

**TRANSPORT SYSTEM AND
ECONOMIC
DEVELOPMENT IN ASSAM**

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**PUBLICATION BOARD, ASSAM
GAUHATI-781021**

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Published by
C. P. Saikia, Secretary,
Publication Board, Assam, Gauhati-781021

338. 954 163
MED

First Published : 1978

717
27.8.91

Price : Rs. 45.00

Printed at
N. K. Gossain & Co. Private Ltd., 13/7, Ariff Road, Calcutta-700067



000717

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CHAPTER I

INTRODUCTORY

TRANSPORT IS A personal activity, a social service and an industry that constitutes one of the most important activities of men in every stage of advanced civilisation.¹ No nation could indeed afford to overlook the crucial role of transport in economic development at the national and regional levels as well as in the expansion of international trade. To-day efforts have been made to explain regional imbalance in terms of infrastructure² of which transport is a vital component.

The significance of the transport sector lies not only in the specific services it renders, but even more in the unifying and integrating influence it exerts upon the economy, bringing village and town and the remote and the more developed regions closer to one another, enhancing productivity, widening the market and introducing new stimuli to economic activity.

While it would not be inappropriate to observe that railways have made the development of a certain region possible, it is equally undeniable that the development potential of a region or area has also been responsible for the development of railways. The nature of such relationship, however, varies from region to region depending on the stage of economic development and various other complex set of circumstances. One may further observe that at the initial stage of development of a particular region quantitative aspect of transport is more important while at a later stage of development of the same region it is the quality of transport which assumes more significance. The impact and counter-impact of each different type of transport facility may also be different in the same region from time to time.

The impact of new railway line varies depending on the natural endowments of the region through which it passes. Schumpeter states that as soon as a railroad through a new country gets into working order it disturbs all conditions of location, all cost calculations and all production

¹ The Mediterranean Sea was the cradle of Western and Middle Eastern civilisation, but only those states on its shores became great empires which expanded transportation beyond what was afforded by the sea itself. (Encyclopaedia Americana : volume XXVII, p. 25)

² Infrastructure aids income generation and production in the rest of the economy rather than income generation and production within the infrastructure enterprises themselves : the profitability in superstructure enterprises is usually higher than that of infrastructure enterprises.

functions within its radius of influence.³ Thus, we have the Schumpeterian scheme in which railway innovation plays a critical initiating role in both the Juglar cycles and the Kondratieff by the magnitude of the direct investment involved and by the reverberating effect on related industries.⁴ Again, we have the theory of economic development which stresses the role of railways and the related complex of social overhead capital as a precondition of rapid growth. Other economists have stressed the importance of the railways in creating such forces of economic growth as capital markets, corporate organisation, technical education etc.⁵

There is not much disagreement on the point that transport aids in extending the money economy to the agricultural sector and raising its productivity, that it helps to attain preferred regional distribution of population and industry. But the controversial issue is whether the impact of railway is primarily exogenous or endogenous, whether railways first set in motion the forces culminating in the economic development of a region, or whether arising in response to profitable situations, they play a mere passive role.⁶ An answer to such a controversy may be provided by stating that the extent to which transportation stimulates new activity depends on the existence of many conditions within the economy, namely, the quality of administrative structure and social order, the character and drive of its educational system, the nature of legal and property relationships, and the other dimensions of an economy's "propensity to grow".⁷

RAILWAY DEVELOPMENT AND ECONOMIC GROWTH

While trying to explain the mechanism of growth process consequent on the impact of railways, Rostow considers the Western American railways of the nineteenth century as a primary growth sector (from, say 1850 to 1885) and the rapid expansion in the iron, coal, and steel industries as supplementary growth phenomena.⁸ To quote him:

"wheat lands may lead to railroads, and railroads to iron and steel; but the railroads having been built, in turn, generate an endless series of further developments with a life and vitality of their own. The railroads may force the development of an engineering industry from

³ Schumpeter, J.A. : *Business Cycle* (1964), pp. 75-76.

⁴ According to Cootner, railroad investment is induced by certain world-wide economic incentives for commodity production and is not an autonomous, cycle-inducing factor. The phenomena associated with the "Kondratieff" cannot be explained by railroad innovation, and, in particular, not by the Schumpeterian model. (Cootner, P.H. : *Transport Innovation And Economic Development — 1952-53* : Unpublished Thesis submitted to the M.I.T., U.S.A.).

⁵ Cootner, P.H. : *The Role of the Railroads in the U.S. Economic Growth* : *The Journal of Economic History*, volume XXIII, No. 4 (December 1963), p. 477.

⁶ Owen, Wilfred : *Strategy For Mobility* (1966), p. 203.

⁷ Heymann, Hans : *The Objectives of Transportation* in 'Transport Investment and Economic Development', Fromm, G. (Ed.), 1965, p. 31.

⁸ Rostow, W.W. : *The Process of Economic Growth* (1960), p. 265.

which flow many other industrial innovations. A steel industry devoted heavily to the manufacture of rails, in the first instance, may help generate other applications of steel — to bridges, ships, machinery — when the rail demand falls off.”⁹

In the context of the American economy, Rostow thus observes that the introduction of the railways has been the most powerful single initiator of take-off in view of their three-fold impact on economic growth.¹⁰ First, the railways tend to lower transport cost, bring new areas and products into market and widen market. Secondly, these help in developing and enlarging an export sector for generation of capital for internal development. Thirdly, and most prominently, railways entail acceleration effect on the development of coal, iron and engineering industries. But these triple effects alone, consequent on railway construction, are not sufficient to lift the economy to the stage of self-sustained growth. For the society must assume position to develop deeper institutional, social and political prerequisites for take-off. A society must be well-prepared to respond favourably to the impact. To put it in other words, additional income should come to persons who will not only save a higher proportion of increasing income but who will re-invest it in highly productive channel, thus giving rise to a circular process of higher effective demand, bigger market and so on.

The railways, Rostow goes on to add, have led to transformation of old urban centres and the creation of new ones, not solely for railways’ maintenance but also to handle the marketing and commercial traffic. These lateral effects increase the number of dynamic people in the total population and encourage modern attitudes to the production process.

While referring to the forward effects, Rostow notes that leading sectors have forward effects not only on technology but also on supply of raw material. Although the railways in the States were extended to new regions to exploit the possibility of rising grain prices, simultaneously railways found it possible to touch mineral resource centres. The railways have as such induced take-off through their multiple effects.

Rostow says that the take-off in France began in 1830 and was essentially due to railway construction. As regards Germany, Hoffmann states that railway investment during 1835-80 constituted an important incentive both qualitatively and quantitatively for the early industrial development and had an additional effect on economic growth: and he finds a close connexion between the development of the railways and the cyclical movements of the producer goods industries.¹¹ The take-offs of the United States,

⁹ Rostow, W.W. : *The Process of Economic Growth* (1960), p. 267.

¹⁰ *Ibid.*, p. 302.

¹¹ Rostow, W.W. : *The Economics of Take-off into Sustained Growth* (1963) pp. 105-129.

France and Germany, all completed by 1873, were based squarely on railways rather than cotton textiles. In Japan the take-off between 1880-1900 was built on railways, alongwith other things like ship-building, cotton manufacture etc. Rostow states that it is the railway, with its multiple impact on growth, that took Russia into its take-off by the outbreak of the First World War. Like the American take-off the Russian take-off brought to life new modern coal, iron and heavy-engineering industries, and the railway take-off was followed by a stage dominated by the spread of technology.¹²

Even if we do not fall in line with Rostow about the probable impact of railways on an economy we may at least state that there are certain definite consequences of new railway investment. First, if a faster, safer and more dependable form of transport opens up new regions at a lesser cost, it means lesser input is being required to move any volume of goods or any number of persons from one place to another. The crucial point is: how are these released inputs (resources) subsequently used? The secondary effect of this transport development depends on the manner of utilisation of the released inputs. Secondly, the introduction of railways may lead to diversion of resources which otherwise would have been employed more profitably elsewhere. Thirdly, the introduction of railways may eliminate the protection of high transportation cost which acted as a shield against low-cost competition from other regions. In such a case the backward effects may more than neutralise the other spread effects when expansion in sector or region becomes competitive with other regions. An impact of the first type may assume the form of an increased income to producers, consumers, or the suppliers of transport services. But this increased income is meaningless if it does not promote growth through judicious utilisation or if there is no proper investment opportunities for this increased income owing to presence of certain non-economic or institutional factors which are present especially in underdeveloped areas. Transportation's contribution to growth process depends also on the way in which it is made available to society. Alongwith facilities there is to be adherence to published rates and removal of discriminatory practices.¹³ It is, therefore, safe to conclude that the impetus to development process requires a set of conditions of which transport facility is only one. A more fundamental precondition for development is a propensity and ability to identify and exploit a new economic opportunity and a favourable institutional framework, a factor which is very much absent in underdeveloped countries with long colonial characteristics.

Wilson¹⁴ views transport as a strategic sector from two standpoints:

¹² Rostow, W.W. : *The Stages of Economic Growth* (1965), pp. 61-95.

¹³ Healy, K.T. : *Transportation as a Factor in Economic Growth* : *The Journal of Economic History* : volume VII, 1947, p. 86.

¹⁴ Wilson, George W. : *The Impact of Highway Investment on Development* (1966), p. 4.

first, there is a positive correlation between rising gross national product per capita and the degree of mobility. Secondly, there are many non-economic benefits such as national cohesion, political and social unity and the defence needs. Moreover, capital formation in an economy can be linked to transportation investment in as much as about 20 to 40 per cent of annual gross domestic investment is devoted to transportation facilities in underdeveloped countries. In developed countries the proportion ranges between 10 to 14 per cent.

Wilson states that exact nature of impact of transport development depends on the degree to which new economic opportunity is created and the nature of reaction to this new economic opportunity.¹⁵ Economic opportunity is created when the region served by new transportation system is rich in resources quantitatively and qualitatively, and when there is reduction in transport charges. The reaction to such opportunity, in turn, depends on the attitude to changes or novelty. Paradoxically, sometimes creation of economic opportunity and a positive response to opportunity may go against each other. To illustrate, increased accessibility leads to increased opportunity: but increased accessibility is achieved through more stations and frequent stops which mean increased cost (to railways). And if increased cost leads to increased rate it may dampen the response to the economic opportunity so created.

An important issue that deserves probe in regard to impact of railways on the development process in the context of underdeveloped country is whether the railways help all existing industries in the same manner. In case the railway services are to meet the demands of a particular industry, their development potential is closely linked to that industry. It is generally observed that lower the degree of economic development, the higher the degree of transport specificity. In an underdeveloped region like Assam with vast agricultural and plantation sectors and a small undiversified manufacturing sector, the railway services were more specific (to a particular industry, say, tea) and less social at the initial stage of introduction. With the process of gradual development transportation facilities become available to a variety of industries.

The impact of railways, indeed, depends on the environment existing in the region. If there is an atmosphere in which economic opportunity tends to be sought and quickly exploited and where the economy experiences initial growth the task of railways becomes easy. Under such a situation railways facilitate process of development. But in the absence of proper environment railway is required to initiate growth process — a task which is more complex than the facilitating role.

¹⁵ Wilson, George W. : *The impact of Highway Investment on Development* (1966), p. 192.

Albert Fishlow¹⁶ states that railways played an important role in initiating and sustaining economic growth in the United States before the Civil War. He explores three main "paths of influence" through which the railways contributed to economic growth, namely, direct benefit of lower transport cost, growing demand for railway construction and operation, and consequent sequences generated by the availability of railway services. Assigning a major strategic role to railways in economic growth of the United States, he says that from the standpoint of historical fact, it is the railroad that actually brings lower transport cost and induces economic benefits which must be credited to it. Lower transport cost increases the size of the market and affects production decisions in agriculture and industry. What Hirschman calls forward linkage effect is the induced response of other activities as a result of reduction of transport cost. According to him, the principal beneficiary of the antebellum rail network is agriculture rather than industry and that private profits and private enterprise are the main instigators of the rapid extension of railways into the West in the 1850's.

There are other economists who opine that the impact of the railways in the process of growth has been overstated.¹⁷ Cootner, for instance, is of the view that the main significance of the railways for the United States economic growth in the 1850's is that it enabled her to expand population and production at a lesser cost than would otherwise have been the case and that railroads were no more important than wheat or cotton or iron. Like all goods in a price economy, railroad was brought about because its economic benefits exceeded its economic costs. If its benefits were not required, the resources it consumed would have been used to greater benefit elsewhere. According to Cootner, the major impact of the railroads did not come until forty years after the innovation itself. Fogel¹⁸ also challenged the view that railways were indispensable to the American economic growth during the nineteenth century. According to him, railways did not play a vital role in shaping the United States economy as America could have achieved nearly the same level of prosperity without the railroads as it did with them. He contends that the crucial aspect is the implicit assertion that the economy of the nineteenth century lacked an effective alternative to the railroads and was incapable of producing one. Fogel pleads in this respect that as the range and potentiality of the supply of alternative opportunities are virtually unknown the conclusion that developmental potential of substitutes for railways was very low rests on a series of questionable assumptions rather than on demonstrated facts. He goes further to state that in the absence of railways motor vehicles would have been

¹⁶ Fishlow, Albert : *American Railroads and the Transformation of the Ante-Bellum Economy* (1965).

¹⁷ Cootner, Paul H. : *Op. Cit.*, pp. 501-517 & Fogel, Robert, W : *A Quantitative Approach to the Study of American Economic Growth : The Journal of Economic History*, volume XXII (June 1962).

¹⁸ Fogel, R.W. : *Railroads and American Economic Growth* (1964), p. 10.

introduced at an earlier date than they actually were. Prest even goes further to state that magnitude of the impact of transport development on economic growth may be negligible. Major road improvements in Ethiopia in recent years have led to substantial reduction in journey times and freight costs and substantial increase in traffic. But there is no evidence that this has led to more rapid growth of the economy.¹⁹

Thus, the precise nature of relationship between transport and economic development is difficult to specify and quantify. Transport plays both a passive and a dynamic role in the development process. It is passive in meeting the current demands of the economy. It is dynamic in facilitating the exploration of unutilised or underutilised resources. When we try to measure the impact in terms of cost and benefit, we find that measuring the benefits is much more difficult than measuring the cost, as the benefits of transport facilities are more indirect than direct. Again, not only the quantity of benefit but the manner of distribution of benefit in the economy is also important. If with railway development there is reduction in overall cost but no freight reduction, the consumers do not get benefit and the railway might have benefit of higher profits. In such a case net benefit to the economy depends on how the railway uses this higher profits. Besides, there is an additional problem of determining the benefits accruing from transport and various other investments, for, in many cases the transport facility is not the only investment made to achieve increased development in an economy. It is for this reason that it becomes extremely difficult to find out the relative rôle of railways in the process of development.

The manner in which railways exert impact on the process of development differs from country to country owing to a multitude of factors referred to earlier. In Europe the railways were built to accommodate existing traffic, whereas in America these were constructed to handle new traffic. In Europe the railways were the result of civilisation, in America, on the other hand, a harbinger of civilisation.²⁰ In Britain, the industrial revolution preceded the development of railways. The industrial towns like Liverpool, Manchester, Birmingham and Sheffield had already grown to major size by 1830. The task left to the railways was to link together these urban areas. The part played by the railways in America was played by the canals and coastwise shipping in Britain.²¹ As Marshall states, probably more than three-fourths of the whole benefit England has derived from the progress of manufactures during the 19th century has been through its influences in lowering the cost of transport of men and goods, of water and light, of electricity and news: for the dominant economic fact of our own age is the development not of the manufacturing but of the transport

¹⁹ Prest, A.R. : *Transport Economics in Developing Countries* (1969).

²⁰ Seligman, E.R.A. : *Principles of Economics* (1906), p. 520.

²¹ Milne, A.M. : *The Economics of Inland Transport* (1960), p. 37.

industries.²² The rôle of railways is dominant even in Socialist or controlled economies. Lenin states "the railways are the key, they are one of the most striking manifestations of the connection between town and country, between industry and agriculture, on which socialism is entirely based".²³ In Argentina the railway was like a magic talisman, for wherever it went, 'it entirely transforms the economic and productive conditions of the country'.²⁴ In Australia, the State came in to encourage settlement by building railways.²⁵ It is also said that in the mass production, mass distribution era, the railways of Australia have emerged as the mass producers of transport.²⁶

Owing to peculiar characteristics of underdeveloped regions, such as lack of responsiveness to market forces, presence of unorganised agricultural sector, uneven distribution of wealth, illiteracy and State policies, we cannot expect to have the type of impact of railways in India, and for the matter in Assam, as we find in the United States before and after the Civil War. We do not have profit-motivated, market-oriented and mobile farmers.

The economists differ as to the nature of impact of railways on the Indian economy, especially in the pre-independence era. To Marx, the harbinger of the "British Revolution" in India was the railway, for once this was introduced, the dialectical process of industrial inevitability became operative. Given the availability of strategic resources, industrialisation was irresistible once railways were laid.²⁷ Marx, while commenting on Lord Dalhousie's proposition to build railways in India, predicted in 1853:

".....when you have once introduced machinery into the locomotion of a country, which possesses iron and coal, you are unable to withhold it from its fabrication. You cannot maintain a net of railways over an immense country without introducing all those industrial processes necessary to meet the immediate and current wants of railway locomotion, and out of which there must grow the application of machinery to those branches of industry not immediately connected with railways. The railway system will, therefore, become in India truly the forerunner of modern industry."²⁸

Stressing upon the important role played by the railways, Knowles comments, "indeed if one wanted to get an adequate idea of what the railways

²² Marshall, A. : Principles of Economics (1959), p. 561.

²³ Soviet Union Fifty Years, Central Statistical Board, (1969).

²⁴ Martinez, A.B. and Lewandowski, M. : The Argentine in the Twentieth Century (1911), p. 108.

²⁵ Copland, D.B. as quoted by Frankel, S.H. : Capital Investment in Africa (1938), p. 14.

²⁶ Indian Railways : Annual Number 1970, p. 195.

²⁷ Cited by Clairmonte, F. : Economic Liberalism and Underdevelopment (1960), p. 118 (from the periodical *Vnter dem Banner des Marxismus*, 1925).

²⁸ Marx, K. and Engels, F. : On Colonialism, Moscow, p. 79 ; Marx, K. : Articles on India, Bombay (1951), p. 70.

have meant to India, one has only to read the list of complaints quoted in the Report of the Acworth Commission to see how the whole country had come to depend on railway transport."²⁹ Nurkse also opines that although railways were built in India to meet Britain's rising demand for primary products, and although railways did not help in developing communications between different interior places, they did provide an essential prerequisite to over-all economic development in the vast open areas.³⁰ Myrdal also says that although the railway enterprises were motivated primarily by the colonial government's own interests and those of their settlers and business groups, they represented important advances towards creating conditions for general economic development.³¹ Recently, Bonavia has remarked that economic influence of transport is even more obvious than its social effects, since its efficiency (or lack of efficiency) reacts directly upon almost all forms of industry and commerce.³²

There are others who do not want to emphasise duly the impact of railways in India. Daniel Thorner opines that in the economic sphere the railways fostered a measure of regional specialisation in both agriculture and industrial production and encouraged the bringing of more land under cultivation; that the railways also appear to have helped raise the level of wages and prices and make them more nearly uniform in the sub-continent as a whole. Yet he maintains that the railways, which have been the largest and most important enterprise of a truly modern character in India, involving heavy machinery, precision techniques and advanced communications, have had surprisingly few constructive results. They helped spread a veneer of modernisation over the countryside while doing little to initiate a process of genuine modernisation.³³ It is argued that advances in the cotton textile industry in 1854 and after were the only industrial advances which were the result of Indian entrepreneurship in that period.³⁴ Railways "neglected the question of the development of local industries along their lines".³⁵ And they "did not give rise to a flood of satellite innovations and destroyed more occupational opportunities than (they) opened up".³⁶ It is held that railways simply helped to strengthen the complementary colonial relationship. "India had the outer form of many British institutions but not the inner core, the shadow but not the substance."³⁷

²⁹ Knowles, L.C.A. : *The Economic Development of British Overseas Empire* (1928), p. 347.

³⁰ Nurkse, R. : *Problems of Capital Formation in Underdeveloped Countries* (1953), p. 86.

³¹ Myrdal, Gunnar: *Economic Theory And Underdeveloped Regions* (1958), p. 56.

³² Bonavia, M.R. : *Memorandum on Road and Rail Coordination in India*: January (1964), in *Report of the Committee on Transport Policy and Coordination*, January 1966, p. 312.

³³ Thorner, Daniel: *Great Britain and the Development of India's Railways*: *Journal of Economic History*, volume XI, No. 4, 1951, pp. 399-400.

³⁴ Myers, C.A. : *Industrial Relations in India* (1960), p. 27.

³⁵ Gadgil, D.R. : *The Industrial Evolution of India* (1942), p. 126.

³⁶ *Ibid.*, p. 127.

³⁷ Lamb, Helen: in Kuznets, Moore and Spengler (Ed.)—*Economic Growth*: p. 486.

Indian writers like Dadabhai Naoroji, G. V. Joshi, R. C. Dutt, Tilak, Justice Ranade, D. E. Wacha, G. S. Iyer all were critical of the overall impact of the railways on the Indian economy. It is interesting to note the confusing criticisms made by some thinkers in the midst of such scepticism. R. C. Dutt, quoting the Famine Commission's Report (1898), maintained that new railway lines were pushed on vigorously beyond the urgent needs of India, and certainly beyond her resources and that the Famine Commission of 1900 recommended an increase in the rolling stock, but did not urge further extension of railway lines.³⁸ It was stated that the Special Commissioner sent out to India in 1900's to inquire into Indian railways also admitted that so far as railways per square mile of territory were concerned India was better served than Trans-Caspian Russia or Siberia, than Egypt or Natal, than Transvaal or Orange River Colony, than New Zealand or Victoria.³⁹ Daniel Thorner, on the other hand, quoted the Mackay Commission to say that India's total railway network remained much too thin—that in 1908, when about 33,000 miles of railways were opened, India needed a network three times larger, a full 100,000 miles.⁴⁰ Perhaps most of the critics of railways did not realise that impact of railways was narrow not only in colonial India but in China too—where other factors vital for growth process were absent.⁴¹ Cootner has explained the position by stating that British capital flowed to India in large quantities for investment in social overhead capital during 1850-73 just as it flowed to the United States, Canada and Australia, yet the latter countries grew and prospered while India stagnated. In fact present day India has almost the same railway mileage per square mile that the United States had in 1875 (and a substantial mileage of good highways as well), yet the United States in 1875 was well on her way to supremacy, and most of us are much less sanguine about India.⁴²

Most of the critics of railways made a mistake by assuming that the establishment of a railway network must inevitably lead to industrialisation. They failed to realise that railway investments do not automatically create

³⁸ Dutt, R.C. : *The Economic History of India* (1963), volume II, pp. 399-400.

³⁹ Dutt, R.C. : *The Economic History of India* (1906), p. 547.

⁴⁰ Thorner, D. : *Op. Cit.*, p. 396.

⁴¹ In China railways were opposed at the outset by the leaders so much so that in one instance a complete railway enterprise was purchased from the European 'devils' only to be deliberately destroyed. (Woodruff, W. : *Impact of Western Man*, 1966, p. 234).

⁴² Cootner, P.H. : in W.W. Rostow's—*The Economics of Take-off into Sustained Growth* (1963), pp. 275-276.

By 1870 railway mileage in the United States was about 53,400 and the same in India was about 5,300. The average rate of speed for passenger trains on the Massachusetts railways in 1860 was 40 kilometres an hour. (Kirkland, E.C. : *Men, Cities and Transportation*: 1948: p. 319). At the same time we may note that by 1960 France with a railway route of only 25,470 miles had about 3.5 lakh wagons, i.e. 50 per cent more than in India. Similarly, Great Britain, much smaller in size and with about 60 per cent of India's railway route, had over 5 times as many wagons as India. Again as far as railway mileage per billion person was concerned, by 1955, Denmark was 44 times and Great Britain 9 times better off than the United States and even Turkey, Argentine and Japan ranked higher than the United States. (Srivastava, R.S. : *Agricultural Marketing in India and Abroad*, 1960, p. 85 and p. 92).

enhanced possibilities for the risk-taking dynamic entrepreneurs in the Schumpeterian sense of the term. Many critics⁴³ maintained that the financial profitability of new lines should form an important consideration which should be carefully weighed and established before they were sanctioned. It appears that many of the critics wanted to encourage industry⁴⁴ only and not all round economic development. In fact some of the critics overlooked the fact that railway enterprises themselves were an industry. However, some of the criticisms were significant and the impact of railways in India tended to be far-reaching "as a result of the vigilance of the Legislature and partly as a consequence of an enlightened recognition of the best interests of India by Government."⁴⁵

ECONOMIC GEOGRAPHY OF ASSAM

Transport development in Assam⁴⁶ is conditioned, in addition to other factors, by the topography of the region. An inquiry into the nature of the impact of railways on the economy of Assam is, therefore, attempted after making a brief study of the physical and economic geography of Assam.

Situated in the north-eastern region of India, Assam is encompassed on three sides by foreign countries like Tibet and China on the north, Burma on the east, and Bangla Desh (formerly East Pakistan) on the south-west. As the State has a common border with Arunachal (formerly North East Frontier Agency), Nagaland, Manipur and Tripura, all lines of communication to and from these areas have to pass through Assam. Further, the State is connected with the rest of India by a narrow strip of land (about 50 kilometres) through north Bengal.

Till recently Assam had an area of 121,973 square kilometres, representing 3.7 per cent of the land surface of India and ranked twelfth among the states of the country. The State divides itself into two physiographical regions—the plains and the hills. The plains region with an area of 63,236 square kilometres consists of seven districts in the Brahmaputra Valley (namely, Goalpara, Kamrup, Darrang, Lakhimpur, Dibrugarh, Nowgong and Sibsagar) and one (Cachar district) in the Surma Valley. The hills region with an area of 58,737 square kilometres consisted of five districts (namely, Garo Hills, United Khasi and Jaintia Hills, North Cachar

⁴³ Chandra, B. : *The Rise and Growth of Economic Nationalism In India* (1966), p. 199.

⁴⁴ *Ibid.*, p. 215.

⁴⁵ Sanyal, N. : *Development of Indian Railways* (1930), p. 371.

⁴⁶ Assam first became a British Protectorate at the close of the First Burmese War in 1826. In 1832 Cachar was annexed; in 1835 the Jaintia Hills were included in the East India Company's dominions, and in 1839 Upper Assam was annexed to Bengal. In 1874 Assam was detached from Bengal and made a separate Chief Commissionership. On the partition of Bengal in 1905 it was united to the Eastern Districts of Bengal under a Lieutenant Governor. From 1912 the Chief Commissionership of Assam was revived and in 1921 a Governorship was created. On the partition of India in 1947 almost the whole of the predominantly Muslim district of Sylhet was merged with East Bengal (now Bangla Desh).

Hills, Mikir Hills, and Mizo Hills). On April 2, 1970 the first two hill districts were given the status of a "sub-state" named Meghalaya, with a total area of 22,445 square kilometres. In January 1972 Meghalaya was granted full statehood and Mizo Hills district was given the status of a Union Territory.

The plains region is traversed by the Brahmaputra and the Barak and their tributaries... No doubt, these rivers have increased the fertility of the soil but they have given rise to serious problems of erosion and flood causing an average annual loss of about Rs. 8 crores.

The annual rainfall in Assam ranged from 1,900 millimetres to about 7,000 millimetres. The average annual rainfall in the plains districts varies from 1,138 to 3,132 millimetres and that in the hills areas is about 2,550 millimetres. The heavy rainfall has its adverse effects on soil. About 80 to 90 per cent of the rainfall occurs between May and September, resulting in floods in the plains district every year. On the other hand, scarcity of water is experienced by some of these areas in winter.

The general feature of the soil in the plains and the hills areas is its high acidic content. In the plains the acidity is less due to the addition of new alluvial soils by the rivers. As the plains districts are covered by alluvial soils, the areas are fertile and suitable for growing rice, wheat, sugarcane, cotton, banana, tobacco etc. The red and yellow soils of the hill districts help in cultivation of paddy and fruit crops. In Garo Hills district we had areas of black cotton soil.

With about 14.95 million population (1971 Census) Assam (excluding areas of Meghalaya) accounts for about 2.7 per cent of India's population. During the last two decades there has been an annual growth rate of 3.4 per cent in Assam. Scheduled Castes, Scheduled Tribes and the Backward Classes account for about 40 per cent of the total population. About two-thirds of the people belonging to Scheduled Castes and Backward Classes live in the plains region while more than half of the tribal population live in the hills region. The size of Assam's urban population is about 8.4 per cent as against about 20 per cent for India as a whole. This is a pointer to the fact that until the vast rural areas are brought within the network of improved transport facilities there will be no real development and the economy will continue to be of an enclave nature.

As contended by the Indian Industrial Commission as early as in 1918, Assam possesses extensive forests and large areas of culturable waste land and presents important industrial possibilities to which we have not been able to do sufficient justice mainly owing to lack of adequate transport facilities.⁴⁷

⁴⁷ Report of the Indian Industrial Commission 1916-18: London, 1932: pp. 29-38.

The situation has not greatly changed today. There are about 70 different varieties of wood in Assam. The Lower Brahmaputra Valley is rich in tropical deciduous forests of *sal* (*Shorea robusta*), *sisso* (*Balbergia sissoo*). The coniferous pine forests are found in the United Khasi and Jaintia Hills (now in Meghalaya). Assam has the biggest bamboo and reed reserves contributing about 42 per cent of India's total outturn: these are scattered all over the State. There are 52 varieties of bamboo in Assam that can be utilised for manufacturing paper, pulp and rayon. Although the annual yield of bamboo is about 50,000 tonnes per year in Assam, according to experts, it can be increased ten times. Moreover, almost the entire quantity extracted goes outside the State as raw material for manufacture of pulp. The 'muli' variety of bamboo, which gives the highest quality pulp, forms 64 per cent of the entire bamboo resources of Assam.⁴⁸ There are also minor forest products like cane, thatching grass, khoir, lac, rubber, resin, agaru, dhuna, honey and varieties of medicinal herbs. Assam forest has made it possible to have an annual production of about 2,000,000 plywood chests for tea. In fact the rate of extraction of forest resources is much below the optimum or the required level mainly due to transport difficulties.

Assam produces about 3 per cent of total Indian coal and the known deposits of her coal are estimated to exceed 2,500 million tonnes. Assam coal is a national asset because of low ash and high sulphur content.⁴⁹ Assam coal has only about 5 per cent of ash which is rich in rare elements like gallium and germanium, both of which are needed in the electronics industry. These coals, on processing, yield as much as 40-50 gallons of low temperature tar per tonne of coal as compared to the all-India average of 8 to 10 gallons. And more than 50 per cent of this tar could be converted into diesel and kerosene fractions of which there is a shortage in the country.⁵⁰

Assam produces about 60 per cent of total crude oil in the country, the estimated reserve being 100 million tonnes. Upto 1953-54 Digboi was the only source of petroleum in India. In recent years new oil deposits are found in Sibsagar and Lakhimpur districts, especially in Naharkotia and Moran fields, which also show an estimated reserve of 7,90,000 million cubic feet of natural gas.⁵¹

The reserve of limestone in Assam is estimated to be about 1,600 million tonnes. With the output of about 0.9 lakh tonnes (1969) certain brands of limestone in the hills are of purer quality, having upto 98.5 per cent of calcium carbonate and can be used in chemical industries and for

⁴⁸ G.O.A. : Assam Information, April 1966, volume XVII.

⁴⁹ Though the high sulphur content prevents its use in industry, sulphur may be separated and with better technology coal could be utilised in fertiliser, sulphuric acid and sugar industry. (Economic Times, May 20, 1966).

⁵⁰ G.O.A. : Assam Information, April 1966, volume XVII, p. 19.

⁵¹ The Assam Tribune, Gauhati, August 25, 1967.

metallurgical purpose.⁵² Except the deposits of Cherrapunji and Theriaghat (which are now no longer in Assam) the limestone of other areas still remain untapped mainly because of transport difficulties.

Assam also produces about 90 per cent of total sillimanite output of India. Assam's sillimanite, as refractory material, is the best in the world and as such is an important foreign exchange earner.

Besides, an estimated reserve of 11 million tonnes of low grade iron at Chandardinga (Goalpara district) has come to notice. Apart from this the discovery of kaolin at Mawphlang (now in Meghalaya) and Sheelbhatta in Mikir Hills and the proving of feldspar and quartz deposits near Hahim (Kamrup district) may indicate future for ceramic industry.⁵³ At this moment Assam's entire requirements of ceramic materials are imported from outside. Some other important materials are also discovered in different parts of the State and these are fire clay, white clay, lithomargic clay, asbestos, corundum, gypsum, graphite, glass sand, Fuller's earth, phosphate and base metals (copper, lead, and zinc). In view of the present poor rate of extraction it can be rightly said that 'a sine qua non for the future growth of mineral industries is the improvement of transport facilities'.⁵⁴

As regards water power, Assam possesses more than 30 per cent of the hydel power potentiality of India. The Brahmaputra alone can produce 12.5 million kilowatt of hydel power and today only about 1 per cent of this potentiality is being exploited.

Although nature's bounties in the form of some important industrial raw materials have endowed the State with great possibilities, these have not been harnessed to the full extent except in certain selected sectors such as tea, petroleum and forest-based industries. In 1965 Assam with about 2.7 per cent of India's population, accounted for only 1.8 per cent of the country's gross industrial output, 1.3 per cent of value added by manufacturing industries in the country and 1.9 per cent of total employment in registered factories. Assam has only 2 per cent of India's total registered factories compared to 22 per cent in West Bengal and 16 per cent in Maharashtra. While other states have a somewhat diversified industrial structure, Assam's industrial sector is being dominated by miscellaneous food preparation including tea that accounts for about two-thirds of the total value of industrial products. This lop-sided industrial development could be traced to various inhibiting factors like shyness of capital due to vulnerability of the region, shortage of technical personnel in addition to transport situation and remoteness.

⁵² G.O.A. : Directorate of Geology and Mining, Assam: Assam (1969), p. 21.

⁵³ G.O.A. : Assam Information, December 1969, volume XX, p. 13.

⁵⁴ N.C.A.E.R. : Techno-Economic Survey of Assam (1962), p. 77.

Coming to agricultural resources in Assam, about 20 per cent of the land area is annually sown whereas about 67 per cent of the total population of the State depend on agriculture. As the pattern of cropping is conditioned by topography, we have 'jhumming' in the hills and settled cultivation in the plains. Paddy and tea are the principal crops in the plains region. Other important crops are jute, sugarcane, pulses and oilseeds. In the hill areas potato, citrus fruit, pineapples and paddy etc. are grown on flat lands or irrigated slopes. Cotton is an important crop in Mikir Hills (and Garo Hills district which is now in Meghalaya) but its demand is affected by transport difficulty. If the transport conditions improve it will be possible to grow cashewnut, coffee, black pepper, rubber etc. in hill areas in addition to other commercial crops like ginger, chilli, tobacco, sugarcane and fruits like orange, pineapple and banana.

NATURE OF COMMODITY FLOW

The pattern of commodity flow within a particular region is determined by the location of production and consumption centres. An analysis of the crop pattern in Assam shows that Assam has four crop regions, namely, the Upper Brahmaputra Valley (comprising Sibsagar, Lakhimpur, Dibrugarh and Darrang districts which specialise in the cultivation of tea, rice, sugarcane, oilseeds and pulses), the Lower Brahmaputra Valley (comprising Kamrup, Nowgong and Goalpara districts where the crop pattern is more diversified and rice, pulses, oilseeds, sugarcane, jute, potato, tobacco are grown), the Surma Valley (which consists of Cachar district and where the production pattern is same as in the Brahmaputra Valley), and the Hills districts (where rice, oilseeds, potato and fruits grow). Of all these regions, the flow of commodities from the Brahmaputra Valley to other areas is the highest owing to the fact that the Brahmaputra Valley comprising seven districts and 80 per cent of Assam's cultivated area produces about 80 per cent of Assam's total rice, 98 per cent of jute, 86 per cent of tea, 95 per cent of oilseeds and 85 per cent of sugarcane. The inflow of commodities to the Brahmaputra Valley from other states is also high. All these indicate that the transport needs of the Brahmaputra Valley are higher than those of the other areas. Another significant point is that as the crop pattern of the Lower Brahmaputra Valley is more diversified any one particular mode of transport appears to be inadequate for meeting the needs of the region.

Percentage of the cultivated area under different crops may give us an idea of traffic of each product in Assam. Of the total cropped area, paddy occupies 70 per cent, tea 7 per cent, oilseeds 6.2 per cent, jute 5 per cent and sugarcane 1 per cent. As regards tea, about 75 per cent of the total tea acreage is concentrated in the Upper Brahmaputra Valley (in Sibsagar, Lakhimpur, Dibrugarh and Darrang districts), 20 per cent in Cachar area and 5 per cent in the Lower Brahmaputra Valley. All these help us in

understanding that in the total intrastate traffic flow paddy occupies the most important place and in case of tea the outward (interstate) traffic is much from the Upper Brahmaputra Valley.

While trying to explain the relationship between infrastructure and per capita income, the Commerce Research Bureau states that the infrastructure index number for Assam is 72.5 and ranks thirteenth amongst the states which is well below the country's index of 100, as shown in the Table 1.1.

Table 1.1: Index Number of Availability of Infrastructure Facilities in Different States: 1966-67
(Base: India=100)⁵⁵

Rank	State	Index	Rank	State	Index
1	Punjab	201	9	Bihar	98
2	Tamil Nadu	171	10	Andhra Pradesh	93
3	West Bengal	152	11	Mysore	90
4	Kerala	135	12	Jammu & Kashmir	83
5	Haryana	129	13	ASSAM	73
6	Maharashtra	117	14	Orissa	69
7	Gujarat	111	15	Rajasthan	59
8	Uttar Pradesh	107	16	Madhya Pradesh	53

In view of such circumstances it appears that though by all standards Assam is rich in both agricultural and forest resources, because of the poor infrastructure and other constraints, as mentioned above, these resources have not been fully utilised. Transportation poses an even bigger problem because of the remoteness of the area: and remoteness has been a contributory factor towards the lag in the developmental pace of this State as compared to other states.

While we emphasise on the transportation situation, we need not overlook that even in early times when there were no railways Assam had connection with Bengal, Bihar and Orissa on the west, China, Tibet, Bhutan on the north and different frontier tribes all along her border.⁵⁶ At the close of the nineteenth century or in much earlier period such as 1808-09, as noted

⁵⁵ Commerce: Annual Number 1969, p. 20 and p. 137.

The items included in the computation of index number of availability of infrastructure facilities and their weightage are: Power (20), Irrigation (20), Railways (20), Roads (15), Education (10), Banking (6), Post Offices (5), Health (4).

⁵⁶ Waley, A.: *The Real Tripitaka*, p. 73; Ashley: *Bhutan*, p. 128; M'Cosh: *Topography of Assam*, p. 67; Report on the Trade Between Assam and the Adjoining Foreign Countries for the Period 1899-1900; Bhuyan, Dr. S.K.: *Anglo-Assamese Relations; Barua, Dr. B.K.: The Assam Tribune*, August 15, 1948.

by Martin, although there were no railways or modern means of communications in Assam area, considerable traffic moved between frontier tribal areas and more developed Bengal and these movements took place either by river or by road.⁵⁷

A study of the pattern of traffic movement after the partition of 1947 will show the nature of interstate commodity flow and indicate that though Assam exports large volume of jute, tea, cane, timber, fresh fruit to other states, she is bound to take in a substantial volume of imports of iron and steel, sugar, textile, pulses and salt owing to her location as a terminal state and existence of a large proportion of "bridge traffic" between Assam and neighbouring states like Manipur, Nagaland, Arunachal, Meghalaya and the Mizo Hills Union Territory.⁵⁸

The strain on the transport system of this terminal state (terminal from the point of railway) seems to be quite heavy if we take into account the special difficulties created after partition owing to long and circuitous route involving higher transport cost, both in monetary and real terms. Internally also, owing to peculiar topography with hills and rivers although the physical distance between the places is not much the 'economic distance' measured by the cost of transport often becomes forbidding.

To sum up, transport can be viewed either as a determinant of economic development or as an industry. Viewed as a determinant, it is an input to the economy; and viewed as an industry the transport (services) sector's output can be calculated like that of any other sector. Railway, being one of the most important modes of transport, affects the development of an area and, in turn, is affected by it. In advanced economies the impact of the railway has been carefully analysed and it is found to play either a passive or active role in the process of development depending upon the institutional, social and political prerequisites. The exact nature of impact of railways varies from region to region, industry to industry and time to time. The more conservative school opines that the railways are like any other determinant of production which is substitutable; and hence, some economists do not want to consider it as a specific factor for growth process. Although a very precise cost-benefit analysis of railways is difficult owing to various limitations yet the impact or benefit of the railways both direct and indirect is quite perceptible in any economy, developed or under-developed, socialistic or capitalistic. It is less difficult to calculate economic effects than social impacts of railway innovation. Yet there are many criticisms of railway policy and activities in India especially during pre-independence era. The impact of the railways in Assam is to be analysed in the backdrop of its resource potential, peculiar topography and location and

⁵⁷ Martin: Eastern India, volume III, pp. 660-661.

⁵⁸ G.O.A.: Regional Transport Survey — North Eastern Region, Shillong, December 1967, volume III, p. 115.

facilities afforded by alternative modes of transport, apart from railways' own activities. Although Assam is well-known for her natural endowments her transport structure (railway), both interstate as well as intrastate, needs analysis in the context of developmental needs. A study of the relative role played by different means of transport in both pre-independence as well as post-independence era, as is given in subsequent pages, would, therefore, afford us an interesting picture for making a real assessment of the impact of railways in the process of Assam's economic development. With this background of the economic geography of Assam and the nature of the commodity flow we now proceed to a study of the development of various means of transport before coming to study the impact of the railways on the economy of Assam.