

Existing Telecommunications Infrastructure and Applicable Technologies for Bangladesh

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In our workshop on May 22-24, 2004 in Bangladesh, we were provided with information on the present status of basic IT infrastructures in Bangladesh and the new technologies that could be deployed cost-effectively in remote areas. This write-up aims to illustrate, as a sample, the problem of telephone and Internet access in Chittagong and Chittagong Hill Tracts. This is based on the information obtained in the workshop. The write-up also aims to suggest what can be provided to bridge the gap in terms of technology. Major points are summarized below.

1. Bangladesh with underdeveloped IT infrastructures

Despite existing microwave links and optical fiber routes, as of 2003, Bangladesh still has a very low telephone density (0.51%) and a very small percentage (0.03%) of the population has access to the Internet. There are two problems detected: (1) the readily available IT infrastructures is concentrated primarily in major cities and towns; and (2) the telecom backbone of the country, which comprises of microwave radio, only has the available bandwidth of 34-155 Mbps which will not be enough to support broad-based IT services throughout the country.

2. Identifying Network Gap in Chittagong and Chittagong Hill Tracts

Fig. 1 illustrates IT network gap in Chittagong and Chittagong Hill Tracts. This gap is estimated by assuming that telephone and Internet services are available as far as 5 km from existing IT infrastructures, i.e. existing fiber optic links, microwave links and small links connecting districts and upazillas. As seen in fig. 1, only major cities or towns have access to the Internet. Thus, in order to improve the country's teledensity numbers, it is imperative for Bangladesh to expand necessary communication infrastructures at the last hop. This can be done by exploring alternate technologies capable of providing high-speed voice and data transfer capability that is not beyond the reach of many people both economically and technologically.

3. Bridging the last-mile gap

As far as cost of ownership per line per bandwidth is concerned (see table 1), we can conclude that 802.16 is the most promising technology to bridge the last-mile gap. Thanks to its broadband capability, one subscriber line could be shared with 10 or more computers in the same tele-center. On the other hand, WLL could be the most affordable solution to bridge the last-mile gap when high-speed connection is not a requirement.

To provide last-mile service at the least cost, it is a good idea to install base stations at existing microwave towers. This can reduce the first cost of both setting up towers and providing power supply for the base stations. Fig. 1 implies that only a few base stations (with 35-km radius) are required to bring more than 95% of the population in Chittagong and Chittagong Hill Tracts on-line, if the base stations are installed at the existing microwave towers.

4. The need for upgrading the national backbone

As already mentioned that microwave links can only offer 34-155 Mbps in the aggregated bandwidth, it is apparently that this speed will not be sufficient to serve future needs. Thus, the national backbone needs to be upgraded in order to be able to support all of the new bandwidth required by last-mile technologies. In addition, signal strength and quality of microwave links are often affected by weather conditions. It is thus important that optical fiber will be extended to existing microwave stations to provide more reliable connection and higher data transmission capability. Note expanding the reach of fiber could be done by laying fiber cable along railways or highways.

(See Fig. 1 and Table 1 in p. 3)

Table 1. Estimated Cost of Ownership at different levels of remoteness

	Options	Max Data Rate (each subscriber)	Distance from LE				Cost of ownership/line (1,000 lines)	Cost of ownership/line/kbps
			0-10 km	10-20 km	20-35 km	>35 km		
Last-Mile	MMDS	128/256 kbps	☺	☺			840 USD	3.28 USD
	WLL	35/70 kbps	☺	☺	☺		470 USD	6.71 USD
	802.16	24 Mbps	☺	☺	☺		1,543 USD	0.06 USD
Long-Haul	VSAT	2 Mbps				☺	70,200 USD	35.1 USD
	Microwave	140 Mbps				☺	n/a	n/a
	Optical fiber	> Gbps				☺	n/a	n/a

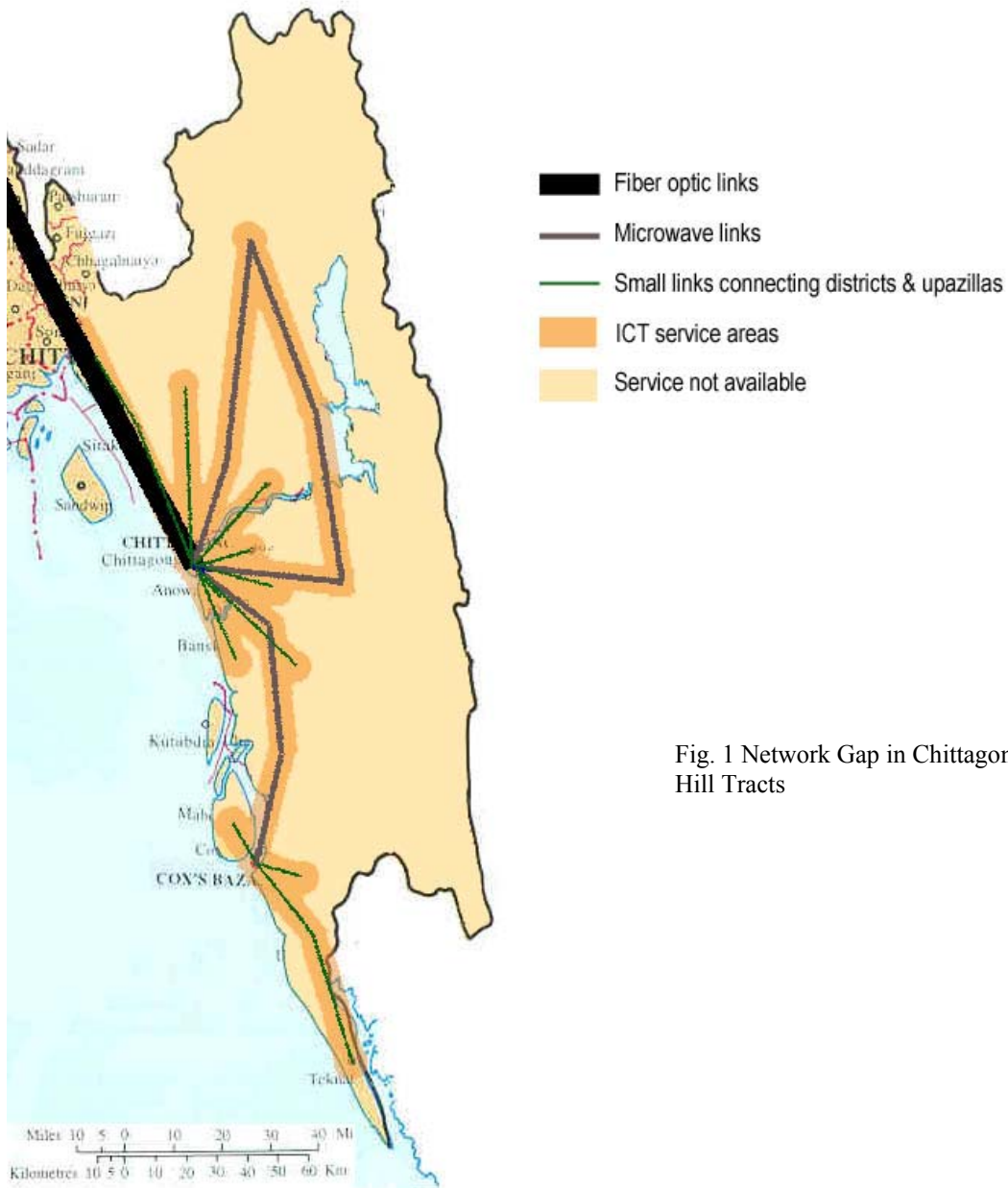


Fig. 1 Network Gap in Chittagong and Chittagong Hill Tracts