Development of Information Technology in North-East India with Special Reference to Arunachal Pradesh (Regarding Post Office and Telecommunication)

R. K. Mandal[1]

North east is geographically isolated, infrastructural backward and predominantly a tribal region. It is located on the international border and this is one of the two meso-regions in the country, which is land-locked. These states are not only ethnically distinct, but also the homes of small ethnic groups, which are not only isolated on the undulating topography, but technologically backward. It is presumed that with the opening of the new telecasting stations, the remote areas will be linked to the national mainstream. The Post and Telegraph Department was created by the British administration as an adjunct to effective administrative control over Indian people. The department was run on the cost-benefit consideration. However, it was also established 'to serve the people' (those who could afford to). The department was rather slow in adopting new technological innovations. But it did increase its network to the length and breadth of the country and with the dawn of independence, the department was geared to the cause of the national priorities and programmes. As a government department, it slowly turned out to be one of the biggest employers of unskilled and semi-skilled persons. With the massive emphasis on rural development and overall demand for social transformation, the department did try to modernize itself technologically to meet the ever increasing demands on it. As a whole this modernization phase in the department is largely based on technological transfer. No serious efforts are being made to ask whether the technological transfer fits in the national policy of self-reliance. In fact, its adoption is based on the principle of trickling down benefits from the top and what is known as technological diffusion. So

[1] Dr. Ram Krishna Mandal ,Selection Grade Lecturer in Economics ,Dera Natung Govt. College, Itanagar, Arunachal Pradesh,

far North Eastern region in general and Arunachal Pradesh in particular is concerned, it is not only inaccessible from transport, communication and telecommunication point of view, but it is also economically at subsistence level. By tradition, the vital resources - land, water, forest and even minerals are controlled by the community, in which technological investment is minimal.

Revolution in information and communication technology has drastically changed the very concept of connectivity. It has reduced distances and made possible to disperse business operations by taking advantage of differentials in wage, natural and other resource endowments and thus to bring down dramatically the production cost. The Indian postal network is one of the largest networks in the world in terms of area covered and population served, and constitutes an important mechanism of achieving transportation and communication. The Indian Postal System currently provides 38 services which can broadly be divided into four categories: Communication services (Letters, Post Cards etc.), Transportation services (Parcel), financial services (Saving Bank, Money Order, Postal Life Insurance) and Premium Value Added Services (Like Speed Post, Business Post). The Post Office Savings Bank is the largest bank in India in terms of network, accounts and annual deposits. As on March 31, 2004, there were 1, 55,669 post offices or outlets, of which roughly 89 per cent were outside cities in the country (Economic Survey.2004-05, P.203).

In the changed industrial system of recent technological progress, innovation and application of sophisticated knowledge to production process have become inevitably common. They are indispensable too. The technological progress encourages interdependence between the enterprises and the environment. The application of sophisticated technical process to an enterprise takes two forms: (a) first is product innovation, that is to say, the innovation in goods and services produced and the programmes of work involved there-in which is known as programme change and (b) second is technological innovation that is to say, the innovation in terms of technique applied to production. The use of the term technology is restricted to the visible items of capital equipment used in the work-flows of an enterprise and the relationship of the operations to which the same is applied.

Technological progress is normally associated with environmental change and complexity with the growth of more sophisticated information technology which is increasingly relevant to various functions of an enterprise. The technological progress simultaneously pressures towards growing scale. Obviously, technological progress is

associated with closer relations between enterprises and governmental agencies, which bear the tendency to wean away enterprise autonomous power with corresponding magnitude. Besides, product differentiation on account of technological progress, growing scale of production, actions of trade unions, consumer organization and government policies also erode the power of business enterprise (Bose, 230-31).All types of technological development depends more or less on the development of information technology.

Case Study of Arunachal Pradesh

Development of Post Offices: No regular attempt had been made to rise in the scale of civilization or to provide any system of direct administration in the north east region of India, though the Frontier Tracts were dividend into three charges in 1914; and in 1919 the names of the Eastern and Western Sections of the Frontier Tracts were changed into Sadiya Frontier Tract and Balipara Frontier Tract, respectively. Roads, postal communication, schools, hospitals etc. did not exist. Practically the tribes were living in a paradise of their own almost ignorant of the outside world.

The crude agency created by the British to administer the tribal territories began to develop after independence. At the time of independence there were altogether three Political Officers for the Frontier territories and a few sub staff to cater to the needs of their offices. Immediately after the independence, the administration of the Frontier Tracts was placed at the disposal of the Government of Assam by Indian Independence Act, 1947, and in 1948 Sadiya Frontier Tract was bifurcated into two charges of Abor Hills and Mishmi Hills. The Constituent Assembly of India viewed the problem of Tribal development carefully and appointed a Committee to investigate and report for a rational administration of the tribals of Assam.

There were 6 post offices in 1953 and the number increased to 70 in 1970. Three post offices in 1956 and 16 in 1972 had telegraph facilities. The development of communication was thus poor (Bhattacharjee-P.175). As on 31.3.93, there were 266 numbers of post offices, 18 post offices had telegraph facilities. During the period, population served per post offices was 3,250. But according to CMIE, there were 269 post offices in the State during 1992-93 with population per post office as 2974 and area served by a post office (sq.km) as 311.15 which is highest in the country. The vastness of the area served by a post office is unavoidable because of low density and dispersed nature of human habitation. A comparative picture of post offices in North-East India is shown in the Table-I given below.

Table-I: **Post Offices in Arunachal Pradesh – a Comparative Study. (1992-93)**

Sl. No.	States	No. of post office			Population per post office	Area served by a post office (sq. km)
		Total	Urban	Rural		
1	2	3	4	5	6	7
1.	Arunachal Pradesh	269	13	256	2974	311.15
2.	Assam	3780	300	3480	6772	22.31
3.	Manipur	660	35	625	2727	33.33
4.	Meghalaya	470	31	439	3830	44.65
5.	Mizoram	362	39	323	1934	58.00
6.	Nagaland	294	19	275	4082	56.11
7.	Tripura	689	49	640	3774	15.08
8.	All India	152037	16283	135754	5607	21.60

Source:Directorate of Economics and Statistics, Govt. of Arunachal Pradesh, "Statistical Abstract, 1992", Itanagar

From the above Table-I, we find that population per post office was 2,974 in Arunachal Pradesh – the third lowest in the North-Eastern States after Mizoram and Manipur and fifth lowest after Himachal Pradesh and Sikkim in all India. The area served by a Post-Office is extremely high in the State (Bhattacharjee-P.95-96).

In 1973, there were 73 post offices of which 16 had telegraph facilities. This increased to 283 in 1995 of which 17 had telegraph offices (Bhattacharjee-P.211).

In respect of communications, total number of post office with telegraphic facilities is noted 28 and without telegraphic facilities 166 during 1979-80. Now telecommunication facility is available, but its effect cannot be experienced on account of inadequate infrastructure. Telephone connections are confined to few pockets only, and therefore, their effects are localized so far (Jha-P.196). In the state the growth of post offices since 1960 onwards is shown in Table-II, percentage of villages with postal and telegraph facilities on the basis of distance covered (1991) in

Table-III, percentage of rural population with access to post and telegraph facilities on the basis of distance covered (1991) in Table-IV and number of postal institutions with telegraph facilities as on 31-3-2001 in Table-V given below.

Table-II: **Growth of Postal Facilities in Arunachal Pradesh (1961-2001)**

Year	No. of Post Office	Population per Post Office	Area served by Post Office (sq.km.)
1960-61	23	14,632	3,641
1970-71	70	6,678	1,196.33
1980-81	200	3,159	418.72
1990-91	249	3,447	363.32
2000-01	303	3,388	276.38

Source: Statistical Abstracts of Arunachal Pradesh.

Table-III: **Percentage of Villages with Postal and Telegraph Facilities on the Basis of Distance Covered (1991)**

Districts	0 Km	0-5 Km	5-10 Km	Above 10 Km
Tawang	5.52	33.13	28.83	32.52
West Kameng	4.78	8.82	11.77	74.63
East Kameng	4.36	11.27	8.00	76.37
Papum pare	2.66	14.45	13.31	69.58
Lower Subansiri	2.19	11.76	12.77	73.28
Upper Subansiri	2.50	8.15	9.60	79.75
West Siang	4.90	25.49	16.18	53.43
East Siang	13.24	22.55	12.25	51.96
Dibang Valley	10.08	14.29	10.50	65.13
Lohit	6.78	21.97	15.81	55.44
Changlang	8.42	28.42	15.09	48.07
Tirap	15.38	10.90	17.31	56.41
Arunachal Pradesh	**5.76**	**17.04**	**13.70**	**63.50**

Source: Census of India, 1991, District Census Handbook of different districts of Arunachal Pradesh

Note: Postal facilities are calculated on the basis that there is at least one extra-departmental branch post office in the villages, i.e., at least, basic facilities are available where postcards, stamps, etc., are sold, and a letter box is maintained.

Table-IV: **Percentage of Rural Population with Access to Post and Telegraph Facilities on the Basis of Distance Covered (1991)**

Districts	0 Km	0-5 Km	5-10 Km	Above 10 Km
Tawang	23.56	36.59	18.69	21.16
West Kameng	35.88	10.49	10.31	43.32
East Kameng	26.22	9.59	10.64	53.55
PapumPare	22.97	13.30	17.44	46.29
Lower Subansiri	18.10	13.95	11.82	56.13
Upper Subansiri	32.94	7.72	7.43	51.91
West Siang	23.20	18.82	15.32	42.66
East Siang	30.58	23.94	8.84	36.64
Dibang Valley	51.38	20.92	4.34	23.36
Lohit	29.10	30.79	13.15	26.96
Changlang	27.08	33.13	9.05	30.74
Tirap	25.26	15.83	8.27	50.64
Arunachal Pradesh	**27.94**	**20.29**	**10.99**	**40.78**

Source: Census of India, 1991, District Census Handbook of different districts of Arunachal Pradesh

Table-V: **Number of Postal Institutions and Telegraph Facilities in Arunachal Pradesh as on 31-3-2001**

Districts	No. of Post Offices	No. of Telegraph Facilities
Tawang	13	1
West Kameng	22	3
East Kameng	14	1
Papum pare	25	3
Lower Subansiri	23	1
Upper Subansiri	13	1
West Siang	28	2
East Siang	30	2
Upper Siang	10	3
Dibang Valley	22	2
Lohit	45	5
Changlang	28	5

Tirap	**30**	2
Arunachal Pradesh	**303**	**31**

Source: Statistical Abstract of Arunachal Pradesh, 2001.

The postal and telecommunication services in the state are growing steadily in the recent years. There were one Head Post Office, 48 Sub-Post Offices and 256 EDBPO's functioning in the state at the end of 2003-2004. Thus during 2003-2004 the average area and population served by each post office were 207.77 sq.km. and 3,675 persons respectively. The growth of post offices is shown in Table-VI given below.

Table-VI**: Growth of Post Offices in Arunachal Pradesh Since 2000**

Sl. No.	**Indicator**	**Unit**	**Post Offices as on 31st March**				
			2000	**2001**	**2002**	**2003**	**2004**
1.	Post offices	No.	301	303	304	305	305
(a)	Head post office	No.	1	1	1	1	1
(b)	Sub-post office	No.	46	46	47	47	48
(c)	E.D.B.P.O.	No.	254	256	256	257	256
2.	Telegraph office	No.	21	21	31	31	-
3.	Population served per post office	Person	3005	3601	3675	3675	3675
4.	Area served by one post office	Sq. Km	278	276	207	207	207

Source: Director of Postal Services, Itanagar.

Development of Telecommunication:

After the announcement of New Telecom policy 1999, progress in telecom in India has been extremely rapid. The structure and composition of telecom growth has undergone a substantial change in terms of mobile versus fixed phones and public versus private participation. Mobile phones were once considered a luxury. In recent years, it has become clear that the capital costs of mobile telephony are lower, which makes mobile telephony the technology of choice for low-price telephony. Few areas of India's economy have enjoyed as sharp a pace of structural change as that in the telecom sector. The rapid pace was the outcome of vigorous competition among firms and technologies.

Table-VII**: International Comparison of Tele-density, December, 2003**

Countries	Tele-density
Australia	126.18
Bangladesh	1.56
Brazil	42.38
China	42.32
India	**6.60**
Indonesia	9.17
Nepal	1.70
Pakistan	4.42
Sri Lanka	9.57
U.K.	143.13
U.S.A.	116.43

Source : ITU.

This drastic pace of structural change highlights the possibilities in other segments of infrastructure for eliciting massive investment by the private sector and for benefiting the consumers through competition between old and new technologies. The total number of telephones (basic and mobile) rose from 22.8 million in 1999 to 88.62 million at the end of October, 2004 in India. Although India's 88.62 million (2004-05) strong telephone network, including mobile phones, is one of the largest in the world, with the low telephone penetration rate of about 8.20 phones per hundred population, the country offers vast scope for growth of its present projections which suggests that by the end of 2007, the total number of phones will reach 250 million in India. While tele-density (number of telephones per 100 people) has risen sharply, India continues to lag for behind countries like Brazil and China, where the tele-density is more than 40 as shown in Table-VII.

Some important policies are taken to develop the telecom sector. In order to 'catch up', there is a need to maintain vigorous pre competitive efforts in terms of public policy, rapidly shift to new technologies, encourage entry of new players, and drive prices down through competition. The policy initiatives taken in the telecom sector recently address some of these issues.

Evolution of Telecommunication in Arunachal Pradesh

1) Establishment Year: First telephone exchange was installed at Bomdila in 1968.

2). In 25th May' 1974, SDOT in Arunachal Pradesh was created under DE(T), Guwahati. The SDOT (Tezpur) & AE Phones (Military), Tezpur looked the charges of SDOT of Arunachal Pradesh. Mr. K.C.Mukherjee was the first SDOT of Arunachal Pradesh.

3). On May 1976, the Office of SDOT of Arunachal Pradesh was shifted from Tezpur to North Lakhimpur.

4). On 31st Dec' 1979, the same office was shifted from North Lakhimpur to Itanagar, capital of Arunachal Pradesh. At that time, there were 15 working exchanges.

5). In Dec'1985, it was converted to DET Office under the control of Area Manager, Dibrugarh, Mr. Motilal, who joined as DET. At that time the entire North-East was under the administrative control of North East Circle, Shillong.

6). In 1987, the post of DET was upgraded to TDM. Mr. M. Ukeel was the first TDM.

7).In the year 1988, the North East Circle was bifurcated into two Telecom Circles: one circle with Headquarter at Guwahati and another circle with headquarter at Shillong as North East Circle. The DET, Arunachal Pradesh was under the control of CGM, North East Circle, Shillong.

8). On 27th May' 1999, the post of TDM was upgraded to GMTD. Mr. A.S. Egaya was the first GMTD of Arunachal Pradesh.

9). In the year 2000, N0rth East Circle, Shillong was further bifurcated into NE-I Circle covering the area of Meghalaya, Mizoram, Tripura with HQ at Shillong and NE-II Circle covering the area of Arunachal Pradesh, Manipur, Nagaland with HQ at Dimapur. At the beginning there were approximately 500 connections.

Over the past years the state has been making slow and steady progress in creating telecommunication network. The state is at present divided into eight Telecom-Sub-Divisions, viz; Itanagar, Naharlagun, Bomdila, Tezu, Pasighat, Anini, Khonsa and Changlang. The number of telephone exchanges in the state at the end of 31-3-2004 was 105 as against 95 at the end of 31-3-2002. The total equipped capacity has increased from 82868 during 2002-2003 to 83,000 during 2003-2004. The total number of working telephone connections which was 53,862 at the end of March, 2003 has increased to 57,700 at the end of March, 2004 registering a rise of about 7.25% over the year. The achievement made during 2001 to 2004 in Arunachal Pradesh is highlighted in the Table-VIII given below.

Table-VIII**: Growth of Telecommunication Facilities for the Public for Last Four Years**

Sl. No.	Indicator	Unit	As on March			
			2001	**2002**	**2003**	**2004**
1	*2*	*3*	*4*	*5*	*6*	*7*
1.	Telephone Exchange	No.	94	95	105	105
2.	Total Capacity	No.	62816	73208	82868	83000
3.	Working telephone Connection	No.	39269	44388	53862	57700
4.	No. of Mobile connections	No.	NA	NA	NA	3750
5.	Internet Connection	No.	53	NA	NA	1107

Source: General Manager, BSNL, Itanagar

The role of Telecom in the process of development: The role that telecom plays in development has remained obscure because of difficulty in measuring its impact. Such difficulties arise because of its point-to-point benefits i.e., telecom generates immense indirect benefits to the users and local economy, which is difficult to be measured statistically. In addition to the direct benefits to the users, its social benefits are likely to contribute to improve the quality of life in rural areas. These emphases reflect current concern with equity, decentralization and self-reliance. To achieve these goals, developing nations such as ours must pay greater attention to rural human development (Hudson, H.E.: 1984). As it is considered to be a socio-economic need of the bulk of the population residing in rural areas, it has to be provided on a subsidized basis. It is imperative to expect certain level of infrastructural, economic and administrative activities to reach for expecting an appreciable rate of even indirect benefits. "Although telecommunications can be used on occasion as a substitute for transport, their effectiveness in coordinating the movement of goods in reducing inventories, in finding the best markets for produce and so on depends on the adequacy of the transport system. The same is true of the role of telecommunications played in emergencies. The telecommunications link between patient and doctor will not fulfill its purpose unless transport is available to move the patient to hospital or to deliver drugs and other supplies" (I.T.U.: 1984: 10). And only the telecom infrastructure plus other complementary infrastructures can together lead to more economic growth and more effective social service delivery. The need is not only to increase the telephone density, but also give a thrust on the accessibility of

communication for rural masses. We realize that the modernization process has to relate to the larger sections of the community. As a whole, the telecommunication (i) provides information; (ii) plays a vital role in emergencies and health services; (iii) increases efficiency of public administration, commerce and other economic activities; (iv) assist in national integration, self-reliance and political stability; (v) reduces regional disparity within the country; (vi) helps shrink distance; (vii) can reduce need to travel, and (viii) facilitates better use of exiting transport facilities. However, full utility of rural telecom can be realized only when most of the villages are telephonically linked and other associated infrastructural amenities are extended to the area. Though its indirect and imperceptible impacts take time to be felt, the measurable economic impact for the use of telecom channel in an area like Arunachal Pradesh will depend on two factors: (i) the increase in information flows achieved by telecom in comparison to other communication networks and (ii) the extent to which new messages change economic agents' opinion of the probability of events (i.e. the social receptiveness of the rural folk to new information). The existing telecom infrastructure suffers from serious problem of accessibility, reliability and credibility of the service. Thirdly, because of its strategic location, a reliable telecom will have an impressive demand in future that all the villages in the sub-division, district, state or region will have to be linked telecommunicationally; supporting secondary information sectors such as education, health care, industries etc. move in to take advantage of telecom; and laws of land are liberalized to encourage interaction at social, economic and industrial levels. And lastly, access to telecom amenities may affect the social equilibrium widening the gulf between the elite and the masses (Sinha-P.210-27). The preset status of NE II Circle is shown in Table-IX given below.

Present Position: At present, since January, 2007, there is prevailing competition among BSNL and private companies in the cell phone market. Airtel, Aircell, Reliance and BSNL try to enlarge their own market through cut-throat competition. Day to day the number of cell phone customer is increasing. It is not possible to get the exact figure of cell phone connections. But this facility is limited within the urban areas in the state.

The Next Frontier: Broadband

Indian telecom is set for high growth rates embracing the wider population, when it comes to ordinary voice telephony. While India's tele-density lags behind the world,

present trends suggest that catching up is presently underway. India also lags behind the world to a considerable extent in the field of broadband telecom. At end-December, 2003, penetration of Broadband, Internet and Personal Computer (PC) in the country was 0.02 per cent, 0.4 per cent and 0.8 per cent respectively. As per the Broadband Policy announced on October 14, 2004, broadband has been defined as an "always-on" data connection supporting interactive services including Internet access with minimum download speed of 256 Kbps per subscriber. The broadband policy aimed to target three million broadband subscribers and six million Internet subscribers with a timeframe of December, 2005. Further, it is targeted that, by 2007, the broadband subscribers would be 9 million. By the end of the year 2010, the policy aims to target of 40 million Internet subscribers.

Table-IX: **Status of Telecom Services in NE II Circle**

Sl. No.		**NE II Circle as on 31st Dec., 2006(Arunachal, Manipur and Nagaland)**	**Arunachal Pradesh as on 31st April,2007**
1.	Area (in sq.km.)	122500	83,743 sq. km.
2.	Population (in lakh)	53.89	1,09,67,968
3.	No. of Telecom connections a). Land line b). WLL c). Mobile	 150777 21558 212382	 55,832 7,094 91,534
4.	Equipped Capacity a). Land line b). WLL c). Mobile	 210448 36250 225454	 86,452 24,000 94,259
5.	Internet Connections	15895	4,213
6.	Broad Band	765	223 (Capital complex and Ziro only)
7.	Dias	186	49
8.	PCOs	7240	1,823
9.	Total no. of villages	7340	968 out of 3,863
10.	Total no. of DHQs	36	16 DHQ

			with Mobile service
11.	Total no. SDHQs	115	39
12.	Total no. of SDCCs	56	31
13.	Total on of Block HQs	145	58
14.	Total no. of WLL BTSs	64	24
15.	Total no. of GSM BTSs	192	59
16.	Total no. of Telephone Exchanges	219	104
17.	OFC Route Kilometers	2748.2	1,196.6
18.	Micro Wave Kilometers	1745.4	1,083.54 kms

Source: General Manager, BSNL, Itanagar

The prime consideration guiding the policy includes affordability and reliability of broadband services, incentives for creation of additional infrastructure, employment opportunities, induction of latest technologies, national security and bringing in a competitive environment to reduce regulatory interventions. The new policy encourages creation and growth of infrastructure through various access technologies which can mutually coexist like optical fibre technologies, digital subscriber lines on copper loop, cable TV network, satellite, and terrestrial wireless technologies. The choice is left to the service provider.

Ability to emulate the success of many other Asian countries in the broadband area will have major implications for smoothing intra-India commerce and industry, knowledge flows into India, e-governance, greater integration into the world economy through international voice and videoconferencing traffic and lower prices for NLD and ILD traffic, and services exports such as software and "business process outsourcing". Broadband services have already been launched by BSNL on January 14, 2005. They proposed to cover 198 cities in India in addition to Delhi and Mumbai by April 2005 (Economic Survey.2004-05, P.201).

In Arunachal Pradesh the **Broadband** facility for internet is, at present, only at Itanagar and Ziro, the Head Quarter of Lower Subasiri District. Regarding this, the General Manager, Telecom, Itanagar is very much optimist. He expects that he will be able to give facility of Broadband in almost all district towns in Arunachal Pradesh within two years.

Problems Faced By the Telecommunication Department

1.To Take Fibre Cable under Ground: To take fibre cable under ground is not only a time taking matter but also a very problematic issue because of peculiar shape

of hilly terrain and stone like soil. Very often it is taken along the side of road. Generally one side of road is river and another side is drain. As a result it is not an easy task to get the cable under ground. Again the road leads not in a straight way but in a semi circular way because of lying so many streams. Sometimes it is not possible to get the cable under ground because of high peak and solid stone. Therefore, it is a very time taking and expensive matter. One cannot say how much costlier it is than that of plain areas.

2. Road Sliding: In the hilly terrain of the state like Arunachal Pradesh, road sliding is very common matter especially during rainy season. Fibre cable is torn with sliding.

3. Local Pressure: The local people create pressure to the authority of the telecom department to be engaged as contingency staff to participate in the field work. They have no expertise regarding field work and again are not willing to do such type of hard work, but simply want to earn easy money after having been appointed. It creates delay and disturb to the authority.

4. Population: The state is very much thinly populated in our country. As per 2001 Census, the population density per sq. km. is 13 only which are lowest in the country. To provide telephonic facility through optical fibre under ground in the remote villages is not economically viable.

5. Establishment of Sub-exchange: Due to existence of so many high peaks of hill it is necessary to establish frequent sub-exchange which is practically not possible. Again to connect sub-exchange with main exchange through satellite is not possible due to non-economic viability.

6. Scarcity of Power: Though the state is emerging as power house as Arunachal Pradesh is the home of unexploited hydro-power potential, there is much below of supply of electricity generated by diesel and hydro set in comparison to demand. As a result, the exchange cannot do function properly due to non-availability of power. Another problem is that to run exchange with the help of generator, fuel is not at hand.

7. Poor Road Network: The state is much behind the rest of the North Eastern states regarding road network.. As such in the development plans, the government has been attaching high priority to the construction of roads and as a result the total length of roads constructed in the state stood at about 15021.80 kms. including 399.80 Kms. under National Highway giving the road density of 17.9 kms. per 100 Sq.Kms. of area at the end of March, 2004 as against the all India average of 74.9 Kms. per 100 Sq.kms. during 1997. Due to lack of transportation it is very much difficult to set up sub-exchange in remote villages.

N.B. The author is grateful to the present G.M., Mr. Ranjan Datta who has supplied the necessary information of Tele-Com Department.

References:

Bhattacharjee, R.P.(2000): Economic Development of Arunachal Pradesh, Himalayan Publishers, Delhi, Itanagar, p.175,95,211

Bose, M.L.(1997): History of Arunachal Pradesh, Concept Publishing Company, New Delhi, p.230-31

Govt. of Arunachal Pradesh (2005): Economic Review, Directorate of Economics and Statistics, Itanagar, p.41

Govt of India, Ministry of Finance, Economic Division (2004-05): Economic Survey P.201-03.

Mandal,R.K.".Arunachal Pradesh Emerging as Power House"Journal of Global Economy,Vol.1.,No4.

Sinha, A.C. (1994): North-Eastern Frontier of India, Indus Publishing Company, New Delhi, p.210-27

JGE