

INFRASTRUCTURE: ITS DEVELOPMENT AND IMPACT ON AGRICULTURE IN NORTH-EAST INDIA

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INTRODUCTION

The term 'infrastructure' has been defined differently by different authors in various fields. In its literal sense it is a term coined by joining the words *infra* and *structure*, meaning thereby subordinate parts, substructure or foundation of an undertaking. The permanent installations like airfields, naval bases etc. for the purpose of military operations are some of the good examples of infrastructure. According to some economists, it comprises all those facilities and activities the basic rationale of which is the sustenance which they provide to income generation and production in the rest of the economy rather than income generation and production within the infrastructure enterprises themselves (Bajpai, 1995). To Rosenstein Rodan Infrastructure and Social Overhead Capital (SOC) are synonymous terms. According to him SOC comprises all those basic industries like power, transport, communications etc. which must precede the quicker yielding, direct productive investments and which constitute the framework of infrastructure (Sharma, 1995). Kindleberger and Herring (1973), however, while defining infrastructure introduced two more concepts such as Economic Overhead Capital (EOC) and Strictly Social Overhead Capital (SSOC) which are two different components of Social Overhead Capital. According to them, EOC are nothing but public utilities in the form of transport, communication, road, railways, electricity, etc. whereas SSOC includes the plants and equipments required for providing services in the form of education, health and housing. Rao and Prasad also gave similar views while defining the term infrastructure. However, Rostow and Nicholas Kaldor emphasized upon different characteristics of infrastructure at different points of time. Rostow (1960) stressed on the characteristics of long gestation period of infrastructure and the role of government in its creation and maintenance whereas Kaldor (1963) argued in favour of their creation and maintenance out of government revenue because of their huge establishment cost.

All the above mentioned views taken together leads us to draw the following common characteristics of infrastructure:

Infrastructures are basically certain facilities and services rendered to the society on which the structure of the economy largely depends. As it is multidimensional and multipurpose in nature it is accepted as a complementary sector and a boom to other sectors of the economy by creating external economies. Because of its long gestation period and huge establishment and maintenance cost it is generally financed by the government without having any profit motive.

INFRASTRUCTURE AND ECONOMIC DEVELOPMENT

A number of studies were undertaken by different economists to establish a linkage between infrastructure and economic development. While establishing the linkage between the two crucial factors economists proposed different operational definitions to these factors. However, all of them were unanimous that infrastructure was a *sine quanon* for overall economic development. According to Rostow, creation of infrastructure was one of the important pre-requisites for driving an economy from its traditional stage to the take-off stage. Brutan (1960) was of the view that infrastructure had a positive impact on the development of an economy by reducing cost of production through economies of scale and thereby increasing its profitability and overall increase in production, employment and hence further expansion. Ahluwalia (1984) statistically proved a significant correlation between infrastructure and per capita income of different states of Indian economy. There were also a few micro studies conducted on the linkage between economic development on the one hand and infrastructure in different forms on the other. In this connection mention may be made here about the works of Berdi and Cavinato who used transport and communication as the representative variables for in infrastructure. Similar type of studies were undertaken by Pandey, Rao, Pant and Verma in the agricultural sector where irrigation was taken to be the proxy variable for infrastructure. Kohli, Thakur and Singh studied the role of power in the economic development of a country. Some studies were also conducted treating services as the representative variable of infrastructure. For instance, the works of Cairncross, Nurkse, Schumpeter and Joan Robinson on the role of banking and finance and that of Tinbergen, Rao, Kuznets, Sen and Panchmukhi on human resource development through education and health care are worth mentioning.

All these literatures reveal that a good number of studies have been undertaken to establish the linkage between infrastructure and economic development both in the agricultural and industrial sectors at the national and international level. But none of the studies conducted on the role of infrastructure on the economic development of North Eastern Region of India has got any direct bearings with linkage. The present paper in this regard is an attempt not only to focus the magnitude and trend of infrastructural development in the region but also to study its impact on agricultural sector which is the leading sector of the economy in the region.

INFRASTRUCTURAL GROWTH IN NORTH EAST INDIA

Infrastructure being one of the vital sectors of the economy is highly neglected in the north eastern region. Even after 50 years of independence of the country, the region is not seen at par with the rest of the country. Both in terms of EOC and SSOC the region is lagging behind. The N.E. Region which constitutes 7.8 percent of the total geographical area of the country has a meager of 1, 16,551 kms. of road length. It is estimated that for every 100 sq. km. area the region has only road length of 45.7 kms. as against 62.8 kms in the country. Besides, road condition is far from satisfactory. Hardly 27.1 percent of the total road length is surfaced in the region in sharp contrast to 50.5 percent at the all India level. The state-wise figures reveal that Tripura is in the most advantageous position followed by Assam in regard to road development.

In the last ten years, however, there has been good progress in this regard. There has been an increase of road length from 28.7 kms. for every 100 sq. km. of area in the year 1983 to 45.7 kms. in 1992 when the entire country witnessed an increase from 47.3 kms. to 62.8 kms.

Development of railways is quite insignificant in the region. There exist only 2466.8 kms of length of railway line in Assam and 45 kms. in Tripura. All other states are yet to be connected by railway lines. About 266 kms. of length of broad gauge line has been created in the entire region. In other words only 10.6 percent of the total railway line in the region is broad gauge and that too it is only in the state of Assam. There has been very minor progress in the development of railway network in the region in the last ten years. The total gauge has increased hardly from 2378.6 kms. in 1983 to 2524.8 kms in 1992.

Power situation is also not satisfactory in the north east. The region has an installed capacity of 1138.8 MW of which Assam and Meghalaya taken together have more than 65 percent. The central sector has about 23 percent and the rest 12 percent by the remaining five states. As far as electrification of villages is concerned it is not lagging behind. Almost 83 percent of the total villages in the region are electrified when the same is 84 percent at the all India level. Assam and Nagaland have made tremendous progress and only 2 percent of the villages in these two states are not electrified. But due to inadequate supply of power in comparison to its demand frequent power failure is being observed; because of this reason per capita consumption of power is very low. It is as low as 83.9 KWH in Tripura. The highest per capita power consumption in the region is in the state of Meghalaya which is hardly 159.4 KWH as against the all India average consumption of 330.6 KWH.

Development of postal and telecommunication facilities although seem to be quite adequate, services rendered are considered to be not satisfactory from the consumers' point of view. As many as 428 telephones exchanges with 1.26 lakhs of switching capacities are installed in the region. It has been able to give as many as 1.02 lakhs connections. Over the years there has been tremendous progress in the telecom facilities. Number of telephone exchanges has increased from 272 in 1983-84 to 428 in 1993-94 and number of connections increased from 30, 686 to 1, 02,505 during the same period.

There are 6524 post offices located in different parts of the region. It is estimated that on an average each post office serves 5288 persons in the north east as against 5607 persons at the all India level. However, if we examine from the point of view of area served by a post office it can be said that the region is relatively more backward. Each post office serves a much bigger area of 48.2 sq. kms. on an average in the region as against an area of 21.6 sq. kms. in the country. There has also been greater disparity in the concentration of post offices in the different states in the north east. Tripura has been given maximum advantage in this regard. On an average every 15.08 sq. kms area has one post office in Tripura in sharp contrast to 311.15 sq. kms in Arunachal Pradesh.

Banking facilities created in north east is quite significant. There are as many as 2052 bank branches in the region of which 1048 numbers are in the rural areas. It seems rural areas are given adequate attention not only in mobilizing resources but also in giving loans to rural

artisans, small scale and cottage industries and farmers. However, every state in the region is not equally treated in this regard. Average number of population served by a bank branch varies from the lowest of 7753 in Mizoram to the highest of 17,335 in Assam. Although Assam is the second biggest state in the region least importance has been given to this state while opening more bank branches. However, there has been rapid rise in the number of bank branches over the years in the entire region. It has increased from 1274 branches in the year 1985 to 2052 branches in 1994.

Although people in north east are susceptible to various diseases because of many obvious reasons including non-availability of good quality of water and supply of poor quality of vegetables and fishes to the region, they have not been given adequate attention through better health facilities. In the entire region hardly 387 hospitals are established along with 8297 other small poor health centers in dilapidated conditions. The number of beds in total in these hospitals and health centers comes to 20,620. Average number of population served per bed in the region comes to 1637 as against all India average of 1324. However, there has been good progress in this regard during the period from 1984 to 1992. Number of hospitals has increased from 228 to 387, health centers from 2636 to 8297 and beds from 17,124 to 20,620 in the said period.

One of the most important infrastructures is education. It plays a crucial role in the economic development of a nation. Education develops not only skills and abilities of the people but also fosters a value system and creates awareness conducive to national development. It is one of the most powerful means of promoting social change. Realising the importance of this vital infrastructure the Government of India and different states have been giving more and more emphasis on it in different five year plans. Unfortunately, the progress made in this regard is not quite satisfactory at the national level. The last four decades of planning has resulted only in bringing up the literacy rate from 16.5 percent in 1951 to 52 percent in 1991. Besides, the Central Government has not been very successful in bringing the literacy rates for males and females at par. There still exists a wide variation in the literacy rates among the different states in the country.

In the north eastern region, however, excepting two states, viz., Arunachal Pradesh and Meghalaya, no other state is lagging behind the national average so far as literacy is concerned.

Mizoram has achieved the highest literacy rate of 82.3 percent in the region whereas Nagaland, Tripura and Manipur witnessed literacy rates around 60 percent which is much higher than the national average. More importantly, all the states in the region except Arunachal Pradesh have done excellent jobs in bringing up female literacy rate at a much higher level than that of the country as a whole. When the country witnessed a female literacy rate of 39.3 percent in the year 1991 Mizoram has been able to attain a rate of 78.6 percent which is double the rate of national average. It has set an example in the country. Although the north eastern region has fared well in bringing up literacy rates, at higher levels of education it has equally failed like that of the country in attaining uniformity in this regard among the different states. Growth of literate persons has also been quite satisfactory in the region in the last decade. Particularly Arunachal Pradesh which had the lowest literacy rate 20.8 percent in 1981 could attain a rate of 41.6 percent in 1991. Similarly, Mizoram which had the highest literacy rate of 59.9 percent in the region in the year 1981 could be able to maintain its status-quo by bringing up its rate to 82.3 percent in 1991.

Besides bringing up literacy rate at a higher level in the region, attempts were also made to improve education at its different levels. Primary education has been made compulsory. Higher education has been given due weight. Technical education is also not neglected in the region. The total number of educational institutions at the elementary level (i.e., up to Class VIII) has increased from 44,154 in the year 1983 to 54,948 in 1991 along with the increase in enrolment figure from 41.5 lakhs to 68.9 lakhs in the same period. Number of High Schools and Higher Secondary Schools has increased from 3260 to 5371 and the corresponding enrolment figure from 7.2 lakhs to 10.2 lakhs. Number of colleges for Arts, Science and Commerce streams has also increased from 210 to 317 and the enrolment from 0.8 lakhs to 1.5 lakhs during the same period. Three more technical colleges and two more Universities have been added. Subsequently, after 1991 three more Central Universities and one IIT have been established. Thus, from the educational point of view a tremendous progress has been achieved in the region.

INFRASTRUCTURE AND AGRICULTURAL DEVELOPMENT IN NE REGION

Among the important infrastructures on which the overall growth and development of agricultural sector in an economy depends are irrigation, power, transport and communication. We have already made some analysis on the growth of some of these infrastructures in the previous paragraphs. As far as irrigation is concerned it is believed that it has a direct impact on agriculture. It is considered to be the most crucial infrastructure and critical determinant of agricultural productivity. Irrigation yields its desired result when it is adequately available and timely supplied along with other modern inputs of production. As a matter of fact a number of steps were undertaken along with the creation of irrigation facilities by the Central and various State Governments. Unfortunately all the states in the region do not come under the purview of those fortunate states. If we have a look into the figures on plan allocation at the national level in different five year plans, we find that the role of agriculture has been highly undermined over the years. In the First Five Year Plan the Government of India invested 37 percent of the budgetary expenditure on the development of agricultural and allied sectors including the investment on irrigation and flood control. This percentage was reduced to 29 percent in the Second Five Year Plan and subsequently further reduced and it stood at 20 percent at the end of the Seventh Five Year Plan. The situation of the north eastern region in this regard is no different. Over the years the budgetary allocation for agricultural development has gone down in a systematic manner and it stood around 23 percent at the end of the Seventh Five Year Plan.

Hardly 22 percent of the net sown area in the region is irrigated as against 30 percent at the all India level. Virtually there has been no progress in the creation of irrigation facilities in the region over the last few decades. The existing irrigation system in the region is neither fully dependent nor equally spread over different states. Canal irrigation system does not at all exist in the states of Arunachal Pradesh, Manipur, Mizoram, Meghalaya and Nagaland. Irrigation in the form of tanks, tube wells and other wells is also insignificant in the region. About 50 percent of the existing irrigated land are supplied with water with very minor irrigation system devised mostly at the farm level and are non-dependable.

For the purpose of establishing the linkage, if any, between infrastructure and agricultural development, investment on irrigation and flood control was considered to be the proxy variable for infrastructure on the one hand and rice and total food grains production and their productivity were considered as the proxy variables for agricultural development on the

other in the present study. Data on these variables for a period of 10 years from 1983-84 to 1993-94 for the north eastern region were collected and the correlation coefficients between the following alternate variables were estimated:

- i. Rice production and investment on irrigation and flood control;
- ii. Food grains production and investment on irrigation and flood control;
- iii. Yield of rice and percentage of total plan allocation on irrigation and flood control;
- iv. Yield of food grains and percentage of total plan allocation on irrigation and flood control.

In all these cases it was found that the correlation coefficients were too low and statistically insignificant. Thus, according to the results so obtained, infrastructure and agricultural development seem to be not correlated with each other. In other words, it has not been possible to increase production and productivity in agriculture through higher and higher investment on infrastructure like irrigation. The result, thus, looks quite absurd from the practical point of view. It may, therefore, be concluded that the extent to which infrastructure has been developed in the north eastern region is too low to create impact on agriculture.

CONCLUSION

The study reveals that there exists an unbalanced approach to the development of various infrastructures in the north eastern region. Some of these infrastructures like road, railways, power, health and irrigation are highly neglected. At the same time a good progress has been achieved in the development of education and various other facilities like post, telecommunication and banking. The study also reveals that development of irrigation is too inadequate to create its impact on total production and productivity in agriculture. There, it is felt that for the overall development of the region all the state governments in the north east should come forward, join hands and start for a combined approach for the development of various infrastructures which are highly neglected.

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