid-sixties which is, at least, partly due to the freight equalisation scheme introduced in mid-1980s.

Thirdly, the bottlenecks of the Calcutta port, the neglect of the development of coastal and inland water transport are also important factors in inhibiting goods flow in Calcutta.

Lastly, the share of road transport in the goods flow to and from Calcutta is growing over time. Except in the case of bulky raw materials, for most of the manufactured items, road transport is becoming relatively more important than rail transport, particularly with respect to the intra-state goods flow which are mostly over short distance. This is largely due to the cost advantage of road transport over rail transport for relatively shorter distance.

To consider the policy implications of these findings, we take the last issue first. In view of the increasing goods flow by road in the Calcutta Metropolitan region, road transport facilities for goods traffic must be improved in terms of highway facilities, goods vehicles terminals, and intra-city corridors for goods vehicle to and from the port.

As to the decline in the goods flow, the link between the goods flow in the city and the development of surrounding regions should not be taken as something axiomatic. It depends on the geographical structure of the region, its location vis-a-vis the rest of the country, the location of the metropolitan city, and the nature of the industrial development of the region and its link with the metropolitan activities. It may so happen, that the growth of the hinterland would result in the direct integration of the regional flows to the national market, thereby bypassing the metropolitan city. For instance, the growth of the petro-chemical complex in Haldia, while contributing to the development of the hinterland, is unlikely to increase the import of crude petroleum through Calcutta dock.⁹⁵

However, the development of coastal shipping along with the development of the coastal areas and Andaman and Nicobar islands, and improvement of trade relations with the south-east Asian countries, would increase goods movement through Calcutta. The possibility of carrying foodgrains by coast may be explored. Since Calcutta is situated on the most important inland waterway of the country, the development of inland water transport would be likely to boost goods flow through Calcutta.

Finally, it should be noted that transportation, though helpful in attaining efficiency as it makes specialisation on the line of comparative advantage possible, is a necessary sacrifice⁹⁶ of productive resources. Therefore, while more of goods flow in a city is welcome from the narrower perspective of a metropolis, a reduction in the goods transportation may not necessarily be undesirable also from the national or state point of view. On the other hand, real transport bottlenecks, leading to reduced goods flow and inefficiencies, would have to be removed. Similarly, the decline in goods flow due to irrational transport policies, including the policies like freight equalisation and telescopic freight rate, should be scrapped.

APPENDIX

Estimate of Congestion Cost in Calcutta, in 1964-65

Congestion cost has different components : the opportunity cost of lost time of vehicles and passengers, and the cost of pollution. While a comprehensive estimation of the congestion cost in Calcutta is not feasible, due to lack of data, we have attempted here to get at some rough estimates for the goods traffic only.

The methodology adopted is as follows :

We estimate the average speed for Calcutta and take the difference of it from the desirable one (in this study this is the intra-city average speed for the Bangalore city) and then estimate delay per kilometre. We obtained data on average truck trip length in time, which is converted into distance using the average speed available in Calcutta; then delay per trip is computed. This has been blown up by the total number of truck trips per day to get the estimate of total delay time, or hours lost per day. We use the per hour cost for trucks prepared by the Central Road Research Institute to get the money value of the hours lost due to congestion. Then per day cost has been multiplied by the 313 (assumed number of working days per year) to get the annual figure.

Estimate

The Calcutta Metropolitan Planning Organisation in their study reported the peak-period speed distribution of the arterial roads in the cities of Calcutta and Bangalore.

| <u>Calcutta, 1964-65</u> (Peak period) | | <u>Bangalore, 1965</u> (Evening peak period) | |
|-------------------------------------------|-------------------------|-------------------------------------------------|-------------------------|
| <u>Speed (km/h)</u> | <u>% of road length</u> | <u>Speed (km/h)</u> | <u>% of road length</u> |
| 5-16 | 8.0 | 8-16 | 3.3 |
| 16-20 | 30.0 | 16-24 | 10.4 |
| 20-24 | 56.0 | 24-32 | 33.5 |
| 24-40 | 6.0 | 32-40 | 52.8 |

Sources : Calcutta Metropolitan Planning Organisation, Traffic and Transportation Plan : Calcutta Metropolitan District 1960-86, Calcutta, 1967, p. 18; Central Road Research Institute, Comprehensive Traffic and Transportation Studies of Greater Bangalore, New Delhi, 1975, p. 13.

On the basis of this information, the average speed for Calcutta and Bangalore has been estimated at 18.5 km/h and 28.9 km/h respectively. It has been further given that the average trip duration in Calcutta is about 11.4 minute which at the average speed of 18.5 km/h can be translated into a distance of 3.5 km. Hence delay per trip is

$$(3.5 \times (1/18.5 - 1/28.9)) \text{ hours} \\ = 0.06837 \text{ hr/trip}$$

Given that the total number of truck trip per day in Calcutta is 34033, total delay time is (34033×0.06837) = 2326.84 hours/day.

The Central Road Research Institute estimated the per hour cost of trucks in waiting as follows :

: 45 :

| | |
|---------------------------------|-------------------|
| Commodity Cost | : Rs. 2 per hour |
| Crew Cost | : Rs. 2 per hour |
| Fixed Cost (excluding taxes) | : Rs. 11 per hour |

| | |
|-------|-----------------|
| Total | Rs. 15 per hour |
|-------|-----------------|

Note : Assuming 20 hours performance per day

Source : Central Road Research Institute; Road User Cost Study in India : Final Report, New Delhi, 1982.

If we use this cost estimate, then the cost of congestion inflicted upon the goods traffic in Calcutta is in 1964-65 Rs. 34903 (Rs. 15 x 2326.84) per day and annually Rs. 1,09,24,513 (assuming 313 working days).

This is far from a comprehensive exercise of the estimation of congestion cost in Calcutta. This does not include for example the estimate of cost inflicted upon the passenger traffic. Besides the estimates are based on a very limited set of data and extremely simplifying assumptions, like, all delays are due to congestion, all truck trips take place during the peak hours.

Notes and References :

1. See, for example, Charles Gore, Regions in Question : Space, Development Theory and Regional Policy, London : Methuen, 1984, p. 133.
2. See, Webster's New Twentieth Century Dictionary, 2nd Edition, 1975.
3. See, Government of India (Planning Commission) Regional Transport Surveys - Summary (Joint Technical Group for Transport Planning), New Delhi, July 1968, p. 126.
4. We do not consider here the link between the growth of the hinterland and the growth of the metropolitan city in terms of service demand.
5. See Nilmani Mukherjee, The Port of Calcutta - A Short History. The Commissioners for the Port of Calcutta, Calcutta, 1968, pp. 200-201.
6. See, S. Sivasubramanian, 'Inter-State or Inter-Regional Balance of Trade : Some problems of Compilation with Special Reference to India', in V.K.R.V. Rao et al. (eds.). Papers on National Income and Allied Topics (Indian Conference on Research in National Income) Vol. 2, 1962, p. 91.
7. See Bhanu Koti, 'Inter-state or inter-regional balance of trade : Methodological and practical problems with special reference to India', in V.K.R.V. Rao et al. (ed.) Papers on National Income, op. cit., p. 78.
8. See, for example, R. Dhar, An Input-Output Table for West Bengal and Calcutta Metropolitan District : First Interim Report (Notes on the Selection of Sectors and Sources of Information), New York, Institute Public Administration, 1962 (mimeo), pp. 30-35. In particular Calcutta is the exporter of jute textiles and iron and steel products.

9. See, S.R. Hasim, 'Inter-regional linkages and the changes in the pattern of commodity flows in India 1950-51 to 1959-60,' The Indian Economic Journal, V. 19 (2), October-December, 1971, pp. 187-207.
10. In the fifties Amritsar of Punjab state was the centre of trade network in Western India; subsequently Delhi emerged as the centre of trade in which Punjabi migrants engaged in trade played an important role (see Government of India, Planning Commission, Regional Transport Survey's - Summary, op. cit., p. 406.)
11. It may be noted that this study has considered the goods flow for the states of Bombay and Madras but not for the respective cities. However, if the goods movement for these cities only were taken into account the conclusions would have been the same because, as observed from the inland trade statistics, in each of the states the respective port city accounted for the major share of the goods flows to and from the state.
12. See Hasim (1971), op. cit., p. 188.
13. See Hasim (1971), op. cit., pp. 187-188, 195.
14. See Hasim (1971), op. cit., pp. 197-198.
15. B.J.L. Berry, Essays on Commodity Flows and the Spatial Structure of the Indian Economy. Dept. of Geography, Chicago University Research Paper No. 111 (Referred in Monnis Raza and Yash Aggrawal, Transport Geography of India : Commodity Flows and Regional Structure of the Indian Economy, New Delhi, Concept, 1986, p. 218).
16. M. Raza and Y. Aggrawal (1986) op. cit., p. 12.

17. See, Government of India, Estimates Committee (1974-75) Report (Need for Integrated Well Coordinated Planning and Firm Linkages for Major Bulk Commodities), pp. 27-29; see, also Government of India, (Estimate Committee (1974-75) Report (Need for Rail-Road Coastal Shipping Coordination)), p. 47.
18. See, Leo Jakobson and Ved Prakash (eds.) Metropolitan Growth : Public Policy for South and South East Asia, New York, Sage, 1974, pp. 139-140.
19. Government of India, Commodity Transport Studies - Summary (Joint Technical Group for Transport Planning, Planning Commission) New Delhi, 1968, Vol. II, p. 37.
20. See, Calcutta Metropolitan Planning Organisation, Traffic and Transportation Plan, Calcutta, CMPO, 1967, pp. 8-9.
21. See, D. Banerjee, 'Industrial Stagnation in Eastern India : A Statistical Investigation', Economic and Political Weekly, Vol. 17 (8-9), February, 1982.
22. Government of India (Planning Commission), Third Five-Year Plan, New Delhi, 1961, p. 146.
23. Foreign trade with East Pakistan (later Bangladesh) by land route was discontinued in 1952 (see, Government of India, Department of Commercial Intelligence and Statistics, Accounts Relating to Trade of India by Land with foreign countries, 1951-52 and did not resume until recent time.
24. See, M. Raghavachari, India's Freight Transport Problem : Problems and Prospect (Department of Science and Technology, Government of India, n.d.) which quotes the results of 'Survey of the Domestic Transport of India's Export Cargo' (Operation Research Group, Baroda, May 1971).
25. See, Calcutta Port Annual, 1981, p. 33 (iii).

26. See, K. Seetharam and Satyesh C. Chakraborty, 'Some Considerations on Interregional Commodity Movement in India', Geographical Review of India, V. 39 (4), December, 1977, p. 327.
27. Ibid., p. 330.
28. Calcutta Metropolitan Planning Organisation, Traffic and Transportation Plan, Calcutta, CMPO, 1967, p. 8.
29. See, R. Mehta, 'Inter-state flow of goods and regional development', in Government of India (Planning Commission), Regional Dimensions of India's Economic Development (Seminar Proceedings), Nainital, 1982.
30. See, CMPO, Traffic and Transportation Plan, op. cit., p. 8f; also Government of India, Planning Commission, Final Report of Committee on Transport Policy and Coordination, New Delhi, 1966, p. 64.
31. See, Government of India, Planning Commission, Report of the National Transport Policy Committee, New Delhi, May 1980, p. 283.
32. Ganga-Bhagirathi-Hooghly system between Haldia-Fara Farraka and Allahabad Stretch has been declared as a National Waterway during the Sixth Five-Year Plan (see, Government of India, Planning Commission, Sixth Five-year Plan 1980-85, Mid-term Appraisal, New Delhi 1983, p. 87.
33. See, Central Inland Water Transport Corporation Ltd., Annual Report 1983-84, p. 15.
34. Calcutta Metropolitan Development Authority, Improvement Prospect for the Link Routes Connecting Calcutta Airport with the City (Directorate of Planning and Development, Report No. 134) Calcutta n.d.
35. Government of India, Accounts Relating to Inland (Rail and River Borne) Trade of India (Department of Commercial Intelligence and Statistics).
36. More detail computerised point-to-point railway data used by Moonis Raza and Yash Aggarwal in their study mentioned above, have not been used here for

obvious reasons.

37. Calcutta trade-block consists of Calcutta city including Calcutta port (see, Government of India, Department of Commercial Intelligence and Statistics, A Guide to official statistics of trade shipping and customs revenue of India, Calcutta, 1965, pp. 70, 71.
38. See, Bhanu Koti, op. cit., p. 72.
39. According to the Report of the National Transport Policy Committee (Government of India, Planning Commission, 1980) in 1977-78, 99.5 per cent of truck ownership was in the private sector (p. 186).
40. The following is the list of road surveys which provide information on goods movement to and from Calcutta by road :
 - (i) A survey of road traffic by the Committee on Transport Policy and Coordination during 1959-60 on six selected routes. It provides weekly data for 18 point-to-point movement (see, Government of India, Committee on Transport Policy and Coordination : Final Report, New Delhi, 1966, pp. 230-239, 255).
 - (ii) A Survey by Ministry of Transport, Government of India between June and November, 1963 on 16 long distance trunk routes to assess the volume and characteristics of inter-city freight traffic (see, Government of India, Committee on Transport Policy and Coordination, op. cit., pp. 240-247.
 - (iii) 'Roads - A Survey' 1965 by Calcutta Metropolitan Planning Organisation, Government of West Bengal.
 - (iv) Goods Transportation Survey on National Highways in Calcutta Metropolitan District during 1973-74 by the Calcutta Metropolitan Planning Organisation. The data have been collected from three check posts, namely, Uluberia, Mogra and Noapara.

40. (v) A survey of commodity flows by roadways in 1978-79 by Rail India Technical and Economic Services Ltd. (RITES). A network of 216 checkpoints was selected covering all the routes on national and state highways (see Monnis Raza and Yash Aggarwal, 1986, op. cit., p. 13).
41. Government of India, Statistics of the coasting Trade of India, (Department of Commercial Intelligence and Statistics).
42. Flow on value basis has not been considered because of the absence of value figures of inland trade by rail and river, and road. The flow on weight basis does not include the flow of live-stocks which are reported in numbers.
43. These proportions are with respect to the cargo handled in eight major ports of India, namely, Calcutta, Bombay, Madras, Visakhapatnam, Cochin, Kandla, Paradip, and Mormugao (see, Government of India, Port Statistics of India, 1980).
44. Statistics are given for Calcutta-Haldia port. Separate figures for Calcutta and Haldia docks are not available.
45. See, Government of India, Report of Inter-Ministrial Group on Freight Equalisation of Commodities. (Maratha Committee Report) New Delhi, Planning Commission, 1977, pp. 16-17; also Government of India Report of of the National Transport Policy Committee, New Delhi, Planning Commission, May 1980, p. 113.
46. Government of India, Report of the National Transport Policy Committee, op. cit., p. 113.
47. Ibid.
48. See, Report of Inter-Ministrial Group on Freight Equalisation of Commodities, 1977, op. cit. p. 13; also, Report of the Railway Freight Enquiry Committee, 1955-57, p. 20.

49. Report of the Railway Freight Enquiry Committee, op. cit., p. 19.
50. See, Report of the National Transport Policy Committee, op. cit. p. 113-114.
51. See, Report of Inter-Ministrial Group on Freight Equalisation of Commodities, 1977, op. cit., pp. 50-51.
52. Ibid., p. 13.
53. Ibid., p. 14-15.
54. See, Government of India, Commodity Transport Studies - Summary, New Delhi, Planning Commission, 1968, Vol. 1, p. 198, 206; also, Government of India, Report of the Foodgrains Policy Committee, 1966, p. 9-10.
55. The growth of the Food Corporation of India (FCI) storage facility in Eastern India during 1971-87 was as shown below :

Storage facility (in '000 tonnes)
(for foodgrains only)

| | <u>1971</u> | <u>1974</u> | <u>1987</u> |
|---------------------|-------------|-------------|-------------|
| Assam | 122.04 | 195.98 | 302.40 |
| Bihar | 184.99 | 243.73 | 680.41 |
| Orissa | 64.20 | 125.85 | 357.98 |
| Port of Calcutta | 1070.04 | 1278.86 | 820.67 |
| Rest of West Bengal | φ | φ | 639.74 |

φ Merged with the figure for port of Calcutta.

Source : Food Corporation of India, Annual Report (Various Issues):

56. See Tea Board of India, Tea Statistics (relevant years)
57. Computed from data reported in Government of India (Ministry of Finance), Economic Survey, 1961-62.
58. See Commodity Transport Studies, op. cit., Vol. 2, p. 37-38.

59. Ibid, p. 37.
60. Ibid, p. 38.
61. While the Gauhati auction started in 1970, the Siliguri auction opened during 1976 (See Tea Board, Tea Statistics, 1971-72 and 1976-77).
62. See, Government of India, Committee on Transport Planning and Coordination : Final Report, New Delhi, 1966, p. 118.
63. See, Indian Bureau of Mines, Indian Minerals Year Book (Government of India, Ministry of Steel and Mines) 1960, 1982; also, Government of India, Committee on Transport Planning and Coordination : Final Report, op. cit., p. 123.
64. Commodity Transport Studies, op. cit., Vol. I, p. 392.
65. Ibid., p. 270.
66. Committee on Transport Planning and Coordination : Final Report, op. cit., p. 120.
67. See, National Council of Applied Economic Research, Transport Requirement of the Iron and Steel Belt, New Delhi, 1964, pp. 81-82.
68. See, Committee on Transport Planning and Coordination : Final Report, op. cit., p. 122.
69. See, S.N. Sanklecha, 'Coastal Shipping - Measures for Revival', Indian Shipping, Vol. 41 (2-3), 1989, 15ff.
70. See, Commodity Transport Studies, op. cit., Vol. 1, p. 201.
71. See, Government of India, Estimates Committee 1971-72, Fifth Lok Sabha, 20th Report, Planning, Development Production, Distribution, etc. of Iron and Steel and Ferro Alloys (Ministry of Steel and Mines, (Dept. of Steel), p. 105.
72. Commodity Transport Studies, op. cit., Vol. 1, p. 210.

73. It has been estimated that the cost per tonne - Kilometre for carrying petroleum products, at 1962-63 prices, is lowest for pipeline, 2.29 paise, and then road transport, 12.30 paise (Commodity Transport Studies, op. cit., Vol. 1, pp. 124-127).
74. See Government of India, Commodity Transport Studies, op. cit., Vol. 1, p. 144; also Accounts Relating to Inland (Rail and River Borne) Trade of India. (Directorate of Commercial Statistics and Intelligence, Government of India) 1960-61.
75. See, Government of India (Bureau of Public Enterprises), Annual Report on the Working of Industrial and Commercial Undertakings of the Central Government, 1974-75, Vol. 2, p. 40.
76. See, Commodity Transport Studies, op. cit., Vol. 2, p. 3.
77. Ibid., p. 6.
78. Ibid., pp. 4-5.
79. Ibid., pp. 7-8.
80. Ibid., p. 8.
81. See, Government of India (Planning Commission), Commodity Transport Studies, op. cit., Vol. 2, p. 14-15; also, Government of India (Directorate of Commercial Intelligence and Statistics), Accounts of Inland Trade of India, op. cit., 1970-71 and 1980-81.
82. Computed from data available in Government of India, Statistical Abstract (Central Statistical Organisation) and Economic Survey, (Ministry of Finance) for relevant years.
83. The same as Note 82 above.

84. The flow of jute products by road has been estimated from the data reported in Government of West Bengal, Calcutta Metropolitan Planning Organisation, The Goods Transportation Survey on National Highways: Calcutta Metropolitan District 1973-74, Calcutta, 1974. However, this estimate may include some raw jute movement as well. The data on coastal consignments are obtained from Coastal Trade Statistics (Government of India, Department of Commercial Intelligence and Statistics).
85. See, Government of India, Commodity Transport Studies, op. cit., Vol. 1, p. 375.
86. Ibid, pp. 376, 384.
87. Ibid, p. 378.
88. Ibid, p. 382.
89. Ibid, p. 392.
90. A survey conducted by the Calcutta Metropolitan Planning Organisation in the early 1960s revealed that about 92 per cent (6147 out of 6707) of the fast moving goods vehicles on the Calcutta roads were heavy duty lorries, which usually carry over long distance (see, Calcutta Metropolitan Planning Organisation, Traffic and Transportation Plan : Calcutta Metropolitan District, 1966-86. Calcutta, 1967, p. 146.
91. See, Government of India, Regional Transport Surveys : Summary, op. cit., p. 125.
92. See, B.N. Bhattacharyya, 'A Study on An Attempt to Reduce Congestion in the Calcutta Metropolitan Core', Arthaniti, Vol. 20 (1979-80), p. 68.
93. See, Calcutta Metropolitan Planning Organisation, Truck Terminal System Plan (Planning and Development Department, Government of West Bengal), Calcutta, n.d.
94. See B.N. Bhattacharyya, (1979-80), op. cit., p. 67-88.

84. The flow of inter products by road has been estimated from the data reported in Government of West Bengal.

95. See, Ananda Bazar Patrika, 13th April, 1990.

96. See, H.W. Richardson, Regional Economics : Location Theory, Urban Structure and Regional Change, London Weidenfeld, 1969, p. 111-112.

97. However, this data on coastal consignments are obtained from Coastal Transport Statistics (Government of India, Department of Coastal Transport and Shipping).

98. See, Government of India, Coastal Transport Statistics, Vol. I, p. 125.

99. Ibid, p. 125.

100. Ibid, p. 125.

101. A survey conducted by the Calcutta Metropolitan Planning Organisation in the early 1980s revealed that about 92 per cent (617 out of 670) of the last moving goods vehicles on the Calcutta roads were heavy duty lorries, which usually carry over long distance (see Calcutta Metropolitan Planning Organisation, Traffic and Transportation Plan : Calcutta Metropolitan District, 1986-87, Calcutta, 1987, p. 146).

102. See, Government of India, Regional Transport Survey, Summary, op. cit., p. 125.

103. See, B.N. Bhattacharyya, 'A Study on an Attempt to Reduce Congestion in the Calcutta Metropolitan District', Urbania, Vol. 20 (1979-80), p. 68.

104. See, Calcutta Metropolitan Planning Organisation, Traffic Terminal System Plan (Planning and Development Department, Government of West Bengal), Calcutta, n.d.

105. See B.N. Bhattacharyya, (1979-80), op. cit., p. 67-68.

106. Ibid, p. 125.

107. Ibid, p. 125.

108. Ibid, p. 125.

109. Ibid, p. 125.

110. Ibid, p. 125.

111. Ibid, p. 125.

112. Ibid, p. 125.

113. Ibid, p. 125.

TABLE - 1

PERCENTAGE DISTRIBUTION OF IMPORTS TO AND EXPORTS FROM
CALCUTTA BY INLAND (RAIL AND RIVER BORNE) TRADE,
1950-51 AND 1959-60

| Share of | Imports | | Exports | |
|-------------------------------------|-----------------|-----------------|------------------|------------------|
| | 1950-51 | 1959-60 | 1950-51 | 1959-60 |
| Assam | 28.96 | 21.80 | 12.70 | 12.19 |
| West Bengal (excluding Calcutta) | 27.71 | 20.54 | 21.40 | 22.18 |
| Bihar | 16.75 | 20.67 | 21.45 | 14.43 |
| Orissa | 0.67 | 4.29 | 3.30 | 5.45 |
| Uttar Pradesh (Eastern States) | 9.48 (83.57) | 6.80 (74.10) | 15.63 (74.48) | 13.55 (67.80) |
| Bombay | 2.46 | 2.71 | 2.16 | 2.80 |
| Western Region | 2.73 | 4.38 | 5.44 | 5.64 |
| Delhi | 0.33 | 0.07 | 2.82 | 2.66 |
| Madras | 0.10 | 0.69 | 2.11 | 4.76 |
| Other regions | 10.81 | 18.05 | 12.99 | 16.34 |
| Total | 100 | 100 | 100 | 100 |

Notes : (i) Other regions include Central Region, Northern Region, Rajasthan, Hyderabad, and Southern Region
(ii) Percentage share in the aggregate value of commodity flows; quantities are converted into values using wholesale prices of the commodities for 1959-60.

Source : S.R. Hasin, 'Inter-regional linkages and the changes in the pattern of commodity flows in India, 1950-51 to 1959-60', The Indian Economic Journal, V. 19(2), October-December, 1971, pp. 187-207.

TABLE - 2

CHARACTERISTICS OF GOODS FLOW BY RAILWAY IN THE FOUR
METROPOLITAN CITIES OF INDIA, 1973-74

(FOR ORIGINATING (O) AND TERMINATING (T) TRAFFIC)

| | | Calcutta | Bombay | Delhi | Madras |
|------------------------------|-----|----------|--------|-------|--------|
| Share (%) of all - (O) | (O) | 1.38 | 3.16 | 0.37 | 1.38 |
| India freight (T) | (T) | 5.19 | 3.39 | 2.96 | 2.65 |
| Share (%) in freight (O) | (O) | 21.94 | 50.24 | 5.88 | 21.94 |
| of the four metropolis (T) | (T) | 36.57 | 23.89 | 20.86 | 18.68 |
| Interaction (O) | (O) | 3076 | 2998 | 2414 | 1809 |
| No. of nodes connected (T) | (T) | 2442 | 2347 | 2065 | 1567 |
| Average (O) | (O) | 804 | 764 | 893 | 574 |
| distance (km) (T) | (T) | 528 | 883 | 882 | 630 |
| Average flow per (O) | (O) | 0.81 | 1.92 | 0.28 | 1.38 |
| interaction (100 tonnes) (T) | (T) | 3.96 | 2.62 | 2.62 | 1.11 |

Sources : M. Raza and Y. Aggarwal, Transport Geography of India : Commodity Flows and Regional Structure of the Indian Economy, New Delhi, Concept, 1986, p. 170.

TABLE - 3

PRODUCT GROUP-WISE SHARE OF THE METROPOLITAN CITIES IN
NATIONAL FLOWS (FOR ORIGINATING (O) AND TERMINATING (T)
TRAFFIC) 1973-73

| | | (Percentage) | | | | |
|-----------------------------------------|-----|--------------|--------|-------|--------|--------------------|
| | | Calcutta | Bombay | Delhi | Madras | Total ^φ |
| Food Products | (O) | 1.49 | 4.37 | 1.38 | 2.50 | 9.74 |
| | (T) | 8.38 | 5.48 | 3.88 | 1.59 | 19.33 |
| Raw Materials From Primary Source | (O) | 0.20 | 0.22 | 1.07 | 0.11 | 1.60 |
| | (T) | 5.50 | 2.14 | 0.62 | 5.87 | 14.13 |
| Coal/fuel | (O) | 0.49 | 2.26 | 0.003 | 1.35 | 4.10 |
| | (T) | 3.95 | 0.96 | 3.76 | 1.37 | 10.04 |
| Input to Agriculture | (O) | 2.36 | 7.42 | 0.76 | 3.63 | 14.17 |
| | (T) | 1.05 | 4.62 | 0.69 | 0.49 | 6.85 |
| Construction Material | (O) | 0.55 | 4.50 | 0.17 | 1.53 | 6.84 |
| | (T) | 5.54 | 4.54 | 4.08 | 2.51 | 16.67 |
| Industrial Products | (O) | 8.95 | 5.56 | 0.76 | 1.69 | 16.96 |
| | (T) | 9.26 | 7.59 | 5.15 | 3.47 | 25.47 |

(φ) Total of the four metropolises.

Source : M. Raza and Y. Aggarwal, Transport Geography of
India, op. cit., 1986, p. 171.

TABLE - 4
PATTERN OF INLAND TRADE BY RAILWAY (NET OUTFLOW AS
PERCENTAGE OF TOTAL FLOW^φ) IN METROPOLITAN CENTRES,
1973-74

| | Calcutta | Bombay | Delhi | Madras |
|---------------------------------------|----------|--------|-------|--------|
| Total Freight | -0.58 | -0.03 | -0.78 | -0.32 |
| Food Products | -0.70 | -0.11 | -0.48 | 0.22 |
| Raw Materials from Primary Sources | -0.93 | -0.82 | -0.79 | -0.96 |
| Coal/Fuel | -0.78 | 0.48 | -1.00 | -0.01 |
| Inputs to Agriculture | 0.38 | 0.23 | 0.05 | 0.76 |
| Construction Material | -0.82 | 0.01 | -0.92 | -0.24 |
| Industrial Products | -0.11 | -0.15 | -0.74 | -0.35 |

(φ) It is computed as : (originating tonnage - terminating tonnage)/(originating + terminating tonnage).

Source : M. Raza and Y. Aggarwal, Transport Geography of India, 1986, op. cit., p. 188.

TABLE - 5

SHARE OF RURAL AND URBAN AREAS IN THE INFLOW (T) AND
OUTFLOW (O) TO THE METROPOLISES BY RAILWAY, 1973-74

| | Urban (city size) | | | | | Rural |
|-------------------------------|-------------------|------|------|------|---------|-------|
| | I | II | III | | IV+V+VI | |
| <u>I. Raw Material</u> | | | | | | |
| Calcutta | (O) | 68.7 | 2.9 | 8.6 | 4.4 | 15.3 |
| | (T) | 10.2 | 5.3 | 10.6 | 49.6 | 24.2 |
| Bombay | (O) | 57.2 | 8.8 | 6.7 | 3.5 | 20.8 |
| | (T) | 25.8 | 13.5 | 16.2 | 17.5 | 27.0 |
| Delhi | (O) | 40.1 | 12.8 | 4.6 | 27.8 | 14.6 |
| | (T) | 17.5 | 4.8 | 12.0 | 15.4 | 50.3 |
| Madras | (O) | 63.3 | 7.6 | 10.0 | 3.4 | 15.7 |
| | (T) | 10.5 | 19.3 | 1.7 | 1.1 | 67.4 |
| Total ^φ | (O) | 60.1 | 7.1 | 8.8 | 5.7 | 17.3 |
| | (T) | 13.0 | 12.4 | 7.8 | 23.1 | 43.7 |
| <u>II. Industrial Product</u> | | | | | | |
| Calcutta | (O) | 55.1 | 5.7 | 8.6 | 9.6 | 20.9 |
| | (T) | 36.3 | 0.7 | 3.2 | 3.8 | 6.0 |
| Bombay | (O) | 56.3 | 8.7 | 4.1 | 13.4 | 17.5 |
| | (T) | 70.0 | 3.3 | 3.6 | 7.9 | 15.4 |
| Delhi | (O) | 61.6 | 6.3 | 8.2 | 6.7 | 17.2 |
| | (T) | 61.6 | 6.3 | 8.2 | 6.7 | 17.2 |
| Madras | (O) | 72.4 | 4.7 | 6.0 | 8.5 | 8.4 |
| | (T) | 80.1 | 1.1 | 3.7 | 5.8 | 9.2 |
| Total ^φ | (O) | 57.5 | 6.6 | 6.8 | 10.6 | 18.4 |
| | (T) | 75.6 | 2.6 | 4.4 | 5.9 | 11.5 |

(φ) Total of the four metropolises.

Source : M. Raza and Y. Aggarwal, Transport Geography of India, 1986, op. cit., p. 188.

TABLE - 6

GOODS FLOW IN CALCUTTA BY DIFFERENT MODES, 1973-74

| | Inward Flow | Outward Flow | Total Flow |
|---------------------------------------------------------------------|---------------|--------------|---------------|
| 1. Rail-cum-river ^φ of which w.r.t. West Bengal | 5081.6 (36.7) | 957.7(10.2) | 6039.2(26.0) |
| | 1807.5(13.1) | 139.8(1.5) | 1947.2(8.4) |
| 2. Road ^φ of which w.r.t. West Bengal | 4875.9(35.2) | 6005.2(63.8) | 10081.1(46.8) |
| | 2389(17.3) | 2684.0(28.1) | 5037.2(21.7) |
| 3. Calcutta Port Coastal Trade | 1192.0(8.6) | 642.0(6.8) | 1834.0(7.9) |
| Overseas Trade | 2698.0(19.5) | 1793.0(19.1) | 4491.0(19.3) |
| 4. Calcutta Airport* | | | |
| Inland | 4.4(0.03) | 6.4(0.07) | 10.8(0.05) |
| Foreign | 1.2(0.01) | 5.4(0.06) | 6.6(0.03) |
| Total | 13853.1(100) | 9409.6(100) | 23262.7(100) |

(φ) Excluding flow of animals given in numbers.

(*) For the year 1978-79.

Sources : Goods flow by rail and river data are based on Inland (rail and river borne) trade statistics (Director General of Commercial Intelligence and Statistics, Government of India); Road data are compiled from Goods transportation Survey on National Highways, Calcutta Metropolitan District, 1973-74, (Calcutta Metropolitan Planning Organisation, Government of West Bengal, 1974; Data on Calcutta Port are collected from Government of India, Central Statistical Organisation, Statistical Abstract (various issues); Data on airport from International Airport Authority of India, Annual Report (various years).

TABLE - 7

SHARE OF INWARD AND OUTWARD FLOW IN EACH MODE OF
TRANSPORT IN CALCUTTA, 1973-74

| Transportation Mode | (Percentage) | | |
|------------------------|--------------|---------------|-------|
| | Inward Flows | Outward Flows | Total |
| 1. Rail and river | 84.14 | 15.86 | 100 |
| <u>of which w.r.t.</u> | | | |
| West Bengal | 92.82 | 7.18 | 100 |
| 2. Road | 44.81 | 55.19 | 100 |
| <u>of which w.r.t.</u> | | | |
| West Bengal | 47.43 | 52.57 | 100 |
| 3. Calcutta Port | | | |
| Coastal trade | 64.99 | 35.01 | 100 |
| Overseas trade | 60.08 | 39.92 | 100 |
| 4. Calcutta Airport | | | |
| Inland | 41.00 | 39.00 | 100 |
| Foreign | 18.70 | 81.30 | 100 |
| Total | 59.53 | 40.45 | 100 |

Note : See below the Table 6

Source : Computed from Table 6

TABLE - 8
COMMODITY-GROUP-WISE GOODS FLOW THROUGH CALCUTTA 1973-74

| | | Rail and river ('000 tonnes) | Road ('000 tonnes) | Port Coastal ^φ (Rs. million) |
|----------------------------------------|---|----------------------------------|------------------------|-----------------------------------------------|
| Foodgrain | I | 1023.1 | φφ | 45.6 |
| | O | 148.6 | | 17.0 |
| | N | -874.5 | | -28.6 |
| Other food- products | I | 300.3 | 1016.9 | 45.5 |
| | O | 76.3 | 1016.4 | 12.3 |
| | N | -224.0 | -0.5 | -33.2 |
| Raw Material | I | 809.3 | 1257.2 | 113.5 |
| | O | 67.5 | 808.9 | 9.0 |
| | N | -741.8 | -448.3 | -104.5 |
| Iron and Steel | I | 963.4 | 542.9 | 2.0 |
| | O | 479.4 | 515.0 | 15.6 |
| | N | -484.0 | -27.9 | 13.6 |
| Coal-coke, Ores | I | 1949.7 | 2036.1 | - |
| | O | 46.2 | 42.9 | 34.2 |
| | N | -1903.5 | -1993.2 | 34.2 |
| Petroleum and Petroleum Products | I | 5.1 | 22.9 | 4.0 |
| | O | 0.7 | 270.5 | 18.4 |
| | N | -4.4 | 247.6 | 14.4 |
| Non-food Manufactured Products | I | 34.4 | 862.8 | 20.9 |
| | O | 138.9 | 2489.9 | 60.1 |
| | N | 104.5 | 1627.1 | 39.2 |
| All Commodi- ties | I | 5085.3 | 5738.8 | 231.5 |
| | O | 957.6 | 5143.6 | 166.6 |
| | N | -4127.7 | -595.2 | -64.9 |

I : Inflow, O : Outflow, N : Netflow (outflow = inflow)

(φ) Relates to the year 1974-75.

(φφ) Included in 'other food products' category.

Sources : The same as in Table 6.

TABLE - 9

ESTIMATED SHARE OF DISTRIBUTIVE FLOWS IN TOTAL FLOWS IN
CALCUTTA FOR SOME SELECTED COMMODITIES, 1960-61

| | Export (E) (1000 tonnes) | Import (M) (1000 tonnes) | Percentage of distributive flow : $(2E/(E+M)) \times 100$ |
|-------------------------------------|-----------------------------|-----------------------------|--------------------------------------------------------------------|
| 1. Coal | | | |
| Rail and River | 180.5 | 3716.1 | 59.28 |
| Port | 1385.0 | - | |
| 2. Tea | | | |
| Rail and River | 38.4 | 164.7 | 99.20 |
| Port | 159.0 | - a, b | |
| Road | - | 35.9 a, b | |
| 3. Wheat | | | |
| Rail and River | 736.8 | 82.9 | 56.25 |
| Port | - | 1800.0 | |
| 4. Iron and Steel | | | |
| Rail and River | 587.6 | 514.3 | 87.74 |
| Port | 84.0 | 345.0 | |
| 5. Salt | | | |
| Rail and River | 123.3 | 3.6 | 51.03 |
| Port | - | 357.0 | |
| 6. Petroleum and Petroleum Products | | | |
| Rail and River | 90.7 | 0.2 | 42.82 |
| Port | 4.8 | 1371.0 | |
| Road | 278.1 | - | |

(a) Relates to the year 1963-64.

(b) Includes 4.5 thousand tonnes by air.

(c) Relates to the year 1962-63.

Sources : Rail and River data from Government of India, Department of Commercial Intelligence and Statistics, Accounts Relating to Inland Trade of India, 1960-61; Port data from The Commissioners for the Port of Calcutta, Administrative Report and Annual Accounts for the year 1960-61; and road data from Government of India, Planning Commission, Commodity Transport Studies, (2 Vols.) New Delhi, 1968.

TABLE - 10

TRENDS OF GOODS FLOW THROUGH CALCUTTA

| Mode | (million tonnes) | | | |
|----------------------------------|------------------|---------|---------|--------------------|
| | 1950-51 | 1960-61 | 1973-74 | 1980-81 |
| Rail and River ¹ | | | | |
| Calcutta | 7.9 | 9.0 | 6.0 | 5.3 |
| West Bengal (excluding Calcutta) | 10.8 | 17.3 | 19.7 | 20.0 |
| All India | 34.5 | 60.4 | 71.0 | 102.4 |
| Road (Inter-state) | | | | |
| Calcutta ² | n.a. | 3.3 | 5.8 | 6.7 ^φ |
| All India ² | n.a. | 13.4 | n.a. | 181.8 ^φ |
| Port - Coastal | | | | |
| Calcutta ³ | n.a. | 2.9 | 1.8 | 2.1 |
| All India ³ | n.a. | 9.2 | 7.9 | 9.6 |
| Port - Overseas | | | | |
| Calcutta ³ | n.a. | 6.5 | 4.5 | 7.1 |
| All India ³ | n.a. | 24.6 | 47.8 | 67.8 |
| Airport | | | | |
| Calcutta | n.a. | n.a. | 0.009 | n.a. |
| All India | 0.04 | 0.04 | n.a. | 0.13 |

(φ) Relates to the year 1978-79.

(1) Reports only inter-trade block movement. While the figures for Calcutta and West Bengal (excluding Calcutta) are the totals of inflows and outflows, the all-India figures are incoming consignment totals.

(2) The figure for 1960-61 is obtained as follows: the total road traffic of 17400 million tonne kilometres divided by an average lead distance of 363 km. multiplied by the proportion of inter-state movement 0.28 (since 28 per cent of all truck movement is for more than 320 km. distance). (For these data see Government of India, Committee on Transport Policy and Coordination :

TABLE - 10 (Contd.)

Final Report, New Delhi 1966, pp. 10,242,237. The 1978-79 figure is the estimated total inter-regional traffic handled in the metropolitan cities.

- (3) Total of the cargo handled at six major ports of India, viz., Calcutta, Bombay, Madras, Visakhapatnam, Cochin, Kandla, Paradip and Mormugao.

Sources : Compiled from data available in Government of India, Department of Commercial Intelligence and Statistics, Accounts Relating to Inland (Rail and River Borne) Trade in India; Government of India, Planning Commission, Report of the National Transport Policy Committee, New Delhi, 1980; Calcutta Metropolitan Planning Organisation, Goods Transportation Survey on National Highways : Calcutta Metropolitan District 1973-74, Calcutta, 1974; Government of India, Directorate of Transport Research, Basic Port Statistics (Ministry of Transport and Shipping); International Airport Authority of India, Annual Report (relevant issues).

TABLE - 11

ALL INDIA INTER-BLOCK TRADE BY RAIL-AND-RIVER AND THE SHARES
OF CALCUTTA AND WEST BENGAL (EXCLUDING CALCUTTA) IN SOME
SELECTED COMMODITIES, 1950-1980

('000 tonnes)

| | All India | Share of Calcutta | Share of West Bengal |
|-------------------|-----------|-------------------|----------------------|
| | (1) | (2) | (3) |
| 1. Coal | | | |
| 1950-51 | 19273 | 4362 (11.3) | 7975 (20.7) |
| 1960-61 | 31479 | 3897 (6.2) | 13020 (20.7) |
| 1973-74 | 30155 | 1923 (3.2) | 12770 (21.2) |
| 1980-81 | 37464 | 1294 (1.7) | 12104 (16.2) |
| 2. Iron and Steel | | | |
| 1950-51 | 1800 | 587 (16.3) | 491 (13.6) |
| 1960-61 | 3702 | 1102 (14.9) | 1081 (14.6) |
| 1973-74 | 7885 | 1443 (9.1) | 1854 (11.8) |
| 1980-81 | 7189 | 796 (5.5) | 1626 (11.3) |
| 3. Wheat | | | |
| 1950-51 | 1037 | 214 (10.3) | 10 (0.5) |
| 1960-61 | 3064 | 820 (13.4) | 218 (3.6) |
| 1973-74 | 5147 | 474 (4.6) | 622 (6.0) |
| 1980-81 | 6115 | 660 (5.4) | 741 (6.1) |
| 4. Tea | | | |
| 1950-51 | 272 | 220 (41.5) | 72 (13.2) |
| 1960-61 | 241 | 203 (42.1) | 45 (9.3) |
| 1973-74 | 176 | 85 (24.0) | 40 (11.2) |
| 1980-81 | 98 | 34 (17.5) | 12 (6.0) |
| 5. Salt | | | |
| 1950-51 | 1295 | 338 (13.0) | 93 (3.6) |
| 1960-61 | 1354 | 127 (4.7) | 72 (2.6) |
| 1973-74 | 2106 | 44 (1.0) | 68 (1.6) |
| 1980-81 | 2475 | 117 (2.4) | 74 (1.5) |
| 6. Jute Products | | | |
| 1950-51 | 145 | 42 (14.5) | 17 (6.0) |
| 1960-61 | 178 | 63 (17.7) | 49 (13.8) |
| 1973-74 | 377 | 141 (18.7) | 135 (17.9) |
| 1980-81 | 414 | 170 (20.6) | 160 (19.3) |

TABLE - 11 (Contd.)

| | (1) | (2) | (3) |
|--------------------|--------|-------------|--------------|
| 7. Raw Jute | | | |
| 1950-51 | 404 | 308 (38.1) | 166 (20.6) |
| 1960-61 | 401 | 227 (28.3) | 226 (28.2) |
| 1973-74 | 437 | 117 (13.4) | 327 (37.4) |
| 1980-81 | 253 | 22 (4.4) | 175 (34.6) |
| 8. All Commodities | | | |
| 1950-51 | 34475 | 7946 (11.5) | 10800 (15.7) |
| 1960-61 | 60418 | 9008 (7.5) | 17300 (14.3) |
| 1973-74 | 71040 | 6039 (4.3) | 19707 (13.9) |
| 1980-81 | 102382 | 5385 (2.6) | 19952 (9.7) |

Notes : (i) All India trade flow figures represent the total of inward consignments, while the trade flow figures for Calcutta and West Bengal include both inflows and outflows. The percentage share (shown in the brackets) are, therefore, computed with respect to twice the all-India flows.

(ii) The percentage figures may not tally exactly with that is obtained from the reported absolute figures because of rounding up error.

(iii) The flows between Calcutta and West Bengal are included in the shares of both Calcutta and West Bengal.

Source : Compiled from the data available in Government of India, Department of Commercial Intelligence and Statistics, Accounts Relating to the Inland (Rail and River Borne) Trade of India, Calcutta, (relevant issues).

TABLE - 12
GROWTH OF ROAD TRAFFIC IN CALCUTTA

| Year of Survey | Scope of Survey | ('000 tonnes/year) | | |
|----------------|--------------------------------------------------------------------|--------------------|-------------|--------|
| | | Originating | Terminating | Total |
| 1959-60 | Survey on Selected Highway ^{1,2} | 93 | 240 | 333 |
| 1963 | - Do - | 222 | 491 | 713 |
| 1965 | Road Survey by CMPO covering both intra and inter state flows | 2097 | 2400 | 4497 |
| 1973-74 | CMPO Survey covering both intra and inter state flows ³ | 6005 | 4876 | 10881 |
| | (of which inter-state flows) | (3357) | (2487) | (5884) |
| 1978-79 | RITES' survey covering inter-state flows ⁴ | 4106 | 2632 | 6738 |

- (1) Survey on highways connecting Calcutta and Asansol, and Ranigunge.
- (2) The 1959 survey was conducted by the Committee on Transport Policy and Coordination (Government of India), while the 1963 survey was conducted by the Ministry of Transport, Government of India.
- (3) Related to Calcutta Metropolitan District.
- (4) Related to Calcutta Metropolis.

Sources : For 1959 and 1963 data, Government of India, Committee on Transport Policy and Coordination : Final Report (Planning Commission), 1966, p. 255 (Reported weekly quantities of goods movement are multiplied by 52 to get the annual estimates); for 1965 data, Calcutta Metropolitan Planning Organisation, Transport Survey (Roads) Report 1965 (Govt. of W.B.) (Weekly flows has been multiplied by 52 to get the annual estimate); for 1973-74, CMPO, Goods Transportation Survey on National Highways : Calcutta Metropolitan District, 1974; for 1978-79, Govt. of India Planning Commission, Report of the National Transport Policy Committee, New Delhi, 1980, p. 255.

TABLE - 13

GOODS FLOW TO AND FROM CALCUTTA, 1960-61 to 1980-81

(in 100000 tonnes)

| | 1960-61 | 1973-74 | 1980-81 |
|--------------------------------|------------|------------|-------------------------|
| 1. Rail and River ¹ | | | |
| Total | | | |
| Outflow | 22.4 (100) | 9.6 (43) | 7.9 (36) |
| Inflow | 67.7 (100) | 50.8 (75) | 45.9 (68) |
| Total | 90.1 (100) | 60.4 (67) | 53.8 (60) |
| Of which | | | |
| Intra-state | | | |
| Outflow | 6.2 (100) | 1.4 (23) | 0.4 (7) |
| Inflow | 33.7 (100) | 18.1 (54) | 6.6 (20) |
| Total | 39.9 (100) | 19.5 (49) | 7.0 (18) |
| 2. Road | | | |
| Inter-state | | | |
| Outflow | 13.2 (100) | 33.6 (255) | 41.1 ^φ (311) |
| Inflow | 19.6 (100) | 24.9 (127) | 26.3 ^φ (134) |
| Total | 32.8 (100) | 58.4 (178) | 67.4 ^φ (205) |
| Intra-state | | | |
| Outflow | n.a. | 26.5 | n.a. |
| Inflow | n.a. | 23.9 | n.a. |
| Total | n.a. | 50.4 | n.a. |
| 3. Calcutta Port | | | |
| Coastal | | | |
| Outflow | 14.6 (100) | 6.4 (44) | 11.5 (78) |
| Inflow | 14.8 (100) | 11.9 (80) | 10.0 (68) |
| Total | 29.4 (100) | 18.3 (62) | 21.5 (73) |
| Foreign | | | |
| Outflow | 25.5 (100) | 17.9 (70) | 11.6 (45) |
| Inflow | 40.1 (100) | 27.0 (67) | 59.8 (149) |
| Total | 65.5 (100) | 44.9 (69) | 71.4 (109) |

(1) See note 1 below Table 10.

(φ) Related to the year 1978-79

n.a. Not available

Source : As in Table-10.

TABLE - 14

INTER-STATE GOODS FLOW IN CALCUTTA BY RAILWAY, ROAD
AND COAST, 1960-61 to 1980-81

| | (million tonnes) | | |
|-------------------|------------------|------------|------------------------|
| | 1960-61 | 1973-74 | 1980-81 |
| 1. Railway | | | |
| Outflow | 1.6 (100) | 0.8 (51) | 0.7 (46) |
| Inflow | 3.4 (100) | 3.3 (96) | 3.9 (115) |
| Total | 5.0 (100) | 4.1 (82) | 4.7 (93) |
| 2. Road | | | |
| Outflow | 1.3 (100) | 3.4 (255) | 4.1 ^φ (311) |
| Inflow | 2.0 (100) | 2.5 (127) | 2.6 ^φ (134) |
| Total | 3.3 (100) | 5.8 (178) | 6.7 ^φ (205) |
| 3. Port (Coastal) | | | |
| Outflow | 1.5 (100) | 0.6 (44) | 1.1 (78) |
| Inflow | 1.5 (100) | 1.2 (80) | 1.0 (68) |
| Total | 3.0 (100) | 1.8 (62) | 2.2 (73) |
| Total | | | |
| Outflow | 4.4 (100) | 4.8 (109) | 6.0 (136) |
| Inflow | 6.8 (100) | 7.0 (102) | 7.6 (111) |
| Total | 11.2 (100) | 11.3 (105) | 13.6 (121) |

(φ) Related to 1978-79

Sources : Compiled from data available in : Govt. of India (Department of Commercial Intelligence and Statistics), Accounts Relating to Inland (Rail and River Borne) Trade in India (relevant issues); Govt. of India, Central Statistical Organisation, Statistical Abstract (various years); Calcutta Metropolitan Planning Organisation, Goods Transportation Survey on National Highways : Calcutta Metropolitan District 1973-74, Calcutta, '74; Government of India, Planning Commission, Report of the National Transport Policy Committee, New Delhi, 1980.

COMMODITY COMPOSITION OF GOODS FLOW IN CALCUTTA BY RAIL
AND RIVER ('000 tonnes)

| | 1950-51 | 1960-61 | 1973-74 | 1980-81 |
|-----------------------|---------|---------|---------|---------|
| 1. Food Items | | | | |
| (a) Foodgrains | | | | |
| Outflow | 332.4 | 954.1 | 148.6 | 26.8 |
| Inflow | 483.3 | 715.9 | 1023.1 | 1363.9 |
| (b) Other Food items | | | | |
| Outflow | 149.3 | 267.7 | 76.3 | 73.9 |
| Inflow | 937.1 | 415.1 | 300.3 | 423.7 |
| 2. Raw Materials | | | | |
| Outflow | 158.4 | 77.8 | 67.5 | 53.8 |
| Inflow | 861.3 | 1038.3 | 809.3 | 895.4 |
| 3. Iron and Steel | | | | |
| Outflow | 334.3 | 587.6 | 479.4 | 331.2 |
| Inflow | 256.9 | 514.3 | 963.4 | 464.4 |
| 4. Coal, coke, etc. | | | | |
| Outflow | 143.3 | 182.7 | 46.2 | 94.5 |
| Inflow | 4291.6 | 4048.8 | 1949.7 | 1390.3 |
| 5. Mineral Oils | | | | |
| Outflow | 33.0 | 90.7 | 0.7 | 0.5 |
| Inflow | 25.9 | 0.2 | 5.1 | 0.2 |
| 6. Manufactured items | | | | |
| Outflow | 44.2 | 84.6 | 138.9 | 214.4 |
| Inflow | 31.3 | 37.7 | 34.4 | 51.5 |

Note : Food grains : rice, wheat, pulses and other grains;
 Other food items : wheat, flour, sugar and related products, tea, coffee, edible vegetable oil, fruits dried, fresh fruits (1981) and salt;
 Raw materials : raw cotton, kapas, raw jute, hide and skins, bones, teak and timber, lac and shellac, hemp other cotton, rubber raw, oilseeds, wool etc;
 Coal, coke, etc. : coal and coke, lime and limestone, manganese ore;
 Mineral oils : kerosene and other mineral oils;

TABLE - 15 (Contd.)

Manufactured items : leather, cotton piece goods, gunny bags and cloth, glasses, machinery and equipment, metal products, woolen goods (1981), artificial silk (1981) and shoes (1981).

Source : Compiled from data available in Accounts relating to inland (rail and river borne) trade in India (Department of Commercial Intelligence and Statistics, Government of India (various issues)).

: 75 :

TABLE - 16

SHARE OF EASTERN REGION STATES IN THE INTER-STATE GOODS
MOVEMENT BY RAIL AND RIVER THROUGH CALCUTTA.

| | 1950-51 | | 1960-61 | | 1973-74 | | 1980-81 | |
|----------------------|---------|-------|---------|-------|---------|-------|---------|-------|
| | M | X | M | X | M | X | M | X |
| Assam | 9.70 | 26.55 | 5.79 | 17.60 | 3.39 | 7.70 | 0.26 | 4.53 |
| Tripura | - | - | 0.25 | 0.09 | 0.10 | 0.53 | 0.00 | 0.03 |
| Bihar | 61.39 | 33.90 | 52.54 | 30.45 | 33.84 | 14.46 | 9.35 | 21.19 |
| Orissa | 1.45 | 2.45 | 13.81 | 6.30 | 11.75 | 4.85 | 7.12 | 3.16 |
| Uttar Pradesh | 9.84 | 16.73 | 8.84 | 14.02 | 9.76 | 14.05 | 3.96 | 19.39 |
| Total of five states | 82.38 | 79.73 | 81.23 | 68.46 | 58.84 | 40.89 | 20.69 | 48.30 |
| Volume of trade | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| (000 tons) | 2967 | 1164 | 3401 | 1618 | 3274 | 819 | 3925 | 752 |

M : Inflow

X : Outflow

Source : The same as in Table-15.

TABLE - 17

SHARE OF THE EASTERN REGION STATES IN THE GOODS FLOWS BY
ROAD TO AND FROM CALCUTTA, 1973-74.

| | (Tonnes/day) | | |
|----------------------|---------------|---------------|----------------|
| | Inbound | Outbound | Total |
| Assam | 672.9 (4.3) | 282.0 (2.0) | 954.9 (3.2) |
| Tripura | 9.0 (0.1) | - | 9.0 (0.0) |
| Orissa | 920.1 (5.8) | 613.7 (4.4) | 1533.8 (5.1) |
| Uttar Pradesh | 610.2 (3.9) | 612.5 (4.3) | 1222.7 (4.1) |
| Bihar | 5559.5 (35.3) | 3164.0 (22.5) | 8723.5 (29.3) |
| Total of five states | 7771.7 (49.4) | 4672.2 (33.2) | 12443.9 (41.7) |
| West Bengal | 6545.8 (41.6) | 7255.3 (51.6) | 13801.1 (46.3) |
| Total (All India) | 15743.7 (100) | 14068.1 (100) | 29811.8 (100) |

'-' : Negligible

Notes : (i) Figures in brackets show percentages.

(ii) Here, Calcutta stands for Calcutta Metropolitan Area.

(iii) Computed using percentage distribution of individual commodity traffic by origin in case of inflow, and by destination in case of Outflow.

Source : Computed from data provided in CMPO, Goods Transportation Survey on National Highways Calcutta Metropolitan District, 1973-74, Calcutta, 1974.

TABLE - 18

FREIGHT TRAFFIC FLOW BETWEEN METROPOLITAN REGIONS BY RAIL AND ROAD IN 1978-79.

| (in '000 tonnes) | | | |
|------------------------------|---------|---------|----------------------------------|
| Origin/destination | Railway | Highway | Ratio of highway to railway flow |
| Calcutta - Delhi | 32.5 | 55.0 | 1.7 |
| Delhi - Calcutta | 41.3 | 107.4 | 2.6 |
| Calcutta - Bombay | 22.1 | 45.4 | 2.1 |
| Bombay - Calcutta | 22.9 | 73.5 | 3.2 |
| Calcutta - Gauhati | 10.2 | 124.8 | 12.2 |
| Gauhati - Calcutta | 61.0 | 124.9 | 2.0 |
| Calcutta - Jalpaiguri | 30.6 | 182.8 | 6.0 |
| Jalpaiguri - Calcutta | 28.7 | 142.9 | 5.0 |
| Calcutta - Tatanagar | 13.0 | 149.6 | 11.5 |
| Tatanagar - Calcutta | 103.3 | 112.0 | 1.1 |
| <u>Sub-total^φ</u> | | | |
| Calcutta-Eastern India | 53.8 | 457.1 | 8.5 |
| Eastern India-Calcutta | 193.1 | 379.9 | 2.0 |
| Calcutta-rest of India | 108.4 | 557.5 | 5.1 |
| Rest of India-Calcutta | 257.3 | 560.7 | 2.2 |
| All flows | 365.7 | 1118.2 | 3.1 |

(φ) : Eastern India stands for Gauhati, Jalpaiguri and Tatanagar.

Source : Rail India Techno-Economic Services Ltd.,
Report on Commodity and Passenger Flows,
(Report IV, Vol. 1) October, 1980.

TABLE - 19

SHARE OF CALCUTTA IN THE TONNAGE OF INWARD AND OUTWARD
CONSIGNMENTS (BY RAIL AND RIVER) OF THE EASTERN STATES OF
INDIA

| | 1950-51 | 1960-61 | 1973-74 | 1980-81 |
|-----------------------------|-----------------------------|---------|---------|---------|
| | (Percentage) | | | |
| | <u>Outward consignments</u> | | | |
| Assam | 82.88 | 59.35 | 21.13 | 2.48 |
| Bihar | 16.83 | 9.90 | 6.19 | 1.88 |
| Orissa | 9.05 | 17.07 | 11.36 | 3.36 |
| Tripura | - | 37.51 | 9.79 | 0.30 |
| Uttar Pradesh | 13.12 | 12.28 | 11.40 | 5.38 |
| Eastern States ^φ | 17.63 | 11.70 | 7.81 | 2.60 |
| West Bengal ^{φφ} | 51.33 | 29.19 | 17.06 | 6.49 |
| | <u>Inward consignments</u> | | | |
| Assam | 71.57 | 55.12 | 5.53 | 1.86 |
| Bihar | 11.55 | 11.95 | 3.09 | 1.98 |
| Orissa | 6.75 | 6.42 | 1.03 | 0.45 |
| Tripura | - | 5.09 | 3.50 | 0.05 |
| Uttar Pradesh | 4.32 | 3.21 | 1.42 | 1.35 |
| Eastern States ^φ | 11.87 | 8.32 | 1.97 | 1.37 |
| West Bengal ^{φφ} | 12.20 | 10.75 | 1.53 | 0.44 |
| | <u>All consignments</u> | | | |
| Assam | 76.60 | 56.78 | 10.78 | 1.97 |
| Bihar | 16.68 | 10.28 | 5.64 | 1.91 |
| Orissa | 7.96 | 13.17 | 5.85 | 2.23 |
| Tripura | - | 19.31 | 4.87 | 0.05 |
| Uttar Pradesh | 7.23 | 5.50 | 3.98 | 2.21 |
| Eastern States ^φ | 15.55 | 10.48 | 5.43 | 2.03 |
| West Bengal ^{φφ} | 38.84 | 23.06 | 9.88 | 3.55 |

(φ) : Excluding West Bengal.

(φφ) : Excluding Calcutta.

Note : Consignments in livestock are excluded, because these are reported in numbers.

Source : The same as in Table-15.

TABLE - 20

SHARE OF WEST BENGAL (EXCLUDING CALCUTTA) IN THE TONNAGE OF
INWARD AND OUTWARD CONSIGNMENTS OF EASTERN STATES OF INDIA
AND CALCUTTA

| | (percentage) | | | |
|-----------------------------|--------------|---------|---------|---------|
| | 1950-51 | 1960-61 | 1973-74 | 1980-81 |
| <u>Outward consignments</u> | | | | |
| Assam | 10.56 | 15.98 | 34.59 | 39.86 |
| Bihar | 22.73 | 20.70 | 26.14 | 28.36 |
| Orissa | 12.02 | 28.77 | 21.22 | 30.64 |
| Tripura | - | 62.93 | 59.18 | 45.33 |
| Uttar Pradesh | 5.48 | 6.47 | 12.19 | 12.07 |
| Eastern States | 19.29 | 20.14 | 24.10 | 23.28 |
| Calcutta | 26.56 | 27.65 | 14.60 | 5.43 |
| <u>Inward consignments</u> | | | | |
| Assam | 7.74 | 3.57 | 7.47 | 17.05 |
| Bihar | 43.17 | 38.91 | 35.48 | 16.36 |
| Orissa | 8.19 | 6.74 | 12.16 | 17.20 |
| Tripura | - | 56.05 | 5.45 | 0.48 |
| Uttar Pradesh | 17.85 | 34.31 | 27.71 | 33.72 |
| Eastern States | 30.00 | 31.30 | 24.52 | 27.56 |
| Calcutta | 55.99 | 49.77 | 35.57 | 14.47 |
| <u>All consignments</u> | | | | |
| Assam | 8.99 | 8.43 | 16.60 | 21.24 |
| Bihar | 29.62 | 24.09 | 27.78 | 24.82 |
| Orissa | 10.21 | 20.71 | 16.39 | 25.40 |
| Tripura | - | 59.07 | 17.17 | 1.07 |
| Uttar Pradesh | 13.76 | 27.14 | 23.72 | 29.14 |
| Eastern States | 23.15 | 24.17 | 24.27 | 25.59 |
| Calcutta | 50.38 | 44.28 | 32.24 | 13.14 |

Note : The same as in Table-19.

Source : The same as in Table-15.

TABLE - 21

THE BROAD COMMODITY COMPOSITION OF INTER-STATE GOODS FLOW
TO AND FROM CALCUTTA BY RAIL AND RIVER

(percentage)

| Sl. No. | Item | 1960-61 | | 1973-74 | | 1980-81 | |
|------------|-------------------------|---------|---------|---------|---------|---------|--------------|
| | | Inflow | Outflow | Inflow | Outflow | Inflow | Out- flow |
| 1 | Wheat | 1.22 | 32.95 | 7.11 | 12.81 | 14.20 | 1.06 |
| 2 | Rice | 6.12 | 8.29 | 6.37 | 0.09 | 11.84 | 0.13 |
| 3 | Other food- grains | 3.23 | 1.02 | 7.24 | 2.62 | 3.68 | 2.18 |
| 4 | Sugar, gur, | 3.25 | 0.08 | 4.36 | 0.06 | 3.96 | 0.85 |
| 5 | Tea | 2.43 | 1.72 | 1.05 | 3.42 | 0.03 | 4.17 |
| 6 | Salt | 0.05 | 5.51 | 1.92 | 4.09 | 1.83 | 4.16 |
| 7 | Coal and Coke | 54.89 | 8.07 | 38.05 | 4.67 | 28.19 | 0.05 |
| 8 | Iron and Steel | 7.60 | 26.27 | 19.51 | 50.06 | 10.12 | 41.66 |
| 9 | Timber and Teak | 2.81 | 1.09 | 4.31 | 0.91 | 1.92 | 1.18 |
| 10 | Cement | 3.85 | 0.50 | 6.34 | 1.16 | 13.79 | 3.91 |
| 11 | Bricks and tiles | 0.27 | 0.30 | 0.37 | 1.15 | 0.07 | 0.39 |
| 12 | Raw Jute | 3.32 | 0.09 | 2.27 | 0.48 | 0.48 | 0.05 |
| 13 | Gunny bags and cloth | 0.03 | 2.72 | 0.25 | 13.29 | 0.05 | 21.15 |
| | Total of 13 items | 89.07 | 88.61 | 99.15 | 94.91 | 90.16 | 80.94 |
| | Total flow | 100 | 100 | 100 | 100 | 100 | 100 |
| | Million tonnes | 6.77 | 2.24 | 4.94 | 0.96 | 4.59 | 0.79 |

Source : The same as in Table-15.

TABLE - 22

FLOW OF THE SELECTED COMMODITIES TO AND FROM CALCUTTA BY
RAILWAY AND RIVER DURING 1950-51 to 1980-81

(in '000 tonnes)

| | 1950-51 | 1960-61 | 1973-74 | 1980-81 |
|-------------------|---------|---------|---------|---------|
| 1. Wheat | | | | |
| Inflow | 37.6 | 82.9 | 350.9 | 651.7 |
| Outflow | 176.0 | 736.8 | 7.1 | 8.4 |
| 2. Rice | | | | |
| Inflow | 227.9 | 414.5 | 314.6 | 543.4 |
| Outflow | 80.6 | 185.4 | 0.9 | 1.1 |
| 3. Coal and coke | | | | |
| Inflow | 4252.9 | 3716.1 | 1878.9 | 1294.0 |
| Outflow | 109.5 | 130.5 | 44.7 | 0.4 |
| 4. Iron and Steel | | | | |
| Inflow | 255.2 | 514.3 | 963.4 | 464.4 |
| Outflow | 332.0 | 587.6 | 479.4 | 331.2 |
| 5. Cement | | | | |
| Inflow | 123.8 | 260.3 | 312.8 | 632.7 |
| Outflow | 102.3 | 11.2 | 11.1 | 31.1 |
| 6. Salt | | | | |
| Inflow | 24.6 | 3.6 | 94.9 | 84.2 |
| Outflow | 335.4 | 123.3 | 15.9 | 33.1 |
| 7. Tea | | | | |
| Inflow | 195.9 | 164.7 | 51.7 | 1.3 |
| Outflow | 29.9 | 38.4 | 32.8 | 33.1 |
| 8. Raw Jute | | | | |
| Inflow | 302.8 | 225.1 | 112.1 | 21.9 |
| Outflow | 4.8 | 2.1 | 4.6 | 0.4 |
| 9. Jute Products | | | | |
| Inflow | 11.1 | 2.1 | 12.8 | 2.3 |
| Outflow | 30.7 | 60.9 | 128.2 | 168.1 |

Source : Compiled from relevant issues of Accounts of Inland (Rail and River borne) Trade of India, (Department of Commercial Intelligence and Statistics, Government of India).

TABLE - 23

THE PATTERN OF MOVEMENT OF PETROLEUM PRODUCTS IN EASTERN INDIA AFTER COMMISSIONING OF PIPELINES, 1970.

| Consumption/ distribution centre | Source of supply | Nearest point on pipeline | Means of trans- portation from source |
|----------------------------------------|---------------------|---------------------------------|---------------------------------------------|
| West Bengal | | | |
| 1. Calcutta | Haldia | Kolaghat ^φ | Pipe-cum-road |
| 2. Kharagpur | Haldia | Kolaghat | Pipe-cum-road |
| 3. Asansol | Haldia | Asansol | Pipeline |
| 4. Rampurhat | Haldia | Asansol | Pipe-cum-road |
| 5. Siliguri | Gauhati | Siliguri | Pipeline |
| Bihar | | | |
| 6. Tatanagar | Haldia | Kolaghat | Pipe-cum-rail |
| 7. Chakradharpur | Haldia | Kolaghat | Pipe-cum-rail |
| 8. Patna | Haldia | Patna | Pipe-line |
| 9. Gaya | Haldia | Asansol | Pipe-cum-rail |
| 10. Kodarma | Haldia | Asansol | Pipe-cum-rail |
| Orissa | | | |
| 11. Rourkela | Haldia | Kolaghat | Pipe-cum-rail |

(φ) : Nearest point for Calcutta has been Maugrigran after the establishment of Haldia-Maurigram-Rajbandh pipeline.

Sources : Government of India (Planning Commission), Commodity Transport Studies - Summary, New Delhi, 1968, Vol. 1, p. 176; Bureau of Public Enterprise, Government of India, Annual Report on the Working of Industrial and Commercial Undertakings of the Central Government 1974-75, Vol. 2, p. 40.