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1. "In most countries [of the developing world], those who live in the countryside typically earn 25% to 50% less than those in the towns and cities," *Human Development Report 1991*, United Nations Development Programme.

2. <http://www.eto.org.uk/faq/faqtcvtc.htm>

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The Voru telecottage homepage is at <http://www.werro.ee>

4. Richard Fuchs, International Development Research Centre Multipurpose Community Telecentre Advisor
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5. Johan Ernberg, Universal access through multipurpose community telecentres – a business case?, paper given at the Global Knowledge Conference GK'97, Toronto, Canada, July 1997.

6. *World Telecommunication Development Report* 1996/97, ITU, 1997.

7. ibid.

8. Making the business case for providing telecommunications in remote locations, presented by A. Dymond at the Telecoms Industry Global Summit – Rural Telecommunications, London, UK, February 1996.

9. According to information from Fundação de Toledo, the rates applied for some of the services provided by the telecentre staff in 1996 were:
Fax (sending): US$0.61 per minute + US$0.75 per sheet transmitted
Text processing (PC typing and editing): US$0.80 per sheet
Printing (black and white) (dot matrix printer): US$0.05 per sheet
Printing (black and white) (inkjet printer): US$0.50 per sheet
Printing (colour inkjet printer): US$0.50 per sheet
Other PC processing work (graphics, spreadsheets): US$10 per hour.

10. *Public Telephone Project: Synthesis Evaluation Report*, Ministry of Foreign Affairs, DANIDA, 1991.

11. *Options for Rural Telecommunications Development – Final report* (submitted to the World Bank by Intelcom Research & Consultancy Ltd in April 1995).

12. *Options for Rural Telecommunications Development* op. cit. and Making the business case for providing telecommunications in remote locations op. cit.

13. Volunteers in Technical Assistance (VITA)
1600 Wilson Boulevard, Suite 710
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E-mail: vita@vita.org
<http://www.vita.org/>

14. Crede A., Mansell R. and van der Krogt S. (eds.) *Examples of Applications: ICTs in Developing Countries* (Booklet IV), International Institute for Communication and Development, 1998, at <http://www.iicd.org/>.

15. The International Small Business Consortium website <http://www.isbc.com/> provides information and a "productive and professional Internet/World Wide Web-based network" to help small businesses "communicate about business needs, share their resources and expand their markets".

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17. See for example the southern African tourism and travel site at <http://www.kweku.ananzi.co.za/catalogue/tourism>.

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19. <http://www.unesco.org/webworld/ipdc/projects/projects_98.html>

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23. Johan Ernberg op. cit.

24. This section draws on a paper by Andrew Dymond, Public and private interests in achieving viable rural service: the role of a favorable policy environment, in Paisley L. and Richardson D. *The First Mile*, FAO, Rome, 1998.

25. Intelcon at <http://www.intelconresearch.com/pages/projpp/pCEEurA.html>

26. Paisley L. and Richardson D. *The First Mile*, FAO, Rome, 1998.

Telecommunications & *Rural Development*

ITU/A. de Ferron

THIS SECTION of *Telecommunications in Action* looks at bringing telecoms to previously isolated rural areas of developing countries. It shows how information and communication technologies can provide a way to accelerate development in such areas, which are often disadvantaged compared with the cities. Traditionally, rural populations have been somewhat neglected and have no access to the socio-economic infrastructure, the cultural advantages and most of the services that those living in cities take for granted. And yet, rural dwellers represent some three-quarters of the populations of many of the poorest developing countries and should not be the object of economic discrimination. As well as advancing development on a number of fronts, bringing telecom services to rural areas can be a profitable undertaking for telecommunication service operators and for local entrepreneurs. Approaches that optimize the profitability, and therefore the sustainability, of the new services are explored. These include the setting up of multi-purpose community telecentres, franchising, and policies that encourage operators to bring services to rural areas in the first place. Finally, the benefits that can result from telecommunication applications in rural settings are summarized.

THE WORD that most aptly describes the situation of many of the world's peoples who live outside the cities is isolation. Isolation, in itself, is not necessarily a problem, but it usually means that rural inhabitants are excluded from certain advantages that are enjoyed by city dwellers, because the infrastructure is not available. There will not be the same access to schools, universities, theatres and museums, as well as reduced access to the media including television broadcasting. Government services, hospitals and medical services, banks, shops and markets will be less available, as may water and sanitation, electricity and telephone, and transportation services. While not necessarily wishing to live as if in a town, the rural dweller should expect to enjoy a minimum of services, including education, communications and health care.

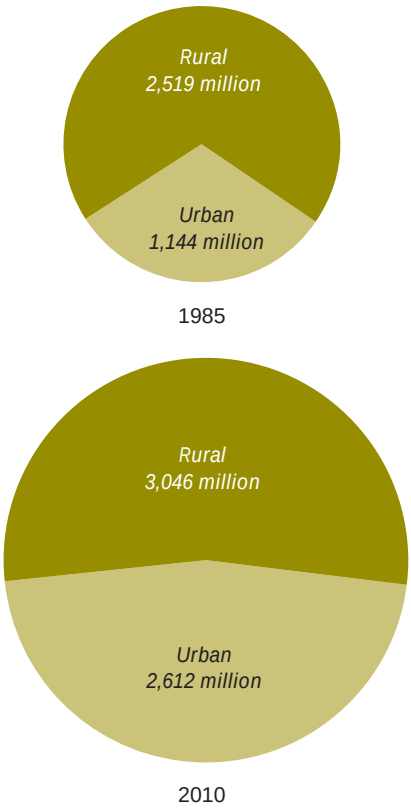
Rural populations are on average poorer than urban populations,[1] and the means for them to get out of poverty are less accessible. Production from their economic activities often remains at subsistence level, perhaps through outmoded methods but also possibly due to ignorance of alternative markets. Artisans, fishermen and farmers lack equipment, have no financial assets and may even lack the knowledge or motivation to acquire the tools or other means that could make their efforts more efficient. Disease and poverty go hand in hand with illiteracy, so medical care and basic education and training could help in most instances. Lack of opportunity in rural areas encourages young people with no education to migrate to the cities where they often find themselves living in worse conditions because the cities cannot absorb them. In each of these situations, a little knowledge could have made a great difference, and experience has shown that telecommunications can help (see also the sections of *Telecommunications in Action* on health, education and urban development). In most cases rural dwellers are not on their own in facing their problems. Development programmes or extension workers from international and non-governmental organizations will often be in place. (Extension workers is a general term applied to specialists or technicians with knowledge of the domain involved and of the local situation and conditions, and whose job it is to help the indigenous workers to apply technical procedures, use new equipment or work with new seedstock or plants. The extension workers are frequently part of the field staff of national government departments, international organizations or non-governmental organizations.) The numbers of such workers, however, are too small, and their help may be intermittent, of poor quality and often not available at the times when it could be crucial. Telecommunications can support such workers and improve the service they offer (see also the section of *Telecommunications in Action* on agriculture).

BRINGING TELECOMS TO RURAL AREAS

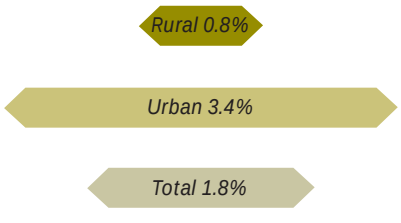
Provision of telecommunication services to rural and remote areas of developing countries can be a commercially viable, self-supporting and therefore sustainable activity – provided the approach is rigorous. It has been found that the practical and economically viable way to deliver information and communication technology services in the rural and remote areas of developing countries is by providing a group of telecommunication lines

giving access to the services at a convenient central location within each rural community. The upkeep costs (operations and maintenance) of isolated loop or access networks are high, since these networks experience above-average levels of problems, and repair visits are time consuming.

RURAL AND URBAN POPULATION PROJECTIONS IN DEVELOPING COUNTRIES



POPULATION GROWTH RATES, 1985-2010



Source: *Dimensions of Need*, FAO, Rome, 1995

The public call office

A public call office is the name given to the place where basic telecommunication services are provided. It is important that this office provide sufficient lines to fully meet the need for both inward and outward calling. This, too, is commercially driven. The catchphrase "one pay telephone in every village" is politically attractive but not commercially viable. The first line in the village is very costly, whatever the technology chosen, and really does not provide adequate access for the inhabitants. For twice the investment, 12 to 15 lines can be provided, bringing in ten times the revenue and providing good to excellent access, with positive business justification.

The service provider's goal is to maximize revenue earned in the community and since charges (revenues) are based on usage, efforts should be made to maximize traffic per line. A queue of people waiting to obtain a line is a clear sign of inadequate provisioning. Also, inward calls, generally originating in another country, are a valuable source of revenue. An event that should never be allowed to happen is for an international call to progress all the way to the rural village and then find no line available to complete the connection.

The public call office should provide appropriate value-added services to meet the needs of the community. These could include messenger services upon receipt of inward calls, voice messaging (a "virtual" telephone line), sending and receiving faxes, and public e-mail. To ensure 24-hour availability, it may be necessary to provide telephones that work with debit or credit cards. Credit cards are widely used to pay for telephone services in the industrialized world, but such cards and the banking infrastructure on which they depend may be scarce in developing countries. Debit cards, however, where payment is made in advance and the card debited each time a call is made are a more immediately viable solution. Other advantages of centralizing the telecommunication services in the community include ready support for users of the service (e.g. help on how to dial an international call), at least some basic maintenance capability, ease of ensuring the security of both the service and the equipment, and easy provisioning of the required power. Last, but certainly not least, charges for service usage can be collected directly, and debit cards can be sold in advance of the actual usage.

As the needs of the community dictate, more capability and capacity must be added. This could well include financial transaction capability and the ability to access remote databases. Related services could be added by having copying capability and by providing, for hire, personal computers equipped with printers and modems to enable data transmission. Audio conferencing, perhaps with the ability to also transmit text-type material, and finally video conferencing, will eventually fill out the portfolio of offered services.

Multi-purpose community telecentres

A location at which advanced services such as these are offered is often called a community teleservice centre or a multi-purpose community telecentre. Whatever it is called (and it is the capability, not the name, that counts), it is important that the telecentre fully meets the communication needs of the community that it serves, and that it be accepted, embraced and used by the community as a valuable community resource. Experience in many countries suggests that a gradual and orderly process of evolution from public call office to multi-purpose community telecentre is normal and desirable. The telecentre constitutes a small and growing local commercial operation, providing some local employment. Experience suggests that a good organizational approach is for the telecom service provider to franchise telecentre operation to a local entrepreneur in each community. Multi-purpose community telecentres were first established in the mid-1980s with the first in Velmdalen, Sweden. The idea quickly caught on in western Europe and North America and most of the trial

CORPORATE VIEW Rural access

GRIFFIN Digital Services, in a joint venture with India's largest telecommunication manufacturer, Himachal Futuristic Communications, is to have the exclusive rights to sell Himachal products and services in world markets. Incorporated in 1987, Himachal began its operations as a supplier of connectivity and transmission equipment to the monopolies controlled by the government of India. It has since moved into the international telecommunication and turnkey services market, supplying radio pagers to Belgium, Germany and the Republic of Korea, and is expecting further orders for equipment and turnkey services from countries in Africa and west Asia.

The company manufactures products which include fibre-optic cable and line terminal equipment, digital microwave and rural radio systems, multiplexers (which combine several services onto a single pair of wires or system) and digital line systems, network fibre equipment and radio pagers, as well as power plants for telecommunication equipment.

Its satellite video receiver, which has a 200-channel capacity and meets individual home requirements, interfaces a dish antenna with a television set and receives television broadcasting programmes via satellite.

The Rural Radio Telephone Link is a unique product providing single or dual telephone circuits over a single radio channel. The Hawk link is designed to provide one or two dedicated telephone circuits to rural subscribers unable to access the public switched telephone network by replacing standard copper pairs with two-way standard radio telephone connections. This system can be applied to telephones, faxes and most types of terminal equipment. A single-channel link will connect the subscriber to the public network over a distance of 60 kilometres whereas the dual link serves up to 40 kilometres. Greater distances can be connected by using repeaters.

The digital pair gain system, which allows three telephones to operate over the same physical copper circuit cable, dramatically reduces the cost of providing additional telephone services to individuals and businesses in rural communities, new estates and even long-established central business districts. The EXICOM DigiGain quadruples the telephone service on a single copper pair cable, providing four independent voice, data and fax services. No additional cables, poles or conduits are necessary, which saves time and money while generating additional revenue from existing infrastructure.

A voice telephone interface, multiple-party teleconferencing and other services are provided by the 30-channel primary multiplexer. This equipment interfaces with local exchange networks over a standard telephone cable, coaxial or fibre-optic cable and high-capacity digital multiplexing systems.

Griffin Digital Services
E-mail: rschenk@earthlink.net
Website: http://www.griffindigital.com
For further information see Annex B

centres that were put in place have remained in operation. During the 1990s the idea has been taken up in Africa, Asia, eastern Europe and Latin America, and numerous new trials are either planned or under way.

■ In Estonia, three "telecottages" (another word for community telecentres) were established in 1993 with the help of local and central government. By 1995, when nine more were added, the all-Estonian village movement (KOKUDANT) formed the Estonian Association of Rural Telecottages as a non-profit, non-governmental organization for cooperation between organizers and supporters of rural telecottages. The association offers consultancy, research and exchange of know-how and information. The services offered by telecottages include tourism; consultation with local authorities and local businesses; distance education; study circles and services to local populations; and marketing. By the end of 1997 more than 30 telecottages had been established. The Estonian experience shows that, in addition to providing information and communication technologies, the centres serve as places where people can meet, work together and share information and ideas, and so can assist in the revival and strengthening of rural communities.[2] At the telecottage in Voru, for example, basic personal computer (PC) courses have been followed by courses and seminars on foreign languages, computing, marketing for small businesses and rural tourism. More than 450 people have participated, 20 small enterprises have been founded and ten projects have received support from outside bodies. Villagers access information sources, use the computers and are beginning to use the telebanking facilities.[3]

The multi-purpose community telecentre concept is being championed by the International Telecommunication Union (ITU) as one of the best ways of bringing universal access to rural and remote regions of developing countries. ITU is collaborating with a number of other organizations which are equally convinced of the utility and feasibility of the telecentre approach. These include the United Nations Educational, Scientific and Cultural Organization, the United Nations Development Programme, the Food and Agriculture Organization of the United Nations, the World Health Organization, the Inter-American Committee for Agricultural Development, the International Development Research Centre, and numerous non-governmental organizations and national authorities. Working together with some of these organizations, ITU is the lead agency in sponsoring telecentre pilot projects in nine developing countries: Benin, Bhutan, Honduras, India, Mali, Suriname, Tanzania, Uganda and Viet Nam. These projects are all close to the implementation stage.

Establishing multi-purpose community telecentres takes time. The matter has to be discussed initially, and at several stages, at all levels and with all stakeholders. Experience has shown that considerable special field research has to be carried out to ensure that the project can get under way and, just as important, can survive and continue. The social characteristics of rural populations where telecentres are to be introduced play a big role in how the project can be successfully implemented. One potential problem that has had to be dealt with has been the negative feelings of the urban agents dealing

The Voru homepage: <http://www.werro.ee>. The telecentre in Voru offers access to computers and training for rural people.

with the telecentre users, because the rural dwellers would have access to technology that was more powerful than that enjoyed by themselves. To overcome this, the field investigators decided to involve the agents by providing them with access to training courses for telecentre users. It was also necessary to find innovators in both the telecentre and the urban locations to ensure optimum exploitation of the potential of the tools put at their disposal. Innovators involve those around them, informally train others and, in general, accelerate the development process. In summary, "while the multi-purpose community telecentre projects will provide important new services, it is the capacity of developing country populations to innovate which is at the heart of what the pilot programme is hoping to achieve. Developing new ways of forming partnerships and generating innovation for social and economic development is really the task at hand."[4]

SETTING UP A TELECENTRE – A WORKING MODEL

The ITU-sponsored pilot projects setting up multi-purpose community telecentres are now close to coming on-line. This makes it difficult to provide operational information at this stage, but information gathered and used during the preparatory activities in Uganda, plus information from operational telecentres outside the developing world, make it possible to draw a picture of a typical centre.[5]

Nakaseke, Uganda, is a community of about 14,000 inhabitants with a population density of 55 per square kilometre. The business plan for the telecentre is based on the assumption that an initial body of relevant services and applications, as well as suitable interfaces and tools, has been developed through pilot projects and other efforts with the support of the international community. Such resources may include government and community information resources, electronic library and distance learning resources, including multimedia, CD-ROM materials, tourist and trade information as well as software in local languages.

Furthermore, it is assumed that initial marketing of the services has already taken place, so that the inhabitants in the community as well as other potential clients (the government, international agencies, non-governmental organizations) are aware of the cost-benefit to them to use these services and are prepared to pay for them. In fact, the client base would normally start small and grow annually to the level of saturation.

The simplified business plan, Table 1, considers the annual costs and revenues for a year in the middle of the life of the telecentre. It is assumed that the initially lower revenue will be compensated for by the higher revenues towards the end of its life cycle.

Estimated investment costs for telecentre equipment and resources are given in Table 2 and for telecom equipment in Table 3. Note that adding a few more computers, telephones and faxes would not change the cost significantly but that high import taxes could have considerable impact on the total capital cost. The estimated cost per line, US$3,400, is well above the world average (of around US$1,500 in 1994) but somewhat lower than the average for the African continent (approximately US$4,500 in 1994).[6] This seems realistic, as new technologies have reduced the costs in recent

Setting up a telecentre – costs and revenues

Table 1: Provisional business plan – multi-purpose community telecentre

Investment	**US$**
Building and furniture	36,000
Basic telecentre equipment and resources	70,000
Total	**106,000**
Annual costs	
Depreciation cost – building 25 years @ 8%	3,700
Depreciation of telecentre equipment 10 years @ 8%	15,800
Finance cost (4%)	4,200
Administration and maintenance, including leasing a 64-kilobyte telecom line	76,000
Total	**99,700**
Pre-tax profit 17%	18,000
Break-even revenue	**117,700**
Annual revenue (income)	
Telecom (8 public phones + 2 fax) @ US$2,160 line	22,000
Office rental – 4 hours per day @ US$10	14,000
Internet – 100 subs @ US$10 per month + 200 extra hours per month @ US$2	17,000
E-mail – 1,000 subs @ US$1 per month or 500 subs @ US$2 per month	12,000
Voice mail – 100 subs @ US$2 per month	2,400
Photocopy/printing – 350 copies per day @ US$0.20 per page	25,000
Training courses – 250 students per year @ US$100 per course	25,000
Video viewing – average 5 viewers per day @ US$0.5	1,000
Total income	**118,400**

Table 2: Telecentre equipment and resources

Items	**Total US$**
Smart-card phone booth, outside (one paycard, one coin) (2)	4,000
Phones with counters (6)	450
Fax machine (2)	1,400
Photocopier and maintenance	10,000
Flatbed colour scanner	1,000
Multimedia Pentium PC, 16-megabyte RAM (8)	12,000
2511 router with 2 synchronized and 16 asynchronized ports	5,000
Local area network (LAN)/Internet caching/Audio server Pentium PC, 32-megabyte RAM	2,000
CD-ROM jukebox (2)	1,600
CD-ROM products (20)	2,000
16-port 10BaseT LAN hub	240
LAN cable (10 metre lengths) (16)	160
Ethernet card (9)	270
Microsoft NT server software	1,000
MS Windows 95/Office, 10-user site licence	1,000
Microtouch prospector touch-screen add-on (4)	4,000
Overhead projector screen	1,000
Colour overhead projector with computer and video input	5,000
Laser printer (2)	1,400
Colour printer	500
Large TV (74 centimetre), antenna	1,400
Video recorder	1,000
FM/AM/SW radio	200
Application software	2,000
Power stabilizer/safety equipment	1,000
Solar panel/inverter/batteries	2,000
Voice-mail services equipment	3,000
Standby generator unit	2,500
Installation	2,500
Total	**69,620**

Table 3: Telecom equipment – Uganda case

Items	**Total US$**
2 hop digital megawatt link	66,000
Installation + material	10,000
Self-supporting steel tower	2,500
Rural automatic switch 256 ports – radiobase station – wireless access	30,000
Telephone sets (40)	2,800
Rectifier and batteries	23,500
Total	**134,800**

Cost per line (rapidly decreasing with additional lines) US$134,800 per 40 = US$3,400

Table 4: Annual telecentre administration, organization and maintenance recurrent costs

	US$
8 staff, including manager, support staff and driver	14,000
Consumables, including books	10,000
Transport (optional)	10,000
Equipment repair	4,000
Leased 64-kilobyte telecom line	36,000
Internet access	1,000
Subscriptions, magazines and similar	1,000
Total	**76,000**

years and are expected to bring down the cost further during the next few years.

Annual depreciation is calculated at 8 per cent with 25 years life for buildings, 15 years for telecommunication equipment and 10 years for computer equipment. Estimated recurrent annual costs for administration, organization and maintenance for the telecentre are given in Table 4. The need for a vehicle and driver may be questioned, as this represents a major recurrent cost. On the other hand, if the centre is to have an important function as a library, the recurrent cost for renewal of books may be higher than shown.

The revenue per individual subscriber varies considerably according to the category of subscriber and calling patterns. The average annual revenue per line in Uganda is high – US$1,140 in 1995, compared with the world average of US$859.[7] According to one analyst,[8] a typical revenue per high-user business subscriber is US$1,200 per year, which seems safe to assume in the Uganda case.

On the basis of the above discussion of revenues, the following assumptions are made:

- annual revenue from each of the telecentre public telephone and fax services lines, including revenues from incoming calls:[9] US$5,400 per line;
- telecom operator's share: US$3,240 per line (60 per cent of total revenue);
- telecentre's share: US$2,160 per line (40 per cent of total revenue);
- annual revenue from individual lines: US$1,200 (all of which goes to the telecom operator).

Affordability

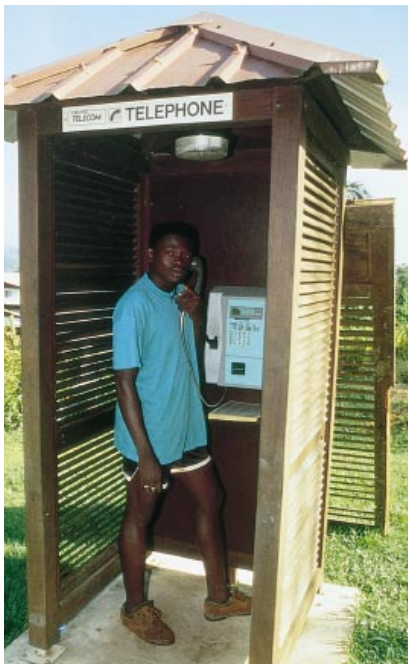
Statistics[10] indicate that people (collectively) generally spend between 1 and 3 per cent of GDP (gross domestic product) on telecommunications. In developing countries, this spending is essentially on basic telecom services, as most people have no access to value-added services. In some countries, notably islands with many tourists, the spending is considerably higher. However, more research is needed to find out how much people are prepared to spend on advanced information and communication services. This could be done in telecentre pilot projects.

With the above assumptions, the total annual revenue from basic telecom services expected in the case of the Uganda pilot project is:

- 10 telecentre public lines x US$5,400 + 40 private lines x US$1,200 = US$102,000. Assuming that half of this is from incoming calls, the local community (including tourists) would spend US$51,000 annually on basic services.

This is 2.7 per cent of the total GDP in this community with some 14,000 inhabitants, assuming that the GDP per capita in rural areas is US$134, i.e. 68 per cent of the average GDP per capita in that country.[11] This is a relatively high level of spending but seems realistic, considering the high proportion of public telephones (20 per cent), which generate more revenue than individual lines, and the marketing effects of the telecentre.

Another way to look at the affordability is to use a model for determining



ITU/Jean-Marie Micaud

Public telephones are the most affordable way for people in rural areas to get connected to the wider world.

the number of people needed to support one telephone line, which has been developed by Intelcom Research & Consultancy Ltd.[12] This number (calculated on the assumption of a collective spending of 1.5 per cent of the GDP on telecommunications), depends obviously on the cost per line and on the GDP per capita. In the Uganda example, about one line per 340 inhabitants would be required to make a line commercially viable. The demand forecast of 280 inhabitants per line (ten public lines in the telecentre and 40 individual subscribers for 14,000 inhabitants) therefore may look somewhat optimistic.

However, the high administration, organization and maintenance costs for rural lines used in the model (18 per cent of the capital cost or 50 per cent of the annual operating cost) is likely to be lower in the Uganda case, as the telecentre could handle marketing, billing and part of the maintenance. Moreover, the model does not take into account the income generated from incoming calls.

The tariffs proposed for Internet services – US$10 per month for 20 hours full Internet access (US$2 for additional hours) and US$1 for e-mail only – are low compared to current tariffs in developing countries. The goal is to make these services affordable to as many as possible and it is assumed that very low tariffs will attract more demand, i.e. price elasticity is expected to be relatively high. These are the tariffs applied by the telecentre, which would pay US$1,000 per year to the Internet service provider (which could be the telecom operator). This is considered to be a reasonable corporate subscription fee (in addition the telecentre will pay for the leased line).

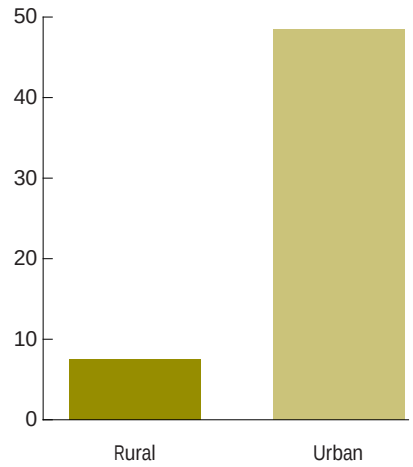
Additional sources of income for the telecentre – indirect benefits

With the above assumptions, the telecentre would generate an annual pre-tax profit slightly higher than 17 per cent, even disregarding the additional sources of income identified below. Many investors would consider this an interesting business opportunity. If the assumptions turn out to be too optimistic, the following additional potential revenue streams (which are more difficult to estimate at this time) may make up for a lower than assumed income from the services above:

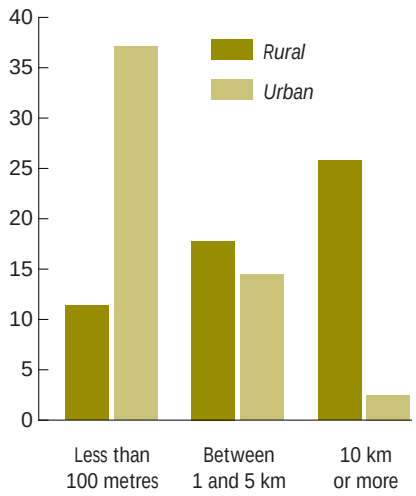
- rental of facilities for public distance education;
- rental of facilities for telemedicine;
- computer processing services;
- postal services;
- banking services;
- website (home page) design and hosting;
- advertisement fees – sponsoring.

Taking into account also the indirect economic benefits, such as improved productivity and increased trade, savings in transport, improved quality and reduced cost of health care and education, the picture looks even brighter. In particular, one may expect that a number of jobs will be generated because of the telecentre, e.g. software development, translations and other forms of distance work, as well as jobs directly related to the services the centre provides.

PROPORTION OF DWELLINGS WITH TELEPHONE, SOUTH AFRICA, 1995 *(%)*



NO TELEPHONE IN DWELLING: DISTANCE TO NEAREST AVAILABLE TELEPHONE *(% in each category)*



Source: South African Central Statistical Services, in *World Telecommunication Development Report 1998*, ITU, Geneva

If one telecentre is implemented for each 10,000 people, the staffing of the centres alone would generate 8,000 jobs in a country with 10 million inhabitants (using the ratio of eight staff per centre, as in the Uganda example).

The above assumptions can only be verified through the establishment and evaluation of some pilot projects. Given the uncertainties in the forecast of revenues and the difficulties to mobilize the investment required to implement such projects quickly, the international community may need to step in and share the risk.

CASE STUDY Telecentres – first phase

Twelve multi-purpose community telecentres are being set up in the rural areas of Rajkot District, State of Gujarat, India, as part of a project co-sponsored by the International Telecommunication Union (ITU).

OBJECTIVES The community telecentres provide the following set of services:
- e-mail and Internet access;
- telemedicine for health care;
- teletrading for selling agricultural produce;
- tele-administration for implementing the rural development programmes of the state government;
- telecustomer service for telephone bill collection and registration of new connections;
- tele-education and computer education;
- miscellaneous services: fax, long-distance telephony, photocopying, word processing.

BACKGROUND Telecommunications have been identified as the key to India's sustainable integrated rural development programme. The government believes that shared telecommunication facilities at a community telecentre can be a realistic and cost-effective way of extending to remote rural areas the health care, trading, education and other community services that are usually available in the cities.

DESCRIPTION The telecentres are being implemented through cooperative societies and by the state government which is offering services through franchises.

Each community telecentre serves the rural population within a 10-kilometre radius. The 12 community telecentres serve:
- a population of 400,280;
- an area of 292,888 hectares;
- 232 villages;
- 66,700 households.

TARIFFS The following tariffs are proposed for the services provided by the community telecentres:
- medical consultation with specialist Rs50 (c. US$1.30);
- electrocardiogram (ECG) Rs50 (c. US$1.30);
- foetal monitoring Rs50 (c. US$1.30);
- teletrading Rs25 per transaction (c. US$0.65);
- tele-administration Rs2 per application (c. US$0.31);
- telecustomer service – no additional charge for telephone bill payment;
- new connection registration Rs10 (c. US$0.26).

COSTS

Financial appraisal (US$*)

	Capital investment	Operating expenses	Operating revenue	Operating surplus
Year 0	144,992			
Year 1	53,671	125,709	205,379	79,670
Year 2		199,356	260,148	60,792
Year 3		216,157	272,964	56,807
Year 4		224,908	283,385	58,477
Year 5		228,822	286,411	57,589

**Original figures given in rupees – exchange rate Rs38.68 = US$1, as at the end of 1998.*

- Internal rate of return 19 per cent.
- Pay-back period less than five years.
- Financing strategy: grant/loan US$177,521; equity US$23,268.

ADDITIONAL BENEFITS
- Computerization of district administration.
- Computerization of markets.
- Impetus to development programmes.
- Computer literacy in rural areas.
- Attaining integrated rural development objectives.

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If the estimates discussed earlier turn out to be realistic, it may be expected that telecentres will come to be seen as a very attractive business opportunity. It should then be possible to find ways of mobilizing the necessary investments for generalizing the model, e.g. by providing "micro loans" to willing entrepreneurs through financing institutions, such as the development banks or the Grameen Bank. In some cases, the community may succeed in creating a cooperative which could raise the money from community members who would invest in, and own, the facility. In other cases local business may be interested in investing in telecentres.

TELECOM APPLICATIONS

Once the basic telephone network has been installed, rural dwellers soon appreciate that telecommunication systems are powerful communication and knowledge-sharing tools. The systems can provide new information resources and open up new communication channels to facilitate dialogue and the flow of information between rural people and organizations, governments and the wider world. Information and communication technologies make it possible to obtain and to distribute information of all sorts from anywhere in the world from databases and other sources. They offer a means of bridging the gaps between development professionals and rural people by initiating interaction and dialogue, new alliances, interpersonal networks and cross-sectoral links between organizations. They can create mechanisms that enable the articulation and sharing of local knowledge and they can also help families stay in touch. Basic literacy is one subject that could be addressed through community telecentres, with courses offered to women as well as to men. Women produce some 60 per cent of food in the developing world and the World Bank has recognized that the best investment in the developing world is to educate women. For the moment, many of the potential applications are not widely used because the infrastructure is not necessarily in place, but the following gives some idea of what is possible.

Communications for rural organizations

Small businesses in rural areas, as well as intermediaries serving rural populations, such as extension field offices, rural non-governmental organizations, health clinics, government satellite offices and church organizations, can take advantage of telecom applications to improve the quality of their work, increase communication capacity and efficiency, and reduce telecommunication costs. As just one example, the Baptist Missionary Society in Kinshasa uses a satellite system based on a ground station in Zaire to e-mail its everyday administrative communications.[13] As telephone, fax and e-mail connections become available, they provide a quick, reliable and cost-effective way to contact suppliers and clients alike. Private sector businesses, large and small, are using the Internet to reach new markets, promote products and services globally and access critical business and financial information. For small businesses, in particular, in remote rural areas, the Internet can provide a market place, a research library and a source of supplies – all without leaving the office or factory.

Administration of the Russian Federation

Satellite systems can now bring cost-effective telecom services to widely scattered rural users.

Lack of suitable infrastructure can be a problem when it comes to providing e-mail networks in remote rural areas. Uganda Connect has developed an innovative solution that links non-governmental organizations in Uganda by using high-frequency radio transmission together with advanced radio modems. The system in use can transmit signals over more than 4,000 kilometres. It is cheaper to use than satellite links and obviates the need for physical telephone lines.[14]

■ As an example of the Internet at work, the International Small Business Consortium,[15] a website dedicated to helping small businesses make international connections, enabled a pipe supplier in Malaysia win an order in the Russian Federation for a project in Italy. A Russian contractor e-mailed the consortium because he was looking for some pipe tubing for the project. The consortium scanned its network of small businesses and the contractor was quickly put in touch with a supplier making the right product in Malaysia. A few keystrokes later the deal was sealed and the pipe was on its way to Italy.[16]

Telecoms and rural tourism

From the point of view of potential tourism businesses, adequate telecommunications are indispensable. They can be used both for developing and promoting the business as well as in the day-to-day operations of making reservations and other detailed arrangements for clients. Experience has shown that potential tourists may refuse to go to areas where "reasonable" telecommunications are not available. They want to be able to keep in touch with business and family interests at home, and to feel secure about being able to contact the wider world in case of civil or natural emergency at their holiday destination. Tourism is a rapidly expanding industry worldwide, and offers a significant commercial opportunity for many developing countries. Already, the tourism sector in some developing countries has been quick to recognize the benefits of the Internet for advertising destinations, tours and holiday services. Of particular interest are the websites for ecotourism, game parks and adventure tours in areas of southern Africa where rural tourism is a growing industry.[17]

The Internet has created low-cost marketing opportunities for tourism operators in rural areas.

■ In Zimbabwe, for example, there is a site for tourists which has 77 clickable information sources covering such topics as transport, hotels, other accommodation (including houseboats), tours, adventure safaris and hot-air ballooning. This site is available at <www.zimbabwe.net/tourism/>.

Tourism operators in rural and remote areas have a difficult time marketing their destinations through traditional media because of production and distribution costs. The Internet now represents a very inexpensive way for them to advertise their sites to the world and interact directly with potential tourists.

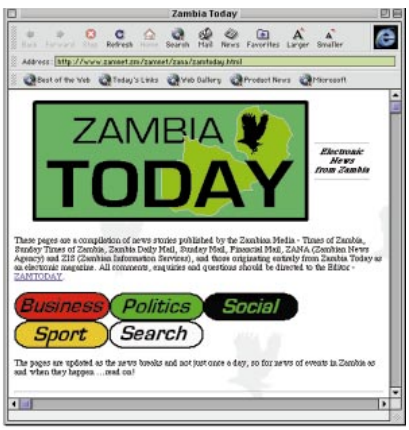
Planning and market information for rural producers

"The change to a global market economy over the last ten years has produced some very big changes for small producers. Now they need to understand global market situations to make better decisions about timing, marketing and management."[18]

The idea that communities of agricultural producers working on a small scale are isolated and living in closed, self-sufficient societies is a myth. Rural communities and agricultural producers can be deeply affected by global economic, environmental and political forces. Indeed, with the appropriate knowledge, small-scale producers can even have a competitive edge over larger operations. When knowledge is harnessed by strong organizations of small producers, strategic planning can be used to provide members with lower-cost inputs, better storage facilities, improved transportation links and collective negotiations with buyers. The Internet is one tool that can enhance this flow of information. It is an inexpensive way to communicate and access global information. Local Internet services can be easily managed by well-organized local user groups and farmers' organizations. Information and analyses can be tailored to local, regional and national knowledge and communication needs and realities. When combined with national and global market information systems, and with the ability to communicate quickly with potential buyers and brokers, local Internet systems become valuable strategic planning and decision-making tools.

■ Indigenous fishermen in northern Canada were having trouble selling their freshwater catch through the sole authorized government agency, which imposed low prices and excluded a number of fish species. The fishermen organized themselves and found out that the Internet could provide a shop window from which they could advertise the various fish species available, with photographs. They were able to make transport arrangements by air to several large United States cities on aircraft whose main purpose had been to carry supplies northward. By using the space available on the return southward flights, they obtained inexpensive transport and were able to sell all their fish, and at much more advantageous prices than the government agency had been paying, all thanks to the Internet. This initiative could be replicated in other countries as Internet access grows.

Community information centres and farmers' organizations can also gather information of interest to their members from the Internet and disseminate it via local radio stations, newspapers and other local information-sharing networks and tools. For example, daily market prices and agricultural news can be posted at cooperatives, local stores, transportation hubs, agricultural supply outlets and social gathering points. Simple newsletters can be developed using Internet information and distributed to members of farmers' organizations. When integrated with other media tools, the Internet can be a powerful information resource and research tool.



Many national newspapers are now available on the Web, making access available to readers anywhere.

How the Internet spreads the news

Radio stations depend greatly on topical information that could be of interest to their listeners, and for radio stations everywhere press or wire services have always been an important source of news. Until recently, however, a major problem for local radio stations in Africa has been the fact that the information carried on these services is written up in Europe or North America. News and other items about Africa were usually subject to industrialized world slants, were mostly concerned with major cities and were

frequently distorted, inaccurate or omitted details of interest to Africans. This has changed since the Media Institute of Southern Africa (MISA) and other similar organizations came into being to help distribute local news through associated African press services (e.g. Inter Press Service). In 1994 MISA started to use the Internet to gather and distribute material; it currently carries between 300 and 400 stories a week which can be taken up by radio stations and newspapers.

■ In Zambia, for example, both national daily newspapers mirror their daily copy on the Web, making the news accessible to rural Zambians with Internet access, as well as Zambian expatriates around the world. E-mail discussion groups provide an opportunity to discuss the daily news with one another. Such e-mail discussion groups for nationals and expatriates exist for almost every developing country in the world and represent a relatively untapped resource for accessing the views, ideas and creativity of members of civil society with regard to development policy and initiatives.

CORPORATE VIEW

Educational television and radio

A DISTANCE learning project run jointly by the Finnish Broadcasting Company and the National Board of Education is changing the face of further education in Finland. The upper-secondary distance learning project was launched at the beginning of 1997 as a three-year European Union programme. Concentrating on the development of distance teaching and learning methods, the objective of the programme is to create a model of upper-secondary distance learning to support the activity of night schools and upper-secondary day schools across the country. Students targeted by this initiative include both employed and unemployed people aged between 18 and 69 as well as young people attending upper-secondary schools or vocational education institutions.

In order to increase opportunities for the adult population, particularly workers and entrepreneurs in small and medium-sized businesses, to study in addition to working, it was necessary to create a flexible, open learning environment using new information and communication technology tools. New distance learning materials are being developed for educational radio, television and data networks as part of the project. Efforts are being made to link adult education institutions and the business community, and educational institutions are being networked to enable students to follow individualized study programmes. The Finnish Broadcasting Company is involved in producing learning material for the World Wide Web as well as planning and producing television programmes, broadcasting studio tutoring sessions and producing related radio programmes.

The basic materials package for upper-secondary distance learning includes 68 Web modules for 20 subjects and 160 half-hour radio programmes for 20 subjects. Cassette versions of the radio programmes are also available for sale. A package for entrepreneurs is being developed by an institute for small businesses which contains course-specific Web modules, radio programmes and a written guide.

The Finnish Broadcasting Company has played a significant role in all aspects of the radio production process. In addition to providing technical expertise during production, it has supplied airtime and the services of a full-time producer. All the distance learning material is being digitally archived. As a result of the television programmes, study materials designed for the project were visible nationwide, providing information on the courses and the way in which distance learning operates, and inspiring Finnish people across the country to learn. The company intends to launch a development project for interactive digital television programming services in 1999 connected to the upper-secondary distance learning project which has proved such a success.

Finnish Broadcasting Company
E-mail: ismo.silvo@yle.fi
Website: http://www.yle.fi
For further information see Annex B

Rural radio

The popularity of rural radio continues and expands. In 1998 the United Nations Educational, Scientific and Cultural Organization (UNESCO) devoted US$50,000 for the provision of a rural community radio for districts of central Ghana "…to assist the development and prosperity of the population, by addressing the issues of education, health, democratic process, the role of women and poverty alleviation". In the same year UNESCO undertook similar projects totalling more than US$700,000 through its agency, the International Programme for the Development of Communication (IPDC), supporting rural radio broadcasting in Cameroon, Cape Verde, Côte d'Ivoire and Zambia in Africa, and elsewhere in the world in Belize, Bolivia, Colombia, the Dominican Republic, Haiti, Georgia, Mongolia, Nepal, Tadjikistan and Turkmenistan.[19] For more on the use of radio for farmer education see the section of *Telecommunications in Action* on agriculture, and for the use of radio in education in general see the section on education.

Telecoms and family ties

Rural villagers in developing countries and their expatriate relations working overseas can use telephone calls to keep in touch with each other. However, this could be expensive or beyond the means of rural dwellers. But there are ways to overcome this. Arrangements such as the Canada Direct service make it easy for calls from the villages to be made at the expense of the person receiving the call. International Call Me service, available in Canada through Teleglobe Canada, provides automatic pre-authorized calling, at the expense of the recipient, to the expatriate who has equipped his family member or friend in his home country with the appropriate Call Me card.

FAO

Information and communication technologies can help governments communicate with their rural populations.

Government presence, more than symbolic

Information and communication technologies can make possible timely and effective communication between the rural population and government departments and agencies, in ways that were previously not possible. The government can warn of impending natural hazards, for example hurricanes or volcanic eruptions, and deal more effectively with the aftermath. Less dramatic but of long-term value is the ongoing non-emergency communication between government organizations and rural and remote areas. Information about good environmental practices can be provided to the citizens and they, in turn, can notify the central organization of possible adverse situations, so that these situations can be dealt with to avoid a major problem. For example, environmental and agricultural ministries are highly concerned about the misuse of pesticides, which leads to up to 25 million cases of poisoning worldwide every year.[20] In Jamaica, a series of radio messages has been used as part of a training campaign in the safe use of pesticides, and in Zambia a radio programme on the same theme has been widely welcomed, with requests from the public to turn it into all seven of the country's local languages.[21]

Telecoms can also play an important role in democratic processes, for example in elections. Information about the election is distributed

throughout the rural areas. Those responsible for managing and supervising the electoral procedures can do this over communication links. Local election results can be reported to central locations and overall national election results flow back the other way over these same links. The advent of information and communication technologies in rural and remote areas provides an opportunity to extend to these areas government services and capabilities that were not previously provided because of prohibitive costs. This government usage of the newly available services, charged and paid for at established or negotiated rates, will provide a valuable baseline of traffic and revenue to the service provider. (See also the section of *Telecommunications in Action* on governance.)

Teleports – a rural solution in India

The launching of the 12 Indian telecentres described in the case study presented earlier in this section has some solid experience behind it. In India, for many years, Teleports (franchised telephone shops) have been the means of providing basic telecommunication services in rural towns and villages. In the state of Punjab alone there are more than 10,000 franchised Teleports serving populations in communities ranging in size from 2,000 to 15,000 people and, on average, these Teleports receive 100 visitors per day. The average spending per visitor is US$0.28 even though GDP per capita in

CASE STUDY Funding for mobile phones

OBJECTIVE
■ To significantly improve communications and to stimulate new commerce by funding mobile phones in each of Bangladesh's villages.

BACKGROUND Grameen Bank operates throughout Bangladesh, providing micro loans to farmers and others running small businesses. It owns 35 per cent of Grameen Phone, the parent company of Grameen Telecom. Telenor, a Norwegian telephone company, owns 51 per cent, and the remaining shares are owned by a Japanese trading house, Marubenu, and a group of Bangladeshis living in the United States.

DESCRIPTION Grameen Telecom is setting up a mobile telephony network based on digital cellphone technology. Through Grameen Telecom, Grameen Bank funds individuals, often existing clients, who are willing to take the risks involved in creating small businesses based on telephone call boxes. The individual buys the telephone with a loan from the Bank, which is then repaid from money that the business brings in.

COSTS It costs taka 18,000 (US$385) to buy a mobile phone and have it connected, paid back at taka 220 (US$4.60) a week. Making it available to other villagers can bring in more than taka 100 (US$2.10) a day.

RESULTS In the first year 103 handsets were sold to rural women. The initiative took off quite slowly because the network infrastructure for the telephones has been limited. But Grameen Phone has now secured the necessary investment to extend the network by means of fibre-optic cables.

Anna Bibi of Kaikarhat was one of the first to set up a village telephone centre under this initiative. She is happy with her income from the telephone, and the other villagers are happy to be able to use it. Iazzuddin Bapari gets better prices for his rice now that he checks the market price by telephone before setting his own price. He no longer has to go to town, a journey that costs him more than taka 150 (US$3.10), to take orders. Mozammel Haq, a doctor, can order drugs by telephone for his pharmacy, so that he rarely runs out any more. And he can keep in touch with his brother in Malaysia, who now has the choice of telephoning when he wishes.[22]

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rural India is as low as US$220 per year. A recent study in 25 of these Teleports showed an average income per line in 1995 of US$10,344, in spite of low tariffs in rural India. With the operator receiving US$2,947 per line for Teleport business, on top of other activities, this is considered to be a highly profitable enterprise.[23]

HOW IT CAN BE FINANCED

Good development is sustainable development. This means that while start-up funding may be necessary, telecom provision and projects must be able within a relatively short period to become self-supporting. Sustainability is certainly possible. The case study of the project for the establishment of 12 telecentres in India is a good illustration. Information and figures provided to ITU by the Indian government show a debt write-off period of less than five years.

Financial investment resources

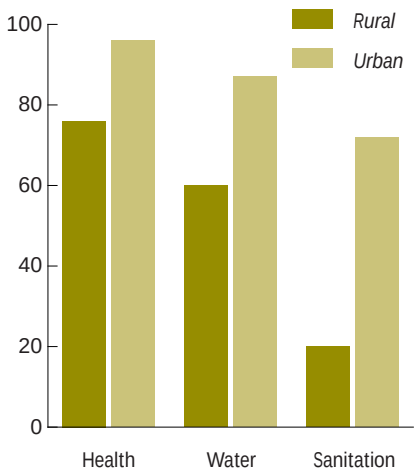
Dispassionately stated, in the current financial context there are only two substantive sources of funds for investment in rural telecommunication programmes. These are the service provider's own internal funds and funds from private sector investors, including individuals and organizations, both national and international. It is important that funds that are already in the service provider's hands (e.g. from depreciation charges or from retained earnings) are permitted to be retained for reinvestment in the network. This may require changes in legislation at the national level; for example, to encourage investment in the network, the government may specify that earnings will not be taxed if they are so reinvested. For investment funds to be forthcoming from potential private sector investors, it is essential that the rural telecommunication network be expected to be and, in practice, be seen to be, a profitable enterprise.

Encouraging investment in rural telecoms[24]

The main obstacle is not lack of technology or money, but rather that there is not a market able to bear the cost. Many countries need to change their policies to create a more attractive investment climate. Some of the policy tools that have been used to date to bring rural investment out of the sector reform process or to entice privatized investors into the rural market include the following:

- Placing service obligations to reach certain categories of community on to newly privatized monopoly operators. The operator negotiates with the ministry concerned to have a limited monopoly providing services for a number of years in exchange for providing services to rural villages with populations above a certain level – Argentina, Mexico, Peru and Venezuela.
- Enforcing rural percentages on new competitive entrants, monopoly concessions, reformed or partially privatized operators – Botswana, India, Indonesia, Malaysia.
- Offering monopoly licences for service areas which are predominantly rural – Bangladesh, Czech Republic, Hungary, Venezuela.
- Allowing competitive entry or cooperative service providers to serve rural areas – Argentina, Poland.

RURAL-URBAN DISPARITY IN ACCESS TO SOCIAL SERVICES IN DEVELOPING COUNTRIES, 1990-1996
(% of population with access to services)



Source: *The State of the World's Children 1997*, UNICEF/OUP, 1997

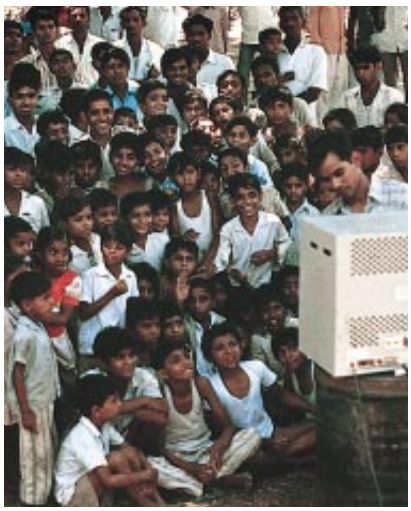
- Tying rural obligations to attractive international gateway, cellular or value-added operating licences – Philippines, South Africa.
- Offering Telecommunications Development Fund finance for areas not covered by main operator obligations – Chile, Peru.

Enforced internal cross-subsidization

The cross-subsidization concept, where more profitable services are included in a licence as compensation for obligations to provide services to rural areas, has provided significant improvements in rural access. One major limitation is that the obligations may reach the commercially most attractive communities at the expense of leaving the most challenging cases still to be served by other means. In Mexico, for example, the obligations have brought service to more than 20,000 new communities with populations above 500, but there are perhaps 100,000 more communities with lower populations which are still beyond the reach of the existing infrastructure. On the other hand, Malaysia Telekom is probably carrying out the most aggressive cross-subsidization programme in Asia today, with targets to reach a penetration of 20 lines per 100 rural inhabitants and to provide access to every village by the year 2000 in return for limited monopoly privileges.

Special rural operators

In several cases – notably in Bangladesh, Czech Republic, Peru, Poland, Venezuela and, in future, some African countries – policy makers are taking a different or complementary approach, by licensing operators who will focus primarily on the rural market. In these cases, the policy environment and terms of interconnection between the predominantly rural operators and the national or urban-based operators is much more critical. The key issues of relative costs and revenues, revenue sharing and the nature and size of the mutual benefits from bothway call traffic have to be considered more thoroughly than in the internal cross-subsidization case.



Administration of India

Even the most remote rural areas can now be joined to the global network by modern communication services.

Policies that could increase profitability

The profitability zone expands as costs reduce and people's use of the telephone increases. However, policy strategists are also able to use various forms of intervention to enable rural operators to develop a more positive business case for higher penetration/access levels – e.g. to serve smaller communities or lower revenue subscribers – than would otherwise be viable. The mechanisms could include one or a combination of:

- fiscal and tax incentives;
- import duty relief, based on technology-related criteria (e.g. wireless spectrum efficiency);
- differential tariffs (e.g. freedom to charge higher connection fees for initial business and institutional subscribers);
- toll revenue sharing or similar arrangements with urban-based operators;
- "universal service fund" transfers from highly profitable or low-cost to high-cost operators;
- soft-loan, development funding or other criteria-based financial mechanisms.

For any of these schemes to work effectively, the regulatory body and prospective operators need to be able to assess the cost and revenue situation accurately to negotiate suitable licensing terms, conditions and resource flows. The primary policy objective must be to optimize the commercial provision of rural telecoms using mechanisms internal to the sector as much as possible, so that the administration and expansion of telecommunications fulfils its strong role as a major contributor to economic and social development without becoming a significant drain on the financial resources of the macro-economy. The sector has sufficient internal dynamism to achieve this in most cases.

PUTTING IT INTO ACTION

A rural telecommunication programme

Rural telecommunications will be introduced through a carefully planned, well-structured and managed, rigorous and orderly multi-year programme. Experience indicates that this approach will obtain the lowest prices and the best support from vendors of network systems and equipment. Also, as the programme progresses, the operator's personnel will gain valuable experience. As a result, the programme will become progressively more effective and efficient, and internal costs per line added will drop dramatically. This approach offers the opportunity to negotiate substantially lower equipment prices. The required support arrangements, e.g. tools and test sets, training the operations and maintenance staff and provision of maintenance spares, become a much smaller proportion of the total cost.

For obvious commercial reasons, the programme should start in those rural areas which are expected to have the greatest service demand, and to be the most profitable. The prospectively "least profitable – highest loss" areas will be served last. As effectiveness and efficiency improve, the costs of network extension will go down, probably dramatically. These last areas will be served when the programme expertise is highest and costs are at a minimum. As a result, these areas may in fact prove to be profitable. If they are unprofitable, they will be only marginally so.

As in other areas, the pilot project approach is often a sensible one. For example, the European Union's PHARE programme undertook a nine-country study to identify feasible approaches to the expansion of rural telecommunication services in central and eastern Europe. The study led to a pilot programme that included innovative roll-out strategies and a special credit line for financing.[25]

Experience indicates that the successful planning, organization and management of the rural telecommunication programme is a very important factor in creating a cost-effective rural telecommunication infrastructure that provides a service which can be priced low enough to be widely used, and hence valuable to the residents, and yet is profitable and sustainable.

IMPLEMENTATION AND OPERATION

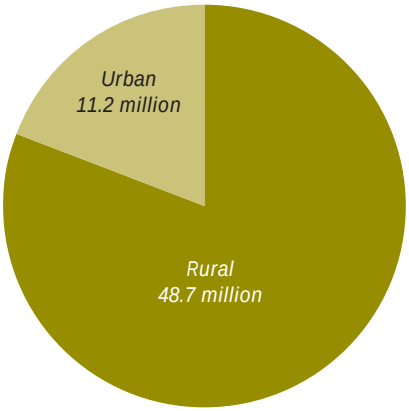
Regulatory framework

An appropriate regulatory framework will be required, which creates the necessary terms and conditions to promote the initial provision and continuing sustainability of the rural service. A firmly enunciated universal service obligation of the service provider, to serve the rural and remote areas

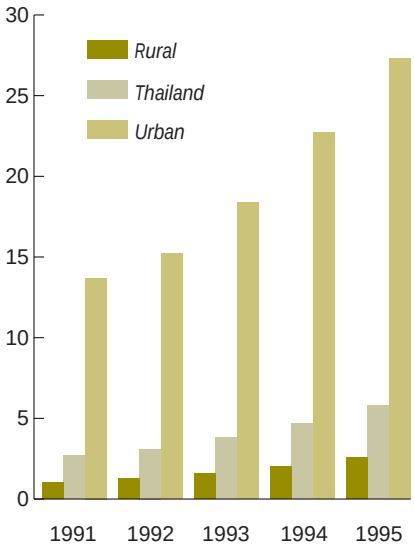
and defining how the obligation will be measured, is usually necessary. Conditions addressed by the regulatory framework will certainly include interconnection and revenue settlement. The revenue settlement arrangement should be based on legitimate costs. Simple schemes such as "sender keeps all" typically disadvantage the rural service provider substantially, and for this reason are not satisfactory.

The regulatory agency must monitor the sustained availability, quality and financial viability of the rural service, preferably through aggregated versions of the same indicators that the service provider uses for his own internal management requirements. Despite the service provider's best efforts, a modest subsidy may be appropriate in fulfilling the universal service obligation. The subsidy should be as low as is consistent with ensuring the continued sustainability of the rural service. The operator's success in pursuit of commercial principles is a key factor in minimizing the level of support.

THAILAND: DISTRIBUTION OF POPULATION, 1996



THAILAND: MAIN TELEPHONE LINES PER 100 INHABITANTS



Source: National Statistical Office of Thailand, Telephone Organization of Thailand, in *World Telecommunication Development Report, 1998*, ITU

Involving the stakeholders

The smooth introduction of telecommunications in a village where no such technology has ever existed is not something that comes automatically. Such initiatives should consult and include the views of local stakeholders or they risk limited success. Any development project that includes rural telecommunication systems ought to begin with assessments of the real needs of participants and use methodologies that catalyse participation and stakeholder engagement. Revenue generation, which is a key component of sustainability, has to be one of the main goals in the establishment of rural telecommunication systems; however, telecommunication experts and operators must realize that stakeholder assessments and a rural client-oriented approach are also key components and will be critical in helping to achieve that goal.

For example, an assessment of a new rural telephone system in the northwest of Ghana showed that pay telephone use in some areas was well below predicted levels while in others the demand exceeded the possibilities of the system. Apparently, in the poor usage areas, no attention had been paid to local users' proposals for the location and design of telephone booths to provide for privacy. These considerations are evidently important for the viability of such installations.[26]

Rural telecommunication initiatives can facilitate stakeholder engagement which in turn can be beneficial to service operators while providing rural stakeholders the opportunity for dialogue, exchange of ideas and problem solving prior to the implementation of a project. For example, a series of simple workshops could assist rural stakeholders in understanding the potential of rural telecentres to support social development objectives and rural economic development. In exchange, stakeholder engagement can help telecommunication operators identify opportunities to target specific client groups with services and marketing initiatives that will increase telecommunication traffic between rural telecentres and from national and international callers.

Franchising – a commercial approach

The rural telecommunication network must be operated as a commercial, entrepreneurial, profit-focused and profitable enterprise. It is this ethos that will motivate the service provider to continually seek to maximize revenues and minimize costs. There are many opportunities to do this. The service provider's success will be directly reflected in minimizing the amount of subsidy that is needed to support the universal service obligation.

The telecentre approach to providing telecommunication services is well suited to a franchise operation. Franchise operations, of which McDonalds Restaurants is the classic worldwide example, provide a well-tested and established, clearly enunciated supportive framework of operational terms and conditions. In the rural telecommunication context, this would include such things as hours of business, general physical arrangements (e.g. provision of appropriate privacy for customers, through telephone booths or equivalent), a standard franchise agreement, standard (and effective but not onerous)

CORPORATE VIEW Value-added benefits

A 100 MILLION rand (US$17.2 million) community project being implemented in South Africa by cellphone network operator Vodacom is demonstrating how telecommunications can have an enormous multiplier effect on local economies.

Numerous operators, drawn from previously disadvantaged communities with few services, are establishing telephone shops on a franchise basis to take up the company's offer to deploy 22,000 phones by the end of 1999, and to provide subsidized calls at half the commercial rate. The scheme is giving people in many communities access to modern communications for the first time. But it is also boosting other local services.

Many of the operators have developed adjacent businesses, while shops in townships have expanded, taxi ranks have grown and hospitals are better run. The telephone shops may even be turned into fully fledged telecentres, with Internet access, e-mail and fax facilities.

Telecommunications can also develop local value-added technology and improve training, two critical components of capacity building for development. When awarded its licence, Vodacom made a commitment to provide both under a ten-year, 1 billion rand (US$171.9 million) joint economic development programme. The programme – which also aimed to boost foreign investment, create jobs, promote research and development and stimulate local exports – was completed within three years, in June 1997.

In addition, the company created the Vodacom Academy to provide unique industry and business training solutions within South Africa and for the cellular industry. It runs courses on cellular products, technical aspects, skills and management training and, in the past three years, has trained more than 9,000 people from companies, disadvantaged communities and neighbouring countries.

The company has given 400,000 rand (US$68,750) to the ORT-STEP Institute to equip and upgrade two technology laboratories; provided university bursaries worth 1 million rand (US$172,000); plans to build a 600,000 rand (US$103,000) training facility; and has spent 5 million rand (US$860,000) upgrading the soccer stadium in Johannesburg for the Africa Cup of Nations.

The company was awarded one of two cellphone network licences in 1993 and started commercial operations a year later, providing national coverage, even to remote and isolated parts of the country, through dual-mode telephones for satellite and terrestrial use. The network offers voice mail, fax mail, short messages, smart messages, Internet, e-mail, information services and prepaid services.

In 1995 the company was awarded a cellphone licence in Lesotho, and has set up a joint venture company with the Lesotho Telecommunications Corporation to build and operate a network.

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For further information see Annex B

financial accounting and reconciliation arrangements, and standard operation and basic maintenance procedures for the telecommunication equipment.

Within this supportive framework and set of guidelines and practices, the franchise holder adapts the operation to meet the needs of the residents. The franchise holder is a local resident, and ideally is viewed as a helpful and dedicated pillar of the local business community. He or she benefits financially by operating the franchise effectively. Motivating financial arrangements, for example payment to the franchise holder based on percentage of revenue, are typical of franchise operation, and are very suitable. There must be appropriate revenue, including the percentage for the franchise holder, associated with terminating inward calls. This will encourage providing whatever is necessary (messenger service, in-village paging, voice message service) to complete inward calls successfully.

Effective franchise operation involves continuing, detailed results-oriented management of the franchise holders by the franchise-granting organization. This includes the use of measurable key indicators to compare locations and franchise holders. Examples of key indicators that would be useful in managing the group of telecentre franchise holders serving the communities of a rural area could include:

- revenue per line;
- revenue per local resident;
- information on lines out of service ;
- revenue information for specific value-added services and features;
- comparison of charges billed and money collected;
- operating cost information.

Ongoing capture and regular (typically monthly) publication of appropriate comparative statistics, at the telecentre level, and circulation of this information to the franchise holders as well as within the franchise-granting organization, will go far to both guide and encourage franchise holders to manage and improve their own operations. The franchise grantor's ongoing commercial management of the franchise operation will take action which will develop information on best practices, based on the successes of the best telecentres, and focus on moving the results of the worst locations and franchises towards those of the best.

BENEFITS

Training and education framework

The framework for extension workers and others attempting to bring development progress to rural and remote areas would be vastly improved by having essential and timely communication possibilities. This could allow workers to catch up on new and improved techniques, be aware of research direction and consult more easily with colleagues or superiors when problems occur. They could also submit routine progress reports or report back on findings of potential interest to agency headquarters and professionals elsewhere.

Revenues

Provision of telecom services would be a stimulant to rural commerce, spread knowledge of best-practice techniques, eliminate inefficiencies and duplication,

and thereby optimize the use of scarce resources while generating revenues. Knowledge of national or even global market possibilities could encourage better productivity, competition and new commercial entries which, in turn, would create jobs. Such activity could attract private investment and reward telecommunication and other information and communication technology operators and suppliers with new revenue sources while promoting knowledge of the region to the outside world.

National development objectives

Provision of information and communication technology services in the framework of rural development can also yield many socio-economic benefits from among established national development objectives, such as:

- making rural populations less isolated and raising their sense of national identity;
- raising literacy levels;
- increasing employment opportunities;
- disseminating advanced technological knowledge;
- eliminating rural poverty;
- improving environmental management to meet global norms;
- stabilizing the rural population and reducing migration to cities;
- attracting business and professional personnel to rural areas;
- improving the national image (useful to attract investment).

Summary of benefits

The benefits noted below represent the global possibilities and may not all apply to any individual project. Benefits include some whose monetary value can be readily ascertained, and others which are less tangible but whose advantages to the population are still obvious:

- increased productivity of existing micro, small and medium enterprises in the rural sector;
- economies in transportation costs for people and goods;
- creation of new enterprises and creation of new jobs;
- revenues from sale of products;
- improved access to education and increased literacy of population;
- improved health care – better knowledge and use of family planning and reduced mortality;
- improved viability for commercial activities;
- promotion of local culture and values, attracting tourism;
- access to government services and information (e.g. employment);
- empowering people to participate in the democratic process;
- protection of the environment for sustainable development;
- reduced isolation and better contact with remote family members;
- new focus on community projects and improved community infrastructure;
- engaging people in taking control of their future, acquiring new skills and market orientation;
- improved awareness of events on a regional, national and global scale.

Administration of Norway

Access to telecom services in rural areas can reduce isolation and increase opportunities for all the inhabitants.