



**Telecommunication Development Bureau (BDT)**

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**Rapporteur for Focus Group 7**

**CONCLUSIONS AND RECOMMENDATIONS**

**1 Concluding discussion and remarks**

*Application of ICTs for rural economic development*

Voice telephony has been the main option for providing access to telecommunications in rural areas for more than a decade. Today, a wide variety of new services such as e-mail, e-commerce, tele-education, telehealth, and telemedicine, among others, has made access to interactive multimedia services as important as - maybe even more important than - voice connectivity alone. Since each rural district or community requires a different mix of voice, text, image, video and audio communications to best meet its needs, telecommunication network operators must be able to support the widest possible range of services and bandwidth levels at a reasonable cost.

The Internet is the most widely used platform used to deliver multimedia applications in rural areas of developing countries. Satellite broadcasting has also been widely adopted in distance education programs and other videoconferencing-based consultations in remote areas. These two platforms are expected to converge as Internet broadcasting and satellite-based Internet links continue to be developed. While much negative attention in developing countries has been focused on the use of the Internet as an illegal bypass mechanism in the international traffic arena, the long-term importance of the Internet for developing countries lies in its potential to improve the domestic flow of economic and educational resources between isolated rural communities and urban centers.

*Technologies for rural applications*

The following are basic requirements for communications systems deployed in rural areas of developing countries:

- (1) Implementation and operation is possible at a low cost in areas where population density is low;
- (2) The system can be easily installed, even in remote and inaccessible locations;
- (3) System operation and maintenance may be carried out even where qualified technical personnel are scarce;
- (4) Implementation is possible even when basic infrastructure such as mains electricity, running

water, paved road networks, etc., are absent.

An increasing number of technologies are available that can meet the above requirements at a reasonable cost to rural network operators.

(1) Wireless access systems

Wireless communication technologies, such as fixed wireless access (FWA) and very small aperture terminals (VSATs), are effective means of establishing telecommunication networks in rural areas due to their advantages over wired telecommunications in terms of cost and ease of installation. For example, when installing telephones in sparsely populated rural areas, wireless communication technologies such as PHS, GSM, DECT, and other cellular technologies can be used in conjunction with satellite stations and point-to-multipoint radio systems to achieve coverage of isolated settlements over long distances.

(2) IP-related technologies

With the Internet becoming internationally widespread, the focus of new network construction around the world is shifting rapidly from conventional PSTN to IP-based technologies. Emerging packet-based wireless access technologies, such as IMT-2000 and wireless routers, are being designed to deliver a wide range of traffic types more efficiently and inexpensively than traditional wired and cellular telephony networks.

Existing satellite operators and planned satellite systems are retrenching in order to serve the global market for Internet access and broadband communications. These technologies have much potential for use in rural areas, but they are just beginning to enter the marketplace. In order to lower the risks faced by network operators in developing countries, new systems offering transitions to packet- and IP-based network architectures need to be tested and, in all probability, developed further in order to meet the requirements of rural areas.

Furthermore, the integration of wireless, IP-based routers with voice-over-IP software offers developing countries the additional technology option of constructing wide area networks to solve the last mile problem in rural areas. Wide area networks can be configured to share bandwidth between telephony and Internet services efficiently, while taking advantage of the low cost of network servers and the easy installation of wireless systems.

(3) Multimedia terminals

The installation of inexpensive multimedia user terminals can be an effective way of providing access to Internet and other multimedia services without resorting to costly and complex personal computers. E-mail, voice and video communications are becoming available through non-traditional devices, such as home entertainment systems, which cost in the range of US\$300–\$500. These systems can be installed at multipurpose community telecenters and shared by many users.

Email-only stations, Internet client appliances, e-commerce server appliances and cellular telephones that accommodate wireless protocols such as i-mode and WAP are additional examples of the variety of devices already available in the marketplace. The proliferation of multimedia devices, and the ability to custom design and modify them, offers tremendous flexibility in the design of applications for rural areas. The price of this flexibility, however, is that service providers must understand the unique needs of their rural customers in order to determine the criteria by which to select technologies and applications.

The wholesale price of a typical Internet appliance unit is estimated to lie in the range of US\$600 to \$700. This is the same price range as a low-end PC. Although Internet clients contain fewer components than PCs, their pricing is similar due largely to the much greater scale of PC production. Deployment of Internet appliances in rural areas of developing countries over the next

several years would be unlikely to lower the initial investment costs of providing Internet access compared to the deployment of low-end PCs.

Deployment of remotely managed networks of multimedia terminals, such as the Internet appliance solutions described in Section 6, should be explored in order to make it easier for rural inhabitants to learn how to use the Internet by doing away with the need for many PC management skills. Another expected advantage would be lower lifetime maintenance costs and slightly lower power requirements per unit. Social benefits could be increased by providing a mechanism for service providers to direct relevant content to rural inhabitants who might be unable to navigate the Internet on their own. Internet appliance solutions may be able to provide some or all of these benefits at a lifetime cost no higher than that of a comparable PC-based solution.

#### *Encouraging the development of new technologies*

To fulfill its mandate from TDAG to "list new measures to be taken by ITU-D to encourage manufacturers and relevant organizations to create technology tailored to developing countries," and "among those measures, recommend priorities that ITU-D should follow to help achieve the development of technology for rural applications," Focus Group 7 has prepared six recommendations, listed in Section 7.3. In addition, the focus group has identified a number of general principles to help private sector companies design products to address the rural communications and IT markets in developing countries. These principles are included in the report as Annex 3. In particular, these guidelines are aimed at companies in the computing and IT industry who may have little familiarity with the disadvantages of rural areas in developing countries.

#### *Legacy of the Maitland Commission*

"Dramatic advances in the technology of telecommunications are taking place at a time when the role telecommunications can play in economic and social development throughout the world is more important than ever. It is our considered view that henceforward no development programme of any country should be regarded as balanced, properly integrated or likely to be effective unless it includes a full and appropriate role for telecommunications, and accords a corresponding priority to the improvement and expansion of telecommunications."

"Given the vital role telecommunications play not only in such obvious fields as emergency, health and other social services, administration and commerce, but also in stimulating economic growth and enhancing the quality of life, creating effective networks world wide will bring immense benefits... The increased flow of trade and information will contribute to better international relationships... We look to governments of industrialised and developing countries alike to give fuller recognition to this common interest and to join their efforts to redress the present imbalance in the distribution of telecommunications which the entire international community should deplore."<sup>i</sup>

Fifteen years before the concept of the digital divide was acknowledged, the Independent Commission for World Wide Telecommunications Development, chaired by Sir Donald Maitland, published these words. The report of the Maitland Commission, known by the title 'The Missing Link', is a core document in the founding literature of modern telecommunications development activity. The following basic recommendations of the Maitland Commission are worth repeating in the present context:

- Governments, development agencies and financing institutions are to give a higher priority to investment in the telecommunication sector.
- Developing countries should review their development plans to ensure that sufficient priority is given to investments in telecommunication.

- Existing networks (specifically rural ones) should be made more effective and commercially viable and should gradually become self reliant.
- All projects or development activities with economic or social components should have a telecommunication element built in.

FG7 has paid particular attention to the recommendations of the Maitland Commission regarding technology development and selection:

- We recommend that manufacturers and operators be encouraged to develop systems which will enable the needs of the more remote areas of developing countries to be met at lower cost.
- Selection of product can be as important as choice of technology. Buyers must know what is available on the market. We recommend that the ITU, in conjunction with manufacturers of telecommunication equipment and components, consider compiling a comprehensive catalogue of telecommunication suppliers and systems currently in use.

As the world enters the 21<sup>st</sup> century, many of the conclusions and recommendations of the Missing Link report remain valid. These conclusions are cited by Focus Group 7 as important and useful guidelines for the information age, even as we conclude our own study and recommendations to promote the development of new telecommunication technologies for rural applications.

## 2 Recommendations

### **Recommendation 1: Promoting the development of information appliances for rural use**

Focus Group 7 of ITU-D Study Group 2,

*considering*

- a) the social and economic benefits of using information and communication technologies (ICTs) to support rural applications in education, health, economic development and other areas to meet the needs of the local population;
- b) that for rural ICT programs to be sustainable, information content must be relevant and application interfaces must be accessible to rural inhabitants, particularly women and youth who make up the majority of the population;

*recognizing*

- a) the difficulty of installing and maintaining ICT devices in areas of developing countries which lack technical infrastructure;

*noting*

- a) remote management of systems deployed in rural areas has been shown to reduce the lifetime costs of equipment operation and maintenance;
- b) speech-based, icon-based and local language interfaces can reduce barriers to the use of ICTs by inhabitants of rural areas;
- c) an increasing number of software applications, form factors and user interfaces are supported by information appliances;

*noting also*

- e) technology start-up companies and systems integrators may not be aware of the special requirements of rural areas in developing countries, and they may lack contacts in developing countries;

*requests BDT*

- 1 to administer a program whereby developers of information appliance systems
  - are identified and listed in an internal contact database for the purpose of maintaining an up-to-date electronic mailing list,
  - periodically receive electronic updates from BDT on the special requirements of rural areas with regard to information technology and its benefits to both women and men,
  - are encouraged to initiate trials of their products and applications in rural areas of developing countries,
  - are assisted in researching, identifying and contacting potential trial partners in developing countries through ITU-D members,
  - provide brief, written evaluations of trials whose initiation was facilitated by BDT, to be made available to all ITU-D members via a Web site,
  - conduct pilot projects in selected developing countries within the BDT regular programmes on practical applications of information technology in education, health and environmental protection, in collaboration with relevant organizations.
- 2 to assess the demand for an introductory training course on information appliances and thin client technologies, and, if there is demand, develop and implement the course in partnership with private sector partners.

## **Recommendation 2: Renewable energy handbook**

Focus Group 7 of ITU-D Study Group 2,

*considering*

- a) an adequate and reliable energy supply is a prerequisite for the deployment of any modern telecommunication or information technology system;
- b) many companies, non-governmental organizations, governments and international agencies, including ITU-D, are currently working to support broader use of ICT systems in unelectrified rural areas;

*recognizing*

- c) it is generally not possible to rely upon the same approach to telecom power system design for end-user equipment as has been used for large telecommunication installations with high power requirements;

*being of the view*

- c) it will be necessary to disseminate useful information on renewable energy system selection, sizing, and design in order to support increased use of ICT equipment at the community and individual level;

*invites*

governments, administrations and recognized operating agencies to link renewable energy specialists with rural telecommunication and ICT initiatives,

*recommends*

that ITU-D Study Groups:

1 request the preparation of a handbook on renewable energy systems for small end-user installations such as wireless local loop terminal equipment, cellular handset battery chargers and VHF radio terminals,

2 disseminate practical and useful information to ITU-D members, project partners and other organizations on selection, design, sizing, operation, maintenance, and troubleshooting of small power systems for rural telecommunication installations.

### **Recommendation 3: Increasing collaboration with microfinance organizations**

Focus Group 7 of ITU-D Study Group 2,

*acknowledging*

a) the wide variety of actors outside the telecommunication sector who are involved in the design and implementation of ICT systems for specific rural applications such as tele-education and tele-medicine;

b) the benefits that can accrue to recognized operating agencies from the increased demand for telecommunication services stimulated by these applications,

*recognizing*

a) the initial success of Grameen Bank in designing and implementing a microfinancing scheme to support sustainable village telephone businesses run by the poor,

*requests BDT*

a) to facilitate links between microfinance organizations, recognized operating agencies, other rural ICT project initiators and information technology developers in order to encourage the development of small, economically sustainable, ICT-based service businesses in rural areas,

b) to consider the creation of a special purpose fund based on voluntary contributions to assist and support pilot testing of low-cost, connectivity-enabled information appliances to help fight poverty in rural and remote areas of developing countries.

### **Recommendation 4: Study of packet-based wireless access infrastructure**

Focus Group 7 of ITU-D Study Group 2,

*considering*

a) that in order to support future ICT applications in rural and remote areas, a small number of operating agencies in developing countries have expressed interest in packet-based access solutions;

b) that few packet-based access solutions designed for rural areas of developing countries are available, although a diverse range exists of wireless data products for LAN and WAN applications;

*noting*

ITU-T Recommendation H.323 covering the technical requirements for multimedia communications systems in those situations where the underlying transport is a Packet Based Network (PBN);

*recommends ITU-D study group 1*

a) to study economic aspects of packet-based wireless access systems, such as local loop networks based on wireless routers, among other technologies, as part of its ongoing study of technology options for rural telecommunication infrastructure,

*requests BDT*

to conduct, within its relevant programmes, technical pilot projects of packet-based wireless access networks in rural areas to examine issues such as:

- provision of basic connectivity for ICT networks
- PSTN gateway interconnection
- high quality voice-over-packet-data solutions

as well as to confirm the technology's effectiveness in dealing with multimedia applications such as telemedicine, distance learning and so forth in rural areas.

### **Recommendation 5: Maintenance of Focus Group 7 Web site**

Focus Group 7 of ITU-D Study Group 2,

*considering*

the continuing demand for case studies on rural applications, particularly those which identify technologies that help to improve the sustainability of rural service models,

*requests BDT*

to maintain and expand the FG7 case library on the Web site as well as look into ways of upgrading the tool.

### **Recommendation 6: Symposium on new technologies for rural applications**

Focus Group 7 of ITU-D Study Group 2,

*requests BDT*

to hold a symposium for ITU-D members to learn about new technologies for rural applications, with particular emphasis on the participation of women and youth, and meet with developers and manufacturers of systems of the types described in the final report of Focus Group 7.

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<sup>i</sup> [The Missing Link, Report of the Independent Commission for World Wide Telecommunications Development. ITU, December 1984.](#)