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<td>Author(s)</td>
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Bridging The Urban-Rural Divide
In Telecommunication In Asia

by

Jonathan Parapak
INTRODUCTION

Currently distance is no longer relevant to our way of life. With a telephone, we can communicate with practically the whole world. With a television set, we can witness "live transmission" of almost any event around the world. With a telephone, a modem and a personal computer, we can access information in computers around the globe.

All these developments have been made possible by global telecommunications networks. Telecommunications certainly play a vital role in the economic and social development of a country. They eliminate distance, overcome isolation, improve efficiency and provide delivery of services to rural and remote areas. Although we have registered unprecedented progress in telecommunications, most of the world’s villages are still cut off from domestic and international communications systems. The still imbalance of telecommunications provision to urban and rural remains a major challenge to government and communications providers. In spite of these challenges, we must all pay special attention to service delivery to the rural areas.

We all welcome the advent of "distance insensitive technology" such as radio communications and satellite systems. Radio based technology appears to be the answer to the needs of our rural and remote areas.

THE NEEDS

Telecommunications are the nerve ends of modern society. Through telecommunications, information is detected, monitored, measured, transmitted and
collected. Like the body's central nervous system, telecommunications systems are networks of control; they are multi-purpose and pervasive in effect. Telecommunications provide significant social and economic benefits critical to improving and maintaining national economies and, by extension, the quality of life.

The expansion of the national telecommunications network has been limited by lack of funds, among other things, and naturally development has favoured urban areas where demand for service is greater and the economic feasibility more obvious. Telecommunications service have been slow to reach rural areas for several reasons: high costs, technical problems, and the lack of a guaranteed return on investment.

"A rural area" in general sense, as opposed to urban area, is an overall description of a remote or isolated area where its features involve such factor as:

1. adverse geographic and or climatic conditions,
2. low density of habitation,
3. low income level,
4. inferior social infrastructure.

Today about 50 percent of the world's population are living in the rural areas. This percentage is even higher in Asia.

In general, provision of rural telecommunications requires 4 times as much cost as, comparing to urban areas. On the other hand, it is difficult to expect the same income as of urban areas due to lower earnings.

Most telecommunications operators look at rural and remote areas as liabilities or cost centers. Most government, however, see rural and remote areas as an important part of the national economy. Rural areas are centers for food supply to the urban areas. In the context of technological and economic development the rural areas act like the suspension albumen to the nucleus or yolk (urban centres) of development. In an egg, remove the albumen of the yolk, and indeed the egg is dead, making the albumen indispensable to the total existence and development of the egg.

Rural and remote areas need services equal to those in the cities. They need information services, banking services, education, medical services and cultural links.
with their counterparts in the urban areas.

As contributors to the national economic and social system, they are entitled to enjoy services similar to those in the cities. It is imperative that the government respond to their specific needs. The imbalance of needs fulfillment has contributed to some extent to the prevailing rural to urban migration. Large cities have become more densely populated, raising many economic and social problems.

Telecommunications have been recognized as a necessary prerequisite to economic growth and, as such, is critical ingredient for developing countries. Many studies have been conducted on the correlation between the availability of telecommunications services and the per capita income of a society. Results indicate that telecommunications play a vital role in the stimulation of economic activities and the increase of per capita income of a nation. Thus if we are concerned with the quality of life of our people in rural and isolated areas, we must do something about the provision of telecommunications services.
3. PROGRESS OF TELECOMMUNICATIONS TECHNOLOGY

When telecommunications proliferated in the last century, it was in the form of direct physical connections between neighbours by using telegraph poles and wire. This was expanded with undersea cables and eventually high frequency radio.

Microwave line-of-sight radio links were installed in the 1950s and 1960s to reach across land masses and between countries, providing high transmission bandwidth and excellent reliability. This was not possible with high frequency radio because of the limitations of ionospheric "skip" propagation.

The first communications satellite capable of relaying message immediately (real time) was launched in 1962. Satellite communications, because of its high location above the equator, can relay between points in different hemispheres. Satellite technology offers wide coverage, high-quality transmissions, multi service offerings and high speed of implementation.

The latest trend is the creation of worldwide fibre optic network. Cables are being laid under vast bodies of water, giving rise to the opportunity to have high-quality, digital, fibre-based services on a global basis. These undersea cables are supplemented by the land-based fibre networks already in operation in many parts of the world.

Development of telecommunications technology has been further stimulated by progress in the field of electronics and computers. Development in the electronics field has presented us with ultra-high integration enabling thousand of components to be deposited on a single semiconductor chip. In the fields of computers we are witnessing the emergence of supercomputers with intelligent processing and almost unlimited capacity and capability.

4. SOLUTION FOR RURAL NEEDS

The foremost objective of the provision of rural telecommunications is to satisfy communications need as a basic human need of the rural population, and to serve the development of the rural districts.
Solution to telecommunications problem in rural areas seems to have received special attention within many international and national institutions. It is apparent that this becoming a constant pre-occupation of telecommunications authority around the world.

Radio-based technology has enabled many countries to serve all section of the community. Vast continent like Australia is well known for its radio-based education system, the flying doctor service and communications services to farmers in outback areas.

Satellite technology has the potential to deliver advanced and modern communication services to rural and isolated areas because it ignores rough terrain and vast distances. Satellites have made possible worldwide transmission of telephone and telex, radio and television broadcasting, business information and delivery of education and health services to rural areas. The issue is the only the cost of providing such integrated services. It is in this aspect that policy and regulatory options play an important role. The basic question is how to charge the customers in rural and remote areas.

Most government and telecommunications providers would agree that provision of services to rural and remote areas needs to be subsidised. It is the mechanism of subsidy which varies from country to country. Some countries have instituted collection of special funds to provide universal telecommunications service.

Let me then outline several premises for telecommunications service delivery to rural and remote areas:

Premise 1
Availability of telecommunications services in rural and remote areas is vital for their economic and social development.

Premise 2
Provision of telecommunications services is highly desirable yet it is very expensive and economically not feasible.

Premise 3
The availability of financing resources for telecommunications development is finite; for
some countries available financing may even be very scarce. A suitable mechanism for financing service delivery must be developed.

Premise 4
A subsidy mechanism must be develop in line with the general approach adopted by a country to ensure reliable and high-quality service delivery.

5. THE INDONESIAN EXPERIENCE

The merest glance, on the map, at the vast archipelago of Indonesia, will make evident the widely scattered distribution of its islands and demonstrate the existence of many remote pockets of population.

Indonesia stretches along the equator with a distance from east to west more than 5000 kilometers and north to south in the order of 1800 kilometers. The population is now over 180 million, making it the fourth most populous country of the world. About 69% of the population live in rural areas with the lowest density of 4 persons per square km in Irian Jaya. There are more than 50,000 small villages or rural areas representing the lowest level of governmental administrative unit.

With its nature as an archipelagic nation, it is easy to see how important communications infrastructure is for successful development of the country. That is the reason Indonesia leaped-frog in the use of telecommunications technology. Our domestic satellite system PALAPA, the first in the developing world and third in the world, was operational in 1976. PALAPA satellite system has enabled Indonesia to broadcast national television program to its most remote areas enhancing dissemination of information to a wider cross section of the society. The PALAPA network has been the backbone for telecommunications in Indonesia.

During the last 4 years, the development of telecommunications in Indonesia has been accelerated. In December 1991, we completed automatizing the telephone network in all the 301 district capitals in Indonesia, bringing the number of cities and towns with automatic telephone services to more than 2,200. During the 6th Five Year Plan we plan to increase telephone connections by 1,000,000 line units/year.
What about rural and remote areas? There are several programmes which deal with the provision of the telecommunications services in rural and remote areas.

a. Rural telecommunications projects. These projects utilize the exchange capacity in the nearest town and digital radio line concentrator, with a capacity of up to 3,000 subscribers.

b. Long-distance subscriber connection by radio utilizing locally-manufactured radio system and remote line concentrators.

c. Automatization of subdistrict capital telephone services and provision of services to surrounding villages utilizing small earth stations or spur-route radio system. There are 3,644 subdistrict capitals, of which 904 centres have been provided with automatic telephone services.

d. Implementation of wireless local loop and interconnection through the cellular network. By 1993, 14 cities and surrounding areas will be served by cellular system.

e. Establishment of integrated service centre in villages areas providing postal and telecommunication services. These service centres, often called “Wartel” or “Communications Services Shops”, are managed by private operators on a revenue-sharing arrangement with the local telecommunications company.
Currently the rural and remote areas communications services are provided by the state-owned TELKOM, the domestic carrier, where the necessary subsidy is internally absorbed by the company. The government determines the priority system, emphasizing tourist destinations and industrial areas.

6. POLICIES AND STRATEGIES FOR FUTURE DEVELOPMENT

It is less expensive and more profitable to develop telecommunications infrastructures for urban rather than rural areas. Increasingly, however, development experts and government planners are realizing the role that telecommunications can play in spurring economic development. A reliable telecommunications system stimulates economic growth and facilitates national cohesion. Everybody is beginning to perceive communications services as a social good to provide to the entire citizenry, rather than solely as enterprises to earn profits.

New technologies and services with lower cost of providing open new opportunity for revenue generation. Now there is growing evidence that expanding service to rural areas is more profitable than conventionally believed. Technology will continue to progress enabling cost reduction fro service provision to rural areas.

On the other hand, we should also promote the view that evaluates telecommunications projects not only from a purely financial but also in terms of their contribution to the improvement in the quality of the life of the majority of the recipients.

The future of telecommunications is exciting, full of challenges and opportunities. The key to our success is cooperation, networking and maybe alliances. In line with the strategy of cooperation we must all work hard to eliminate the missing link between developed and developing countries, and between the urban and rural areas. Concerted efforts must be made to assist the rural areas through special arrangements on technology, manpower development and financing schemes; otherwise the divide of urban and remote areas will remain and we can never really talk about or be proud of our national development.

We must explores all avenues to seek for innovation and technological breakthroughs to meet the demand of telecommunications service for urban and rural
alike at affordable rates. Such moves demand alliances or joint ventures at the national, regional and global levels.

Indonesia is determined to develop the necessary policy, regulatory mechanism and framework to accelerate telecommunications development in order to enhance the quality of life of all her people and to make Indonesia an integral part of the global information society.

7. CONCLUSION

Telecommunications technology is progressing very rapidly creating networks that are available for development activities in many countries. Technology is available for rural communications. Political commitment, financing mechanism and regulatory frameworks are needed to realize telecommunications provision to rural areas with the available technology.

The missing link, the gaps in telecommunications between developed and developing countries, and between the urban and rural areas must be eliminated. Trends in telecommunications technologies indicate a promising future.
BRIDGING THE URBAN-RURAL DIVIDE IN TELECOMMUNICATIONS

Presented at AMIC Conference on "Communication Technology and Development: Alternatives for Asia"

by: Jonathan L. Parapak

Kuala Lumpur, 26 June 1993
1. INTRODUCTION

a. Fast technological progress in telecommunication, offers:

- "distance insensitive service"
- global coverage and connectivity
- almost unlimited capacity
- personalized service
- mobile interconnection
b. Communications (Telecommunications & Transportation) have created "a true interconnected global village".

c. Telecommunications have played a major role in economic and political democratization and development, enhanced cohesiveness of peoples and promoted better understanding amongst the peoples of the world.
In spite of the incredible progress, there are still many gaps and missing links in the world.

- 75% of telephones of the world are in less than 10 countries
- Rural areas in many countries have no access to a telephone
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More than half the world's population live in the Asia Pacific...
Over 90 per cent of the population of the Asia-Pacific live in lower income economies.

...and around 1/5 of the telephone lines...
3 countries account for 70 per cent of the wealth... ...and have more than 50 per cent of the telephone lines.
2. TECHNOLOGICAL PROGRESS

a. Wireline technology ---> optical fibre

b. Satellite technology - fixed communication satellites
   - mobile technology
   - low earth orbit technology

c. Radio technology - digital radio cellular
   - wireless loop cellular

d. Switching technology - rural exchanges
MOBILE COMMUNICATIONS

ULTIMATE OBJECTIVE = GLOBAL INTERCONNECTIVITY & MOBILITY
3. **RURAL NEEDS**

a. Rural 
   - adverse geographic or climatic conditions
   - low density of population
   - low income level
   - inferior social infrastructure
   - more than 50% of world population

b. Rural needs: 
   - information services
   - education
   - medical services
   - financial services
   - cultural links
4. MEETING THE RURAL NEEDS

a. Rural communications
- are vital for economic and social development
- 4 times more expensive than urban
- commercially unprofitable
- need special, distance insensitive technology

b. Selection of systems and technology
1) Wire, pair cable
2) Radio link
3) Satellite link
4) Wireless loop
SYSTEM SELECTION DIAGRAM

RSU: Remote Switching Unit
SE: Small Terminal Exchange
RLC: Remote Line Concentrator

* Where LE still Analog
RURAL TELEPHONE NETWORK ALTERNATIVE SOLUTIONS

LE : Local Exchange
RSU : Remote Switching Unit
SE : Small Terminal Exchange
RLC : Remote Line Concentrator
c. Strategic approach

1) Political commitment
2) Technological selection
3) Financing mechanism, government, cross subsidy
4) Regulatory framework, tariff structure, obligation to universal service
5. **INDONESIAN EXPERIENCE**

a. Largest archipelagic nation in the world (17,508 islands, more than 180 million people).

b. The first developing nation to operate a domestic satellite (leap-frog in technology in 1976).

c. Now going through an ambitious accelerated telecommunications development.
d. Special efforts to provide rural telecommunications using radio link, satellite links. Now all 301 district capitals are automatic (50% of villages will be served by 1998).

e. Integrated service centers will be established in villages.
Evolution of Telephone Services in Indonesia

Years: 1983 to 1999

Y-axis: Millions

Graph shows the evolution of telephone services in Indonesia from 1983 to 1999, indicating the growth in terms of capacity, number of subscribers, and plan.
6. THE CHANGING ENVIRONMENT OF TELECOMMUNICATIONS

a. Progress of technology introduces new services, e.g. PCN, information paging, Low Earth Orbit satellite, worldwide cellular system.

b. Deregulation, privatization and liberalization, are changing the picture of service provision and regulatory regimes.
Market demand, including isolated economic activities, requires sophisticated services.

Government must respond to the changing environment through realignment of policies and regulatory framework.
7. THE FUTURE OUTLOOK

a. Special efforts and attention will be given to rural areas, prospecting true global interconnection even from rural and isolated areas.

b. Technology will continue to progress enabling cost reduction for service provision from rural areas.

c. Information dissemination networks, broadcasting, paging and communications will soon be available to rural areas.
d. It is important to develop special "software systems" for rural area application.

e. Subsidies, through government and/or operating companies, will continue to be needed.
8. CONCLUSION

a. Technology is available for rural communications.

b. Political commitment and financing mechanisms as well as regulatory frameworks are needed.

c. The missing link, the gaps must be eliminated.