

# A Phone in Every Village: Taking Telecom to Rural India

Abhinav Taneja

*Information is critical to the social and economic activities that comprise the development process. Telecommunications, as a means of sharing information, is not simply a connection between people, but a link in the chain of the development process itself.*

—Dr. Heather Hudson

The British government introduced telecommunications services in India in the late 19th century as a means of providing defense, law and order, general administration, and revenue collection. Since that time, telecommunications has played a critical role in shaping India's march toward progress, and the importance it holds for the future of India cannot be overstated. This article:

- Reviews India's telecom policy.
- Discusses guidelines and drivers for developing telecom infrastructure in India's rural areas.
- Makes recommendations for private sector involvement.
- Highlights some relevant technologies for rural telecom infrastructure build-out.

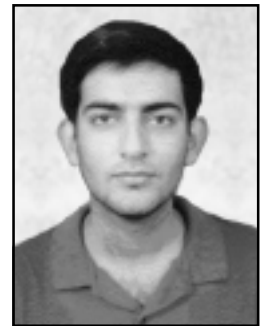
## Telecom Policy in India

India's central government budgets and allocates funds to various government agencies, such as the Department of Telecommunications (DoT), in five-year increments, otherwise called Five-Year Plans. The DoT, in turn, establishes telecom guidelines, goals, and policies in five-year increments to match the budget allocation. National investment in telecommunications in the six

Five-Year Plans since 1950 hovered between 1.4% and 2.7% of gross domestic product (GDP). However, as the Indian economy moved toward liberalization, interest and investment in building telecommunications infrastructure began to grow. The government allocated 3.6% of GDP in the Seventh Plan (1985-1990) for telecom investment and 11.9% in the Eighth Plan (1992-1997).

The Indian economy was liberalized in 1991; subsequently, in 1994, the DoT enacted the New Telecom Policy (NTP) for privatizing the telecom sector. The Department of Telecommunications is now in the process of formulating a new telecommunications plan for 1997 through 2007. The central government has allocated 13% of GDP for investment in new telecom infrastructure under the Ninth Five-Year Plan (1997-2002). Working within these new budgetary allowances DoT has plans to introduce:

- ISDN (Integrated Services Digital Network—a communications standard that covers voice, data, and image services) to all district headquarters by 2007.
- IN (intelligent network) services in all cities with a population above 500,000, starting in 1997.
- Voice response and recognition services.
- Multimedia services, including video on demand, remote diagnostics, and interactive tele-education, should be available by 2000.



Mr. Abhinav Taneja is a senior electronics and communications engineering major at the University of Delhi, one of the premier engineering institutes in India. He is an active member of the student chapter of IEEE and is involved in organizing technical meetings and seminars at Delhi College of Engineering. After graduation in June 1998, he plans to pursue a Ph.D. in technology management, with special emphasis on telecommunications. His career goal is to work in rural telecommunications infrastructure development in India.



**A Phone in Every Village**

In 1989, the Telecom Research Center, under the auspices of the DoT, introduced guidelines for the rural telecom sector. The report entitled *A Phone in Every Village* included plans to provide every rural Indian village with access to a telephone by 1999. The NTP, however, pushed the target date for implementing “a phone in every village” back to 1997—a goal which the government has been unable to meet.

At the time the National Telecom Policy was drafted, only one-third of the existing 600,000 villages had access to a telephone. The DoT has divided India into 319 telecom districts, which are further divided into group centers. Telephone traffic in rural areas is primarily confined to those villages within the same group center or separate group centers within the same telecom district. The result is reduced long distance traffic and revenues, which makes the expense of rural telephone deployment that much more difficult to justify. Consequently, long distance service has to be subsidized by the provider—no doubt, a heavy burden. It

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is obvious that higher long distance call traffic and rates cannot be expected until all rural villages have access to telephone service.

Clearly, there are many reasons for the government to have a more active role in defining and implementing rural telecommunications policy.

- (1) Continued rural economic development requires a reliable infrastructure of enhanced telecommunications. Participation in the information economy by rural and poorer segments of society should be a strategic priority for both social and economic development reasons.
- (2) Special transition policies are a fair and equitable way to help rural India adjust to the new global telecommunications marketplace.
- (3) Rural residents deserve an equal opportunity to participate in the national economy and to determine their own destiny. Particular emphasis should be given to the role of telecommunications technology in enabling rural citizens to integrate effectively in the Indian economy and the global economy.
- (4) Successful systems require more than appropriate technology. Other elements—policies, people, processes, incentives, institutions, and infrastructure—must also be present and work well. The establishment of agencies such as the Telecom Regulatory Authority of India (TRAI) is necessary to solve disputes between public and private operators and to monitor the privatization process.

*Guidelines for Rural Telecom Policy*

The following guidelines are offered as a starting point for establishing a rural telecom sector policy within the framework of the Ninth Plan.

- Communication facilities should be provided such that no person would need to travel more than one kilometer to obtain service. Deployment should be on

the basis of population distribution as well as density.

- Priority should be given to low-cost options that extend the reach of the global information infrastructure to underserved rural areas.
- The communication system should be extremely reliable. The technology implemented should take into account both the climate and existing power facilities.
- Facilities in rural areas should be planned in such a manner as to provide telephone service on demand in the future. The network should be such that it can be upgraded as needed.
- Tariff rates should not be biased toward urban centers. If possible, tariffs in rural areas should be discounted to foster continued deployment.
- Public awareness of how communication systems can assist various sectors of society, i.e., health care, education, rural business, agriculture, and tourism, should be improved.
- Policy guidelines should not be too stringent for the rural sector as long as the above rules are followed on a broad basis under the supervision of TRAI.

### Privatizing the Telecom Sector

The goal of providing on-demand access to telephony requires making about 10 million telephone connections as opposed to the existing target of 7.5 million under the original Eighth Plan. The additional 2.5 million lines would require an investment of approximately \$3.175 billion at a unit cost of \$1,162 per line at 1993-1994 prices. Added to that is the cost of additional rural connections, estimated to be \$1.081 billion. Even with the comparatively modest targets of the Eighth Plan, there is a resource gap of \$2.027 billion, and, by some estimates, the additional resources required to achieve the revised targets could be well over \$6 billion.

Clearly, this is beyond the capacity of government funding and internal generation of resources. Investment and partnerships with the private sector are necessary to

bridge the resource gap. Reforms are possible by placing:

- Primary responsibility for investment and service provision with the private sector.
- Planning and regulation responsibility with the government (e.g., TRAI).

Meeting universal service goals is an important aspect of the privatization of the telecom sector, and extension of telephone networks to rural areas is an important prerequisite. This extension can be funded through levying appropriate taxes or by making new entrants compensate the dominant carrier. In Latin American countries such as Mexico, for example, innovative steps have been taken to ensure that the universal service obligation is met. Private parties with the responsibility of extending the telephone network to rural areas have the incentive of access to revenues from long distance and international traffic. In Chile, a separate fund has been created for compensating companies which have accepted the challenge of providing rural telecom networks.

In India, universal service obligations are an integral part of the provision of telecom services. In January 1995, for the first time, competitive bids were accepted for award of licenses for providing basic telecom services. Licenses are for 15 years, with possible renewal for 10 years at a time on a mutually-agreed-upon basis. One private operator is to be licensed in each of the telecom sectors into which the country is divided. Under the license agreement, 10% of the direct exchange lines provided by private operators must be village public telephones (VPTs). Bharti Telnet will begin basic telecom operations in the first sector in November 1997. Perhaps more importantly, 11% of the installed lines will be in rural areas in this phase.

Several multinational companies bid to provide basic telephone services, but most of the bids were for the more lucrative major metropolitan areas. India currently has 21,328 telephone exchanges with a capacity of 15.1 million lines, and the network is

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growing at a rate of 21.6%. Yet, one-fourth of the total capacity is installed in the four metropolitan cities of Delhi, Bombay, Calcutta, and Madras (see Figure 1). There were no bids to provide competitive service in the telecom sectors of Assam, North Eastern States, Andaman and Nicobar, Jammu and Kashmir, and Himachal Pradesh. Whether it was the Naxalites<sup>1</sup> or the terrain, outside investors perceive these areas as having little or no commercial value. This perception is what the government of India must work to change. All sectors, whether urban, rural, or in difficult terrain, should have an equal opportunity for development.

Thus, private sector involvement in promoting the development of rural telecommunications should include:

- Development of products that can provide current services, are compatible with new technologies, and are suited for the rural sector.
- Equal opportunity for meeting technological and utilization goals for urban *and* rural areas.
- Human resource development for supporting sales, service and maintenance, public awareness, and further expansion of the rural telecom sector.
- Strategies, in association with the government, for rural telecommunications deployment.
- Fulfilling the objectives set by the government for achieving universal service.

#### *Public/Private Cooperation*

In addition, a combined strategy of government/private sector collaboration should include the following elements:

- Identify coalitions or interest groups in rural communities that are involved in community development activities.
- Work with groups to get information on needs and priorities in the various economic sectors such as health, education, agriculture, and tourism.
- Evaluate the degree of awareness and education about telecom technologies and applications.

- Investigate infrastructure facilities and resources and assess specific technology needs.
- Assist groups with planning and provide information and resources about telecommunications applications.
- Develop links between local interest groups and statewide groups for providing resources and support.
- Arrange presentations and demonstrations to increase awareness.
- Identify partnerships for future collaboration and support in implementing community and economic development projects.

#### **Technology for the Rural Sector**

Information technology, when designed for the right job, can be deployed even in regions that lack adequate water, food, and power. Technology can be effective for many tasks, not the least of which is human and economic development. In fact, technology is often indispensable in meeting basic needs. While the information revolution may threaten to increase inequity, it also provides tools to reduce poverty. An agenda for technology—improved access to education, health care, and information—is increasingly possible for the rural sector in India.

The Telecom Research Center has evaluated and recommended several technologies which would work well in India's rural regions.

*Fiber Optics.* As a communications highway from one metropolitan area to another, fiber optics could be used to connect intermediate stations to the main highway by branch routes and drop-and-insert systems. The intermediate stations could be used as collection centers for village telephones within distances of 10 km, 15 km, or even 40 km.

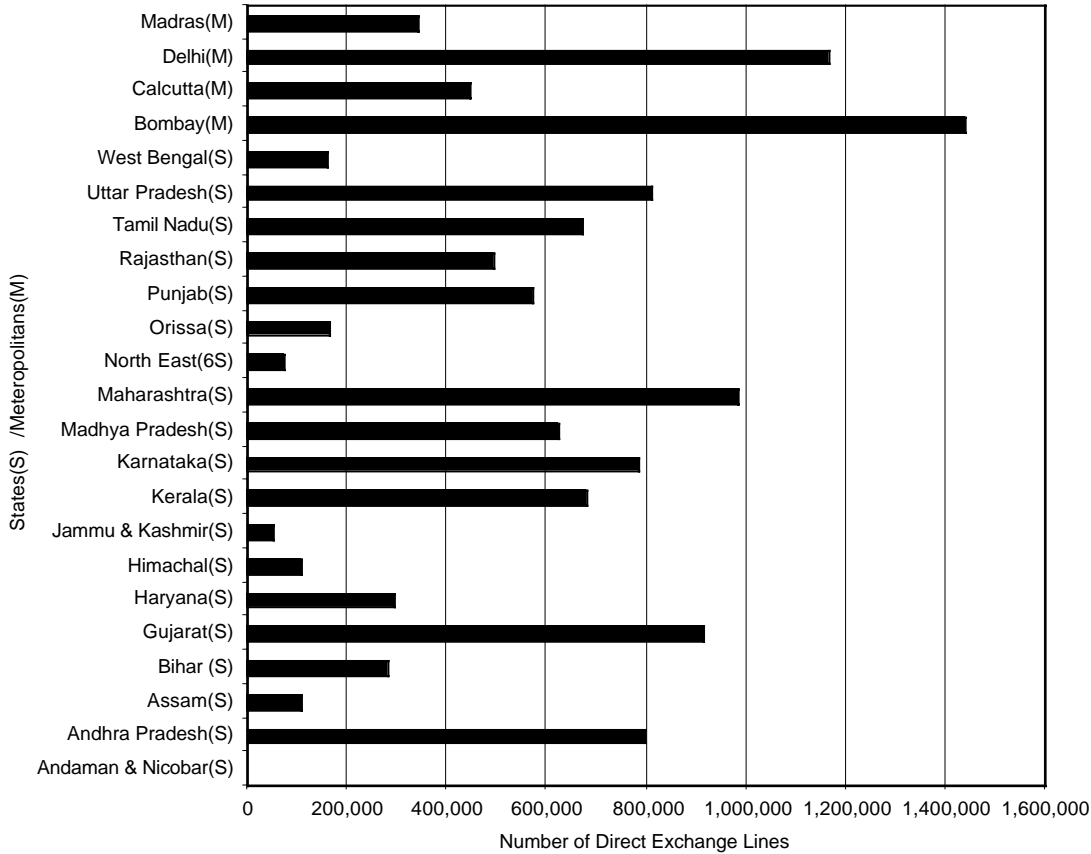
*Rural Cordless Telephones.* Rural cordless telephones are simple and inexpensive, and they could be used in areas where villages are widely dispersed and the terrain is rather difficult. In such areas, one cordless telephone in each village would serve the purpose, and an equal number of transceivers should be provided at the base station,

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Figure 1  
Telecom Infrastructure Distribution



India currently has 21,328 telephone exchanges with a capacity of 15.1 million lines, and the network is growing at a rate of 21.6%. Yet, one-fourth of the total capacity is installed in the four metropolitan cities of Delhi, Bombay, Calcutta, and Madras.

Source: A. Taneja

i.e., the telephone exchange. The number of phones in an exchange area would be limited by the available frequencies, and the distance would be limited by the signal strength, terrain, and topography.

**Radio Sharing System.** This is a radio frequency sharing system with two frequency pairs serving 15 village telephones. The ratio of village telephones to radio channels is 7.5. Even though the system is defined as two radio channels for 15 phones, there is built-in expandability to 32 if actual traffic density is lower. All phones connected to the system have individual line terminations in the telephone exchange.

**Line Sharing System.** A metallic pair passing by a number of villages could be

used on a "line sharing" basis and provide telephone connections to every village on the route. The common pair, serving as an omnibus telephone line, is different from parallel connection of telephones on a line. This system provides for termination of all the village telephones on a manual trunk switchboard, with individual station designations for every phone. Every village telephone retains its individual identity, so it could be called selectively from any place.

**Wireless Local Loop (WLL).** Frost & Sullivan forecasts that WLL transmission equipment will eventually constitute nearly 30% of all new lines. This technology will assist in more rapid installation of the

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network and is ideal for both urban and rural areas.

Very small aperture terminals (VSATs) and low earth orbiting satellites (LEOs) are also being touted as intriguing technological solutions for rural telecommunications.

None of these technologies is a panacea, but each of them will satisfy the demands of rural telecommunications. Different technologies will be more or less appropriate based on specific circumstances. It is most likely that a mix of these technologies will provide the ultimate solution.

### Conclusion

The rural sector plays a very important role in the balanced growth of India's economy. To achieve sustainable development, it is essential that people in outlying areas—representing the bulk of Indian society—are given the opportunity to participate in and benefit from the global information revolution, even if only in the most basic ways.

Some of the immediate and discernible advantages of improved telecommunications in rural areas are:

- Reducing rural-to-urban migration by providing improved employment potential through small business and micro-enterprise development.
- Enabling immediate access to assistance during civil emergencies and natural disasters.
- Improving access to health extension services, such as telemedicine services, including remote diagnosis and treatment advice.
- Increasing access to up-to-date market and price information, greatly reducing the cost of transactions for farmers and rural-based traders.
- Aiding education services, including distance learning.
- Increasing the accountability, transparency, and efficiency of government operations through information systems developed in rural areas.

It is because of these wide-ranging and vital benefits that telecommunications service provision in rural areas should be at the forefront of any discussion of telecommunications development in India.

The final solution to providing service to rural areas in India will require a delicate blend of appropriate technological choices in combination with management and financing mechanisms, initiated at the governmental level, to support the development of rural providers. No time should be wasted in moving ahead with the proposed plans. nto

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<sup>1</sup> Naxalites use blackmail and extortionist tactics, such as strikes, lockouts, and attacks on personnel, to steal money from corporations. Concern for financial and personal welfare in areas infiltrated by Naxalites most likely has had an impact on corporate willingness to invest.