



INTERNATIONAL TELECOMMUNICATION UNION TELECOMMUNICATION DEVELOPMENT BUREAU

**WORLD TELECOMMUNICATION DEVELOPMENT
CONFERENCE (WTDC-98)**

**Document 60-E
19 February 1998
Original: English**

Valletta, Malta, 23 March - 1 April 1998

For information

Agenda item: 3.1

PLENARY MEETING

Canada

RURAL TELECOMMUNICATIONS IN COLOMBIA - LESSONS LEARNED

Executive summary

The Canadian International Development Agency (CIDA) recognizes telecommunications as an important driving force in furthering the economic, social and cultural development of the rural areas of developing countries. Under a CIDA initiative which encouraged the participation of the Canadian private sector in international development, a rural telecommunication services project was implemented on the Pacific Coast of Colombia, west of the city of Cali.

This project served the rural hinterland of the small cities of Buenaventura and Tumaco, through two point-to-multipoint microwave radio systems, which served eighteen small communities in the coastal and remote areas. Telecom Colombia provided the ongoing operation, and received the revenue. The service was introduced in May, 1994.

This project was revisited in March, 1997, to review the in-service experience, determine to what extent the objectives for economic and social development in the communities had been met, and discover what lessons could be learned. Visits were made to all but one of the rural communities served, and both operators and users were interviewed.

The Tumaco system was found to be working well, delivering good service, generating substantial revenue, and providing a high level of satisfaction to its users. Service on the Buenaventura system, in contrast, was poor, with excessive service outages, and with three of its seven remote communities not receiving service at all.

It was found that the telecommunication services impacted economic development positively, through improved trade and market access, employment opportunities, and tourism. Social development was enhanced through better health care, enhanced public safety and security, and access to educational opportunities. User satisfaction and revenue in the communities served were directly related to the service reliability and convenience.

It was very clearly evident that substantial demand exists, if the telecommunication services are delivered in an efficient and sustainable manner. The efficient delivery of services will generate substantial revenue, which will ensure that the services can be sustained.

Valuable lessons were learned, in providing telecommunications to rural and remote areas:

- good quality, convenient and reliable services lead to good revenue and user satisfaction;
- sufficient service capacity and motivating financial arrangements are important;
- appropriate and convenient service delivery arrangements are needed in the small communities;
- there are good commercial opportunities to add new and valuable services, which are made possible by telecommunications, when the community demand becomes evident;
- management and control arrangements are needed, to ensure effective service delivery and to take maximum advantage of commercial opportunities.

A The telecommunications project opportunity

The rural telecommunications project which this paper describes was funded under the "Private Sector Development Fund" (PSDF), an initiative of the Canadian International Development Agency (CIDA) to involve Canadian private sector companies in international development.

The objectives of the project were to bring the rural area improved access to health care services, better governance through access to government services, economic development via wider markets for farm products and the local fisheries, and better access to educational programmes.

SR Telecom Inc. (SRT) of Canada, a supplier of point-to-multipoint microwave radio systems, developed a proposal under the PSDF to provide the telecommunications infrastructure for a remote rural area of Colombia. Telecom Colombia ("Telecom"), the national PTT, would provide the ongoing operation of the service, and would receive the service revenue.

The project provided service to a mountainous area on Colombia's Pacific coast, west of Cali. This remote area, with difficult access, is the rural hinterland of Tumaco and Buenaventura, with a population of about 25 000 people, in some 18 towns and villages, and many small hamlets.

B Implementing the telecommunications project

The technology selected to serve this difficult topography was point-to-multipoint microwave radio. Two systems were required, connecting to Telecom's existing network at Tumaco and Buenaventura, with the central station of each system co-located with an existing network switch. The Tumaco system was laid out to serve eleven communities, with a population of about 15 000, while the Buenaventura system was planned to serve seven communities, the area having a population of about 10 000.

Project construction and the installation of the network equipment was implemented and completed successfully. System commissioning and acceptance testing followed standard procedures, the installed equipment being fully compliant with normal quality standards.

Telecom's operations and maintenance staff received training on the new radio systems at the equipment vendor's technical school in Montreal, where the classrooms are each equipped with a fully configured "captive" system, so that the students can test and practice their newly-acquired skills on a system which is "live" but not carrying network traffic. The project also provided adequate quantities of the appropriate test sets, tools and maintenance spares.

Service was introduced first on the Buenaventura system, in May of 1994, followed shortly thereafter by the Tumaco system. The newly available capability was welcomed by the local residents, both through making and receiving calls, and because of a sense of better safety and security, now being able to notify the appropriate authorities when needed. Telecom reported, shortly after the systems came into service, that good revenue was being realized.

C The project area revisited

The project area was revisited in March, 1997, with field visits to all but one of the locations served by the Buenaventura and Tumaco systems. This included all seven outstation locations on the Buenaventura system and ten of the eleven locations on the Tumaco system. The only location not visited was Buenavista, to which access was not possible at the time.

Telecommunication services in these communities are provided through "Servicio de Atencion Indirecta" (SAIs - "Indirect Attendant Service"), operated as agencies of Telecom. Operating procedures varied considerably among individual SAIs. Structured interviews were held with 68 individuals in the remote communities, including 17 SAI agents, and 51 users of the service.

i) Overview of what was found

The Tumaco system was operating well, giving good quality, reliable service, and earning substantial revenue. The Buenaventura system, in direct contrast, was operating poorly. Throughout the Buenaventura system, service outages were excessive, and Telecom seemed to have given up on provision of service to three communities, all in the Maritime Zone, which required a long trip by boat to maintain the outstation equipment. The Tumaco system outstations all had good service records, including those where access was by boat in the open sea, and all were providing valuable service to the communities. The revenue picture of course reflects the serviceability of the systems. Tumaco's revenue is over eight million pesos per month, trending steadily upward. Buenaventura has revenue of about one million pesos per month, and no upward trend.

The residents report great value from the telecommunication services. This includes improvements in business and commerce, through new market and trading opportunities in locations and with individuals not previously available. Health care is better, since health care workers can be contacted readily. Employment opportunities are improved, the ability to obtain workers when and where needed clearly benefiting both the worker and the employer. Public security and safety are better, it now being possible to contact the authorities when needed. The communities served by the Buenaventura system, which had briefly enjoyed telecommunication services which are no longer available, feel the loss of these services very deeply.

ii) Findings applicable throughout the area

Telecom's standard agency agreement does not reflect the reality of conditions in this remote rural area. For example, the local agent must visit the "supervising" Telecom location monthly, for revenue reconciliation. For many agents, this entails two trips of several hours in a small boat in the open sea, losing one day of his/her working month, often more, plus the cost of the trips.

The value perceived by the residents is very sensitive to the operation of the local agency. Some agents provide a messenger service, to advise the called party when calls are received; others do not. Business hours vary from agency to agency. When the agency is closed or the agent is absent from the community, there is no provision (such as card or coin operated telephones) for calls to be made or received. The number of lines terminated in each SAI seems quite inadequate, one or two or three lines, for communities of hundreds or thousands of people.

It is understood that the "revenue settlement" arrangement is "sender keeps all". Thus the local agent receives no compensation for inward calls to the SAI. Most agents recognize the need to handle inward calls appropriately, despite the lack of financial incentive. In the Buenaventura system, the lines in the SAIs are unable to make and receive international calls, withholding a useful service from the residents, and a valuable source of substantial high-margin revenue.

While better health care and public safety and security were noted, there are other good opportunities for the Government to take advantage of telecommunications. Calls to government agencies and health care organizations are at the caller's expense; there are no "Freephone" or "1-800" services. There are times when calls that should be made to government and social service agencies will not be made, because the callers cannot afford to make them.

iii) The Tumaco system, in operation

The Tumaco system provides telecommunication services in eleven remote communities, as far as 75 km from Tumaco itself. Access varies from paved road to boat access in the open sea. The economy of the region is based primarily on agriculture and fishing. The agriculture ranges from fairly well-to-do cattle ranching to subsistence farming. There is also some tourism, with the opportunity for more.

The service provided by the Tumaco system is generally very good. The revenue generation of the Tumaco system is good, as is service quality. There are wide variations in revenue per line in service, in revenue relative to the population of the communities served, and in the monthly revenue from some communities. There is an opportunity here for "commercial management" by Telecom, exploring the reasons for these variations and promoting the use of the service. The additional telephone lines required in some communities are within the capacity of the system.

Revenue levels and user satisfaction are closely related, and very sensitive to the operation of the individual SAIs. The physical condition of the SAI, whether booths are provided for privacy, whether the operator and family actually live in the SAI, the community's relationship with the operator, and the hours that the SAI is open all have a major impact on the usage of the services offered, and thus on Telecom's revenue, and the level of satisfaction felt by the users.

In the communities of the Tumaco system, the advent of telecommunication services has led to better trade and market opportunities, to enhanced employment, and to new business opportunities, in particular in tourism. Improved access to health care is a frequently cited advantage. Espriella, a commercial centre, is much busier, and the SAI is a centre in the fight against malaria. Tourism in Bocagrande is booming, the visitors being the major users of the service. In Llorente, there is a demand for FAX service. Public safety and security are improved, since authorities can be notified when necessary, leading to better levels and quality of government service. At the personal level, the ability to keep in touch with family and friends is a significant advantage and improvement.

iv) The Buenaventura system, in operation

The area served by the Buenaventura system is more remote than that of Tumaco. The system provides telecommunication services to seven small communities at distances as great as 120 km from Buenaventura. In addition, residents of some 23 smaller adjacent communities use the services provided in these seven communities. In the Zona Maritima, the only access is by boat in the open sea. The communities in the Zona Terrestre have road access, also with long trips. The economy of the area is based on fishing and agriculture, with some tourism, and a small amount of mining.

The quality of the telecommunication services provided on the Buenaventura system continues to be quite poor. The monthly revenue of the Buenaventura system is running at about 13% of the Tumaco system, with wide variations from month to month, reflecting the excessive service outages

which this system continues to experience. The three most remote communities in the Zona Maritima, e.g. Punta Soldado, Boca Mayorquin and Punta Bonita, have had no telecommunication services since July, 1995. At Buenaventura as with Tumaco, the usage, the revenue, and the degree of user satisfaction, are all quite sensitive to and dependant on the details of the arrangements and operation of each community's SAI.

D Statistical analysis and comparison

	Tumaco System	Buenaventura System
i) Revenue	K pesos/month	
Current monthly revenue - mid '97	8 500	1 100
Rate of Increase of Revenue	100	Nil
ii) Average Outstations Out of Service (monthly, mid 1994 to end of 1996)	3%	43%
iii) User Usage Analysis (estimated % of calls - both systems combined) (based on 68 structured interviews, 51 with users, 17 with operators)		
Economic Development (markets, agriculture, transportation, fisheries, tourism)		39%
Social Development (health, government, education, environment)		37%
Personal (family and friends)		24%

Five key principles for bringing telecommunications to rural and remote areas

- i) Provision of Universal Access
- ii) Carefully planned, organized and managed Rural Programme
- ii) Appropriate regulatory framework
- iv) Internal and investment financial resources
- v) Commercial and entrepreneurial approach

These principles lead to rural telecommunications which are valuable, profitable, and sustainable. Also, the service must be operated and maintained effectively and efficiently.

RURAL TELECOMMUNICATIONS OPERATIONS IN COLOMBIA - Lessons learned

1) Service quality, revenue, and customer satisfaction rely on operations

Service providers must supply continuous, reliable, good quality service, conveniently and at affordable prices. This brings good revenue and good satisfaction, which increases usage. Effective and efficient operation satisfies users and generates the revenue which sustains the service. Good service, good revenue and user satisfaction reinforce each other and go together.

2) National policy, regulation, and network planning

Each PCO or SAI requires enough lines to fully meet the community's needs, in a network which adds capacity economically as calling levels increase. At least some lines should be equipped with prepaid card telephones, to provide 24-hour service availability. The revenue settlement arrangement should provide an appropriate payment for receiving inward calls.

3) Commercial operations

The PCO or SAI must be open and service available for a long period each day. Commercial and administrative arrangements must suit the territory and the practical needs of the agents. These arrangements should include specific service performance norms and standards.

4) Development opportunities

Commercial opportunities in the PCOs or SAIs include services such as FAX, with email, Internet and database access and electronic transactions added as need develops. International calling should be encouraged. Freephone calling should be provided for public safety and security calls, and social services such as health care.

5) Service and revenue control and management

A management control system is needed, to monitor the quality and continuity of services, and the resulting revenue stream. The management process must trigger remedial action when needed. Such a system will detect problems and encourage in-service improvements.

Contacts:

Tony Zeitoun - CIDA
Tel.: 819 997 1480
Fax.: 819 997 0945
email: tony_zeitoun@acdi-cida.gc.ca

David Barr - SR Telecom
Tel.: 613 989 1720
Fax.: 613 989 1721

ATTACHMENT 1

Rural telecommunications in Colombia - Lessons learned
A rural telecommunications project revisited
Anecdotal comments from community interviews

The Tumaco system

Salahonda

Salahonda, with its population of 7 000, is much the largest community served by the Tumaco system. The SAI is constructed of cement, provides three telephone lines, and has booths for the users. When calls are received, a messenger is sent to inform the called party, the charge for this service being US\$ 0.20. There is a deeply felt need in the community for another line for incoming calls only, so that these calls do not occupy one of the three currently available lines.

Comments received from the users indicate that the availability of telecommunications has led to improved health care, better administrative services within the community, an increased level of business activity, and improved security. The residents are also asking for more lines to be made available, mainly to call several specific nearby communities.

Colorado

Here, the SAI is administered by the Communal Action Committee ("Junta de Accion Comunal"). Since there is no one person responsible for the SAI, it is kept closed. When someone wants to make a call, it is necessary to find the person who has the key, with resulting inconvenience and delay. An additional problem is that no one can make inbound calls to Colorado, because there is no one at the SAI to answer the telephone.

San Jose Del Guayabo

In this community, the operator who manages the two-telephone lines actually lives in the SAI, which does not have telephone booths. The community is unhappy with the operator, who was not born in San Jose and who often goes away. For this reason, the service is not efficient. On incoming calls, the residents do not want to pay the US\$ 0.20 messenger charge, and the operator takes little interest in notifying the called party.

The people do feel that the availability of telecommunications has improved the quality of life in the community. The addition of telephone booths in the SAI, which is in serious disrepair, would be a very helpful improvement.

Vaqueria

The two lines in this small community are located in an SAI which was built by the people themselves. The lines are looked after periodically by an "appointee" of Telecom. The operator explained that the revenue realized from the usage of the lines is inadequate to support the dedication of a full time attendant. However, when someone wants to make a call, the operator opens the SAI.

The residents report that the installation of the telephones has significantly improved their sources of income. The most importantly source is employment in the hotels of Bocagrande, which can now call to hire staff from Vaqueria when they are needed during the busy tourist vacation season.

Palambi

Here, the telecommunication services are provided in an SAI which was constructed with international help. The two lines are handled by an appointee of Telecom, who is greatly appreciated by the community.

The residents are very pleased with the service, and have specifically noticed an improvement in health care because it is now possible to arrange for visits to the community by doctors and other health care professionals. The community would like one more line to be provided, to be used exclusively for inward calling. The operator has not arranged for a messenger service, and in place of this, would like to be equipped with a loudspeaker, in order to fill this need.

Espriella

Espriella is an important commercial, transportation and transit centre, which has become much more active since the road has been paved and telecommunication services have become available. Saturday and Sunday are the busiest days, when workers from the nearby farms come to town, also miners and native people, and the SAI becomes a community gathering place. It also functions as a drugstore, and a centre for the fight against malaria.

The SAI, with three lines and attended by a full time operator, is very well organized. The operator has hired a messenger to notify individuals of incoming calls, at US\$ 0.20, and the number of calls received is never less than ten a day.

The residents are very happy with the telecommunication services and with the operator. Businesses have flourished and the health service is much more efficient. It was noted that a coin or card telephone would be a very valuable addition, so that it could be used at night and on weekends, when the SAI is the busiest and the lines are congested.

Llorente

The SAI, which is equipped with two lines, is located on the grounds of a school, a little far from the centre of the community. Although the operator is cooperative and opens the SAI whenever it is needed, the residents would like to have a public telephone conveniently located near the centre of the community.

There has been a noticeable improvement in the economic development of the area since the advent of telecommunications. There are more workers, more jobs, and more trade. Some users would like to be able to send and receive faxes, but because electricity is only available for a few hours each day, this suggestion had not been implemented.

Cajapi

In this community, the SAI has two lines which are located in individual booths, and the attendant is an appointee of Telecom. A characteristic peculiar to this location is the very high number of incoming calls, typically 40 per day. The operator has arranged for a messenger service to notify the called party, the messenger fee being US\$ 0.30. In view of this call volume, the operator suggests that an additional line should be provided, for incoming calls only.

Bocagrande

Although it is a very small community, tourism is a major component of the local economy, and the population increases greatly on weekends and in the vacation periods of July and December. The two tourist hotels have their own telephone lines, which are used extensively and successfully in promoting the tourist trade.

The two lines which are available for public use appear in an SAI which is also the home of the operator, who is a Telecom appointee. Usage by the local residents is minimal, the usage being almost entirely by visiting tourists.

Robles

The SAI here is in a very bad state, with only one line and no messenger service because the residents were not willing to pay for such a service. The principal complaint of the residents is that the single line is out of service a good deal of the time.

Buenavista

There are no anecdotal comments because it was not possible to visit this location.

The Buenaventura system

ZONA MARITIMA

La Bocana

This community is a centre of fishing and tourism. In addition to the two lines in the SAI, there are a total of 76 individual commercial and residential telephone services in town, provided through a local switchboard-type exchange.

Telecom's agent has sub-contracted the operation of the SAI. The quality of the service is rated as "fair to poor", because it suffers from interruptions, and the lines are often out of service entirely. While the majority of the traffic is outgoing, there is inbound traffic also, and an informal, unpaid messenger service takes word of the incoming call to the called party. This is carried out by children, or whoever happens to be in the area when the call comes in.

Calls to Buenaventura are local calls. National long distance calls are made also, but never international long distance calls, as Telecom has arranged the network to preclude this. On national long distance calls, the residents always ask the price before dialling, and the charges are generally considered to be high.

The community has found the telecommunication services to be helpful in communicating with the health services, in marketing their products, and in maintaining social contact with their families and friends. The Inspector of Police uses the service frequently, to report instances of public disorder, and to communicate with the law courts. The tourists are heavy users, especially of national long distance.

In the design of the network, La Bocana is a repeater station, providing the transmission connection to the other Zona Maritima locations of Punta Soldado, Boca Mayorquin and Punta Bonita. The repeater function has been out of service for approximately two years, and these communities have been without service throughout that period.

Punta Soldado

Service in this community, consisting of a single telephone line, was first established in July of 1994. The line has been out of service since July of 1995. The people of the community, and the agent who has a contract with Telecom, deeply lament that Telecom has not responded to their requests and demands that the service be re-established.

During the year that telecommunication services were provided, the residents found it to be excellent. They always had access to the service because the operator was always willing to make calls, and also to receive calls. The service operated as a true "community telephone", including a messenger service without charge to advise called parties of incoming calls. The service was used to keep in touch with families, to contact the health services, to deal with environmental protection issues with CVC (Corporacion del Valle del Cauca), to coordinate the marketing of fish catches, for example ensuring the arrival of fishing boats at Buenaventura when the fish plants were ready for their loads. Tourism opportunities were also being pursued.

The community feels isolated and at risk now that the service is no longer operating, with no protection since there is no communication. During the period that the service was operating, thieves came into the community one night to steal a supply of shellfish and fish. The SAI operator called the Colombian Navy, which responded immediately by sending a patrol launch which put the thieves to flight, and the robbery was averted. The community now feels insecure, especially since robbery and piracy have increased in the region.

In December of 1996, there was a violent storm in the Pacific, and 15 houses in Punta Soldado were washed into the sea. Since the telecommunication services were not working, it was not until the next day that one of the residents took a launch to go to Buenaventura to notify the authorities of the tragedy.

Boca Mayorquin

Telephone service in this community was only available for one month, via a single line in July of 1994. For this reason, the residents were able to make little comment about the value of the service. However, the contractor who had supervised the SAI and also the Inspector of Police indicated that the service had been very good when it was in operation, and that it was badly needed so that the residents would be able to communicate with their families by telephone, rather than making the costly and difficult trip to Buenaventura.

Punta Bonita

Telephone service here, a single line, was only available for eight or nine months. There has been no service since July of 1995. When it was in operation, the service was found to be excellent. It was always available, the SAI being open all day every day, and the operator being willing to make the line available at night if it was needed. The line was also available for incoming calls, and the operator and the community organized a messenger service to advise the called party, at no charge.

While it was available, the telephone was used to contact families and friends for family and social reasons, and to seek the services of the health authorities, notably during an outbreak of cholera, and to coordinate environmental protection services with CVC. It was also used to organize the local fishery, and to make arrangements for a ship to be available when needed, to transport wood, during the tourist season, and in the event of a shipwreck.

The community now feels that it is very isolated. "We sense a great emptiness and we are very worried" was the comment of the Inspector of Police, made worse by recent cases of piracy, robbery and general insecurity in the area.

While Punta Bonita is quite a small community, the telephone service was also used by residents from ten other small communities, mainly in the immediate area, and including two that are a considerable distance away.

ZONA TERRESTRE

Zabaleta

As well as two telephone lines in the SAI, the community enjoys two additional lines, one in the general store and the other in the fish farm office. The SAI is not operated by Telecom's agent, but by a teenager whom the agent has hired, and whose knowledge and information is not very precise. Very often the SAI remains closed, and it is necessary to make calls from the general store, which is close to the SAI, and by coincidence is owned by Telecom's SAI agent. The residents feel an uncertainty about the handling of the calls and the amounts charged, when the calls are made from the general store rather than from the SAI.

The quality of the service is rated as "fair to poor", because the SAI remains closed so much of the time, and there is quite a high frequency of cut-off connections. All of the traffic is outgoing, there is no provision for incoming calls.

The residents find telecommunications very helpful in contacting the health service, in making marketing arrangements for their produce and products, for keeping in touch with their families, and dealing with the tropical disease control service. It is suggested that the Inspector of Police should have his own line. The teachers in the local school suggest that it would be appropriate to have both fax service and connection to the Internet. As well as the people of Zabaleta, people from eight small neighbouring communities make use of this service.

The tariffs are generally felt to be reasonable. Much of the traffic is with the city of Cali, where the head office of the fish farm is located. The quality of the service is good when operating, but Telecom seems to take a lot of time for maintenance.

One particular maintenance problem seemed to take a very long time to solve. The final solution involved the solar panels at the repeater site, which turned out to be covered with moss. When the moss was cleaned off, the panels operated as they were supposed to, and the system worked very well.

Bajo Anchicaya

As well as two lines in the SAI, the community enjoys two lines in the offices of the major local employer, CHIDRAL (Central Hidroelectrica del Rio Anchicaya), one for the manager and the other for the administration. These lines also equipped with fax, data modem, and Internet access. The contractor of the SAI is very efficient, providing an effective community and messenger service. As a result, the users rate the service quality as "good", but the transmission quality as only "fair" because of the high incidence of interruptions. This location also serves five neighbouring communities.

A factor which contributes to the interruptions is the solar powering unit of the adjacent repeater, which seems to be overly sensitive to cloud cover. Access to this repeater is difficult, involving a three-hour climb on foot up the mountain to the repeater installation.

The users find the service to be useful in staying in touch with their families, in contacting the health service, and in carrying out commercial negotiations. The teachers in the school use the service to coordinate scholastic and recreational arrangements, and to manage the school restaurant. It was suggested that there should be a private line for the Inspector of Police, and the employees of CHIDRAL would like to have a line for the workers' use, preferably equipped with a card phone.

Bajo Calima

There is a single line in the SAI, but it experiences frequent interruptions of service, especially in the rainy season. Also, the SAI does not have a fixed schedule of open times. For these reasons, the residents rate the service as only "fair".

The service is used to keep in contact with families, to seek the assistance of the health service, and to coordinate environmental activities with the University of Tolima. It is also used extensively by the Inspector of Police, who suggested that he should have a private line in his office for use in dealing with matters of public order. In fact, there is a widespread view that it would be appropriate to have several more lines, both commercial and residential, in the community.

ATTACHMENT 2

Demographics of the communities served

TUMACO SYSTEM

(NOTE - File garbled from here on / H. Pieterse.)
