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ABSTRACT

Although expensive and sophisticated communications technologies tend to be popular as tools of rural development, the real frontier of communication in rural development is comprised of the simpler, less expensive technologies that put the means of communication into the hands of the rural population. Simple, inexpensive equipment such as audio cassette tape (ACT) systems and 8mm film technology shows the greatest promise in making the rural receiver more of an active participant in the communication process. ACT systems can be valuable tools in listening groups, training, information dissemination in family planning, and as tools for field workers; and these systems enable the information receiver to control the listening situation. More expensive, simple radio technology in basic village education and radio schools can also be an effective tool in rural development. (CMV)

THE FRONTIERS OF COMMUNICATION

#8 Royal D. Colle

Forward

In an age when expensive and sophisticated technology tend to be the more sought after tools of rural development, this paper takes a different tact. It suggests that the real frontier of communication in rural development is not the satellite or the video tape machine, but the simpler, less expensive technology that puts the means of communication into the hands of the "campesino" or villagers.

A major thesis of the paper is that we must seek technology for rural development communication that puts more control over the communication process in the hands of those who have traditionally been considered the "receivers." Thus, in discussing the Frontiers of Communication, the author is as much concerned with process as with technology. It is simple, cheap equipment such as audio cassette tape systems and 8mm film technology that shows the greatest promise in making the "receiver" more of an active participant in the communication process.

This paper was originally prepared for the Cornell-CIAT International Symposium on Communication Strategies for Rural Development, held at Cali, Columbia, March 1974. The author, who is an Associate Professor of Communication Arts in the N.Y. State College of Agriculture and Life Sciences at Cornell University, has worked in rural development projects as a communication specialist on assignments for the World Bank, the Ford Foundation, USAID, the Academy for Educational Development and other organizations . He has been involved in communication research in rural areas of Asia, Latin America and the United States.

The Frontiers of Communication

ROYAL D. COLLE*

WHEN we talk about rural development, we are speaking about change. The kind of change we have in mind often involves affecting the knowledge, values, motivations and voluntary behavior of many millions of independent and individual entrepreneurs. Communication clearly ranks with providing water resources, fertilizer supplies and contraceptives as a key development activity. Without communication, the others may not be necessary, because it is communication that influences the making of those millions of individual decisions that result in the growing of new plant varieties and the controlling of birth rates.

More and more the decision to go "modern" binds up the rural dweller in a web of complexities that increase his need for better communication systems. Take the case of agriculture. The introduction of modern techniques usually increases the sophistication of a farmer's operation. He must deal with fertilizer and its proper application, different tools and equipment, pest control, water supply, transportation, current and prospective market conditions, and special credit situations. These are only some of the elements of the "new" agriculture that demand more effective information links between the farmer and the systems in which he operates. The use of some chemical fertilizers involves danger—a danger that is magnified when the farmer cannot read warnings.[1] Similar complexities appear in nutrition, health, family planning and other rural development programs.

As we look to the development of rural areas, communication must be a major concern. This paper examines some of the technology on the frontiers of communication that may help provide better ways of reaching rural families with information that they can use—and better ways of getting information from them that others can use.

To give an idea of the costs of some of the equipment mentioned in the text, an appendix is provided which lists some of the items and their prices.

But let us be clear from the beginning about the word "technology." It refers to more than dazzling new equipment; in the context of this paper it refers especially to the creative application of materials and equipment.

The Frontier

Where is the "frontier" of communication? Obviously it depends on where you are. For some areas, the use of direct broadcast satellites is surely on the frontier (Brazil, India); for other places satellites are already part of on-going pioneering programs (Canada, Alaska, Pacific Basin); and for other places it's just a fancy on the horizon. This paper will take considerable liberty and use a kind of world average for that frontier line, acknowledging that it is, at best, a hazy, ambiguous approximation.

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Meeting Communication Needs

INVOLVING THE PEOPLE

To begin meeting the communication needs now and in the future, several goals should be pursued. One of the major issues that constantly emerges in the various papers of this symposium is the need to involve rural people in the communication process, not just as audiences, but as important participants in planning and producing messages. One superb illustration of how this can be done has been provided by Juan Flavier, who went into the Philippine *barrios* to learn from the people there how best to express the messages of family planning. Their analogies with common events related to agriculture and the home with which barrio dwellers are very familiar resulted in Flavier developing a whole series of illustrations which have seemed to clarify otherwise complex ideas in family planning.[2]

What are the important communication needs for the future? First, it is important that more control over the communication process be shifted from those doing the "sending" to those doing the "receiving." Examine closely what generally happens in information programs aimed at rural people. Whether it is radio, television, newspapers, bulletins, films, or field workers, the sending "apparatus" often controls when, how frequently and, where that communication takes place. The scheduling of the broadcast or of the visit by the field worker is frequently beyond the power of the rural family.

Furthermore the villager finds it difficult to get important or complex points repeated. He or she cannot have the station play a program, or part of a program again if a point is missed. And there is often reluctance or embarrassment in asking a field worker to go over information again.

Print media are impractical for much development work, because of literacy levels, and where they do reach a community, villagers must often depend on the convenience of someone in the community to read the message.

Thus, as we look to the future we have to put emphasis on technology that gives the target audience more of a chance to choose the circumstances in which communication takes place. If villagers can choose the time, frequency and place for receiving information, perhaps we can be assured of more effective communication programs. As I will point out later, I think we have the means now to do this.

LOCAL PRODUCTION

Another goal is to emphasize and use more locally produced materials. Several years ago 14 communication specialists in rural development gathered for a day long conference to discuss some of the practical aspects of their work. The group generally agreed that locally produced materials are by far the most effective. "Locally produced" does not have to mean poorly produced; technology is here that permist exciting materials to be developed even outside the production centers of our capital cities. "Locally produced" does imply that there be more local participation in the development of communication plans as well as in the creative and execution phases. This means that urban-oriented office-bound officials should be willing to put greater faith in the ability of rural people themselves to take an active part in the communication process, rather than be only passive receivers.

HELP FOR EXTENSION WORKERS

Another important goal we must try to achieve is to expand the role of the "grassroots" (village level) extension worker.* Whether the concern is agriculture, nu-

*I use the term "extension worker" in a very broad sense: it includes various kinds of outreach or field workers, not just those in the formal Extension organization found in many countries.

tition or family planning there is no disputing the value of the person-to-person contact provided by these people. But we need to overcome some of the limitations found in the extension worker system, so that we can get full benefit from this scarce resource.

The scope of materials that extension workers provide their clients should be broadened in two ways. First, they should have greater command over their own professional field. They should be able to provide more specialized information to their clients without sacrificing the fundamentals. Second, they should be able to supply information from other professional fields. For example, an agricultural extension person should have the capability of providing families with nutrition and health information as well as farm-related information. Although there is quite likely to be resistance to this idea, it seems clear that in most rural development programs we simply do not have enough professionals or para professionals available to provide separate extension forces for agriculture, family planning, nutrition and health services. Yet, information and education in each of these is generally needed in rural development programs.

Another part of the extension system that needs attention is maintenance of quality control. Although there may be minimum standards in recruiting extension workers, and these workers may be given good training, we are unsure of how uniformly they perform in the field. Undoubtedly there are differences in the quality of work among extension workers, and there are differences in one extension worker's performance from one client to another. We need assurance that the family visited at the end of the day is getting as high-quality service as the family visited at the beginning of the day.

Ideally we can overcome some of these problems by expanding the number of extension workers, by improving training programs, and by providing higher pay to attract more competent people. It has been pointed out that we now have only one agricultural agent for every 8,000 farm families in the developing nations.[3] It is obvious that this data does not reflect the actual distribution of these workers; in many places this implied saturation is much more diluted, expecially where the needs are greatest. Realistically, the major problem that will face us for quite a few years to come is simply stretching and making more effective the resources we have. What we need to do is to apply mass media techniques without sacrificing the distinct advantages of the person-to-person contact found in the village level extension worker system. Such an "inter media" system is a possibility with our new communication technology.

We should also make an effort in our future rural development communication programs to tie rural life into the mainstream of the nation's life. One image of villagers and barrio dwellers is that they want no part of contemporary modern society. And there are those who are cautious (and with good reason) about showing to rural dwellers the temptations of the city, for fear it will increase the already substantial rural-urban migration. But many rural people want to share in some of the excitement and benefits of modernization in ways other than growing more wheat. Many people in rural areas of developing nations know little of their own nation beyond their own village. We should not take comfort in this, or treat it condescendingly as "quaint." It presents a challenge to all of us to use our technology delicately to provide links to the mainstream of the nation's life without filling the highways to the capital city.

These are some of the goals we should aim toward. I would like to shift now to some specific projects and proposals which involve new communication technology, and which seem to me to have potential value in reaching some of these goals.

Cassette Technology

Among the most promising of the hardware on the near frontier is audio cassette technology. (I use the acronym ACT as an abbreviation.) Cassette machines now come in many shapes, sizes, and costs, but the most common are the portable units that measure approximately 3½ x 6½ x 12 inches—not quite so large as a shoe box. They use magnetic tape which is packed in a small sealed case (hence "cassette") 1 x 2½ x 4 inches in size. Tape cassettes have a variety of running times, the most popular standard lengths being 30, 60 and 90 minutes.

Magnetic tape recorders, of course, are not new. They have been available for about 25 years. But what makes ACT such a promising and exciting communication tool for rural development is, first, its simplicity. The user inserts the tape cassette in the machine in toto. No threading is required. The user than pushes a button or moves a small handle to put the tape into motion for recording or listening. Experience in Pakistan and the USA indicates that illiterate and low literates can easily learn to manipulate the machines.

Another characteristic of the technology is that it is relatively inexpensive. Machines used in projects in India and the United States have been purchased for as little as US$17.50. These were "playback" units only without a recording capability. Other good quality machines with the recording capability added can be purchased for US$20-25. This may sound expensive for some budgets, but the potential benefits may easily balance this.

Cassette machines and tapes are also very portable and durable. They operate with four or five "C" batteries, or with standard electric power. Because the tape itself is mostly enclosed in the plastic cassette, it is generally not handled (or mishandled). Transistorized electronics make the equipment light yet strong enough to withstand hard use.

There are two other important characteristics of ACT. First, cassette units and tapes are all compatible. A recording made on a machine in Bogota can be played on a machine in Taipei. Philips Holland, the company that developed ACT, vigorously promoted compatibility by insisting that the manufacturers it licensed not modify the original standards without permission. Secondly, the plastic cassette tapes have little tabs which can be removed to prevent anyone from accidentally erasing or recording over what is already on the tape.

Use in Rural Development.

The most important thing about ACT is how it might be used in rural development. Several patterns have been tried. These include projects in rural areas of Pakistan, India, Guatemala and the USA. The fact that ACT is an audio channel makes it especially important as a communication system for people who lack literacy, or lack the interest in using their literacy. These situations often prevail among the poor people in both developing and developed countries.

Cassettes have been used in several different ways:

ACT in Listening Groups.

In this situation ACT is used in much the same way as radios in radio rural listening groups. The latter were first introduced in Canada and then had a major trial in India beginning in the mid 1950s. The general pattern is for villagers to gather with a convenor who operates the radio set. The group listens to a broadcast especially designed for such groups. After the broadcast the participants discuss the topics covered on radio and try to relate them to their own lives.

The cassette system offers several distinct advantages over radio in these discussion groups. First, the group can gather whenever it or the convenor wishes; the session is not tied to the schedule of a radio station. Furthermore, it is a simple matter to replay parts of the tape for whatever reason: to catch a point missed, for repetition, to solve disagreements over what was said, to take notes, etc. Another advantage is that a simple two-way communication system can be developed with discussion group members recording questions, experiences, or other messages on the blank side of a cassette.

In the radio forums, it has been a convenor's or other appointed person's responsibility to write down this kind of information. Obviously having these responses directly on tape captures the full essence of the communication and provides the project leaders the opportunity to use questions actually voiced by group members in later tape productions. (We have no indications that this oral feedback mechanism has been systematically used although some modest experiments in a similar vein have been tried. This will be mentioned in somewhat more detail below.)

Probably the largest project using ACT in a developing nation is being carried out by FAO in India. This is the Farmers Training and Functional Literacy project in which 1,800 cassette players and 15,000 cassettes are being used by local leaders for group listening. Technical subjects of a general nature, such as control of insects and plant diseases, are being prepared by the Union government; local problems, interviews with subject matter specialists and "progressive" farmers are prepared on a regional basis. Since the project uses the Philips N-2200 cassette unit, no feedback system is possible as the machine is playback only (no recording capability).

In a study in rural upstate New York, a group listening component was included in a larger ACT project. The study was one of several combined under a research program called CSCS, or Cassette Special Communication System. Conducted by the New York State College of Agriculture and Life Sciences at Cornell, it was particularly designed to provide information needed by low income people to help them cope with some of their problems in daily living. After listening to a tape the group discussed the issues presented and these discussions were recorded on tape by the convenor. The purpose of taping the discussions was to provide the researcher some "feel" for the nature of the discussion that followed the listening. But it could have easily been used to feed information back to project leaders if it were an on-going program.

Another feature of this listening group experiment was the opportunity provided some of the participants to borrow a cassette unit and a duplicate tape to take to their homes and play it for themselves. It turned out that some group members used the borrowed units to play the tapes for other satellite groups. (The latter was not in the original research design and came about because people in the group felt that others they knew would benefit by the information.) More recently ACT was introduced into the "mothers clubs" in Korea in much the same way as the radio forum model.

ACT in Training

A second major use-pattern for cassette technology in social development communication is for training of para-professionals. In West Pakistan where manpower to train personnel is scarce, audio cassettes have been used in the training of midwives in the Family Planning Program. In the words of one official, cassettes were used "to multiply the scarce skill of a few competent and trained personnel." A main feature of the training was the use in rural areas of pre-recorded skits. A project report presents data and then summarizes concisely that "It is possible to teach midwives with the help of pre-recorded material."[4] Presumably this training—given enough financial support—could be done with regular "open reel" recorders or even phonographs. However, these have been around for a long time without much use in training. The characteristics of ACT make it more convenient and perhaps financially possible to use them as a field training device.

ACT as a Field Worker's Tool

Another way the cassette can be used is as a tool of a field worker. The field worker takes his/her cassette machine to households and plays a pertinent tape for the "client." Thus a field worker can play a message about a topic either he or the client feels is necessary, and the integrity of the message is protected by its being on tape. The format of the message can be put in more dramatic form (literally and figuratively) than field workers themselves might be able to do. The range or variety of information field workers can deliver is no longer limited by their own training. (Of course, diversity of information has always been possible through use of other teaching aids such as printed material and films, but these are not really feasible options in the usual person-to-person contacts of field workers.)

Several projects have used this pattern. The Family Planning Program in Pakistan trained midwives (*dais*) to play tapes during home visits. (Among the project's findings: "Illiterate but moderately intelligent *dais* could use TPM [tape playback machine] in home visiting.")

One of Cornell University's CSCS projects has also used ACT as a tool to be played for the client by a paraprofessional field worker (i.e., a nutrition aide). A similar system was attempted by a family planning project in Taiwan but it was reportedly unsuccessful in getting the field worker to use it. The Taiwan experience requires further investigation but two factors might be responsible for the problem. First: Playing the cassettes pushes the field workers out from being the central attraction. They may feel "up-staged" by a machine probably carrying the voice of another person or persons. They may feel that being relegated to the role of simply operating a tape recorder through which another authority or attraction appears and then standing by while it plays is demeaning. Second: Boredom could easily engulf the field workers. If they have to listen to the same tapes over and over, their enthusiasm could easily wear thin.

ACT as "Intermedia"

The great potential of audio cassette technology may be in the convenience it gives rural people to tune in to a message when they are ready and motivated to listen. Another model for the use of cassette technology in social development is to build on this advantage: that is, to provide a system in which the "target" audience can absorb the proffered information at a time when it is most convenient (thus, presumably, when the information has the best chance of being absorbed). In short, by placing cassette units and tapes in individual households, the householders can listen when, where, and as frequently as they wish. Field workers can place the machines in the household and supply the appropriate cassettes and leave. They can return to answer special questions, get comments, and accept requests for additional information. Of course, they will also recover the cassette machine so that it can be left at another home.

Rather than being an imperfect master of one specialty (e.g. family planning or nutrition), field workers can, in effect, be masters of resources for many topics for their clients.

Some Basic Principles

The main thrust of the CSCS program uses this pattern and was built on these principles:

(1) Use cassette technology in conjunction with field workers, but shift control over the consumption of information to the household.

(2) Extend the usefulness of the field workers by expanding the information they can deliver to their clients, and eliminate, as much as possible, the boring repetitious material they have to deliver in person and orally. Let them put the time and energy into making more visits with more people, and/or into making more meaningful and helpful contacts with existing clients.

(3) Use pre-recorded cassettes to localize messages, by building local people, names, places, language, and culture into the recordings. Because of the low cost of audio production of this type, it is possible to cover a small area with a set of tapes tailored to that area.

Because audio cassettes used in this manner combine the characteristics of mass media (e.g., radio production) with those of interpersonal communication methods, CSCS might be called "intermedia." The strength of ACT in developing nations, and with some

social and cultural minorities in developed nations, may be in harnessing its use as "interpersonal media."

Preliminary Evaluation

While data is still incomplete, preliminary evaluation reports on CSCS in two rural communities in northeast New York State reveal:

(1) Strong acceptance of CSCS by low income people as a means for getting information. In some cases, ACT gets a message through where field workers (nutrition aides) may not. Aides themselves explain it by saying that when they visit a homemaker the communication flow is from client to aide rather than from aide to client, as is generally intended. The aide becomes a needed and sympathetic "listener." But the tape and machine she leaves behind does the sending and the homemaker then becomes the "receiver."

(2) Very evident use of the opportunity to listen when they wanted, and often more than once, to the cassette tapes.

(3) Attribution of *authority* to the tape by low income listeners. One of the aides' supervisors said: "In the long run [CSCS] presents things with more authority, less diversion, and more understandably than the aides can do with the same scope of information." Several aides themselves echoed this observation.

(4) Definite indication of both mental and behavioral activity as a result of hearing the tapes. Behavior ranges from writing down a recipe heard on the cassettes to having an IUD inserted.

(5) A significant amount of "spill over" exposure beyond the persons to whom the machines and tapes are given. Family members and friends also listen.

Thus, we see in the application of ACT to development-type problems considerable opportunity to communicate with hard-to-reach people. A major difficulty is the skepticism and reluctance of intervention agencies toward having cassette units left in households. A typical statement by an official of an agency is the following:

(1) We think that the audio cassette technology will not work out as planned in the barrio setting for the following reasons:
   (a) It is a rather sophisticated piece of technology, unlike radio. The tape tangles and gets broken.
   (b) Programs can easily be erased, either intentionally or unintentionally.
   (c) The proposed audio cassette project can be very expensive. Cassettes can easily be sold.

(2) On the other hand, we think that the audio cassette technology can be best utilized in the training of small groups (i.e. for example, in training programs conducted by the extension worker, health educator, etc.) The machine and tapes must, however, be in the hands of the training personnel.

Yet, there is a small amount of evidence from some of the places where trials have been made to indicate that a more positive view is warranted concerning the survival of ACT in allegedly "hostile" social and physical climates.

For example, Pakistan:

> TPM [ACT] can be maintained in working condition even in dusty rural areas. The possibility of theft, breakage and misuse is minimal as no complaint of the sort was ever received.

USA:

> In three projects, two in rural areas and one in an inner city, only about 10 out of approximately 250 units circulated have been lost. And all of that loss occurred in the first project which experienced a severe flood at the time the project was gathering up the equipment.

Clearly there is a need to conduct both simple feasibility studies using ACT systems, and more sophisticated tests of ACT systems which will help guide communication strategy and administrative policy decision.

ACT in Family Planning

Audio cassette technology is particularly suited for communication of relatively sensitive topics, such as family planning, particularly when it is possible for the "receiver" to control the listening situation. The characteristics of ACT make this not only possible but feasible. Here's why:

(1) Recordings can "approach" either or both males and females about family planning and contraception. This may often be difficult for a field worker to do, especially if sensitive biological details are involved. Other channels of communication such as broadcasting and print are often unsuitable: broadcasting because of social and cultural taboos; print because of the disinclination of many to read.

(2) Cassettes can raise topics even field workers in face-to-face contact will not. In CSCS research, it was found that the cassette tapes prepared the way for nutrition aides and homemakers to talk about family planning. Apparently hearing it talked about on tape by people much like themselves encouraged homemakers to "open up" with the nutrition aide.

(3) Cassettes enable people to listen as frequently as they want to details of the family planning message without the embarrassment of asking for repetition of certain parts. While persons may not hesitate to ask a lecturer or field worker to explain more or repeat something about the functioning of a farm implement, they tend to be more inhibited about their own (or the opposite sex's) bodies.

(4) Cassettes provide an opportunity for intergenerational communication and husband-wife communication. Members of a family can bring the family planning message to others in the family without directly confronting them with the message. One CSCS project, for example, discovered some mothers giving the tapes to their daughters to listen to, even though they themselves couldn't talk (or initiate talk) about the subject.

(5) Cassettes, creatively programmed, allow the family planning message to be combined with other kinds of messages. This can have a number of advantages. For example, in the CSCS projects, the cassettes were not "family planning" tapes but covered a broad range of social development topics. Persons using the tapes didn't have to worry about a possible stigma from having "family planning tapes." Furthermore, by mixing family planning with other subjects, people might get exposed to the family planning message without deliberately meaning to.

(6) Underlying much of these advantages is simply the opportunity ACT provides to listen privately to something very private, to listen where and when one is ready.

A question can be raised about the lack of visuals in the audio cassette presentation. It has yet to be demonstrated how important intricate diagrams of the human "plumbing" system are to a person's acceptance and performance of family planning. With evaluation still incomplete on one CSCS project, its audio cassettes can claim at least two vasectomies and one IUD insertion without any visuals. It may be that the most important part of an organized communication program in family planning is the motivational and assurance side, rather than the technical "how-it-works" side. The latter might best be done in another context, such as a clinic A-V presentation coupled with professional personnel. This may be particularly true for less sophisticated audiences. Perhaps visualizing the conception and contraception process complicates the real importance of the family planning message for the low-income, semi-literate or illiterate person.

Other Uses of ACT

Finally here are two additional ways that audio cassettes could be used in rural projects. First, take the use of cassettes in conjunction with a field demonstration ar-

ranged by agricultural people. When farmers visit a plot, and then return to their own farms, they may not be able to remember some of the important details of the demonstration, such as quantities of fertilizer, explanation of specific techniques, etc.

The farmers could be loaned cassette units and tapes to take home. The tapes can carry information (combined with some entertainment) that reinforces and supplements the information given at the demonstration. And there is a dividend: other family members (e.g. the wife) can also listen and share in the process. The wife may play an important part (though sometimes obliquely) in decisions about adapting innovations, and listening to tapes may help win her support.

Another method of circulating cassette machines in a community is the ESSEX pass-along system.* An extension person places a unit with one family and provides a complete set of the tapes prepared for people in that community. After that family finishes with it, they pass it to another family they think will benefit from the information. That second family then passes it to a third, and so on. There are two advantages to this system: first, "natural forces" within the community move the equipment from family to family; and second, the process of passing the cassette materials from one family to another carries with it an implied testimonial—a testimonial coming from someone known and probably trusted within the community. Will the machines be lost or stolen? That's usually the first question that arises. We should gather data rather than intuition to answer it. Our modest experience with the Essex system is, in fact, that we don't lose equipment.

Audio cassettes may be the most overlooked, yet one of the most significant, developments on the communication frontier. One major difficulty may be (as alluded to earlier) the skepticism over whether rural people are "ready" for this kind of technology. This is, of course, a legitimate research question. Unfortunately, pre-judgment by the urban "elites" tends to diminish opportunities to find the answer. It also may be that the very simplicity of ACT (which is why it is potentially so valuable) makes this kind of technology less dramatic than other more elaborate technologies. We are suspicious that major funding organizations don't really take audio cassettes seriously, because of the very modest cost in conducting feasibility studies. (Range from $10,000-$20,000.)

We have much to learn about how cassettes can be used effectively and by whom. ACT is not just another magnetic tape recorder; it is a new communication device with many ramifications.

Radio

It surprises some to discuss radio in a paper devoted to the frontiers of communication. It is true that radio broadcasting has been with us for more than 50 years and that every nation has at least one radio station. Yet radio as a tool for rural development is on the frontier in many parts of the world. And in some places, there is danger that radio may be inadequately exploited or ignored because of the great fascination with television.

The invention of the transistor almost 30 years ago has had a tremendous impact on the design of radio receiving sets. They are smaller, portable and cheaper—and can run on simple flashlight batteries. Whereas only a few years ago many villages might be lucky enough to have a community receiving set, now personal "transistors" are penetrating many individual households, even when electrical power is not available.

I have discussed elsewhere the many advantages of radio in rural development.* Here I want only to indicate a few of the experimental ways radio is being used.

One of the ways radio can be made more effective is to increase its "local" character. All India Radio attempts to localize its radio service to rural people by creating farm

*ESSEX comes from a rural New York county where it was first tested.

broadcasting cells at many of its stations. These cells, which include producers and script writers, are responsible for developing programming tailored to the interests of the villagers in the stations' listening areas. Because the cell is devoted exclusively to farm broadcasting there is little chance other kinds of demands will dilute the agricultural programming effort.

Basic Village Education

Another approach is being tried in Guatemala where radio is at the heart of a pioneering project called Basic Village Education. It is aimed at discovering ways of using modern communication systems to educate the large mass of illiterate peasants in Latin America outside the formal education system.

The problem in Guatemala is a familiar one: limitations in resources and manpower for reaching rural people through conventional extension programs, and an urgent need to find effective low-cost means to supplement extension agents. And the rate of illiteracy is very high among the rural population. The decision was made to use radio to by-pass the literacy obstacle, rather than to take precious time to teach literacy first. A special station is being built for the project and its entire programming will be directed toward peasants in a highly limited geographic area. The content will deal with agriculture because officials developing the project feel that improvement in agriculture is basic to all other improvements in a subsistence peasant society. Consideration may be given in the future to health, nutrition, sanitation, and related topics. Program formats will include radio novelas, straight informational programs, spot announcements, and features that reflect local culture. Intensive pretesting of content is a vital part of the plan to insure that the target audience understands and will listen to what is produced.

Several variations in the project have been designed to test the value of support material. For example, one area will get only the radio broadcasts, another area will have the broadcasts plus local "monitors" and some additional audio-visual aid support. The monitors conduct radio forums where there is a suitable concentration of farmers, and work on an individual basis with others. A third area will receive more intensive audio-visual support for the radio broadcasts, as well as agricultural technicians who will reinforce the monitors with activities such as crop demonstrations. Cassette technology is also being used to provide additional exposure for the broadcasts, to record forum discussions to feed back to the project leaders, and to test other ways ACT can contribute to rural information programs.

The Guatemala Basic Village Education project, scheduled for a three year period, should provide us with a considerable amount of information on how to communicate effectively and efficiently to people who are hard to reach because of geographic and/or cultural barriers.

Radio Schools

Another model for use of radio in development is provided by the "radio school." Groups of people are convened regularly, as in a normal school situation, but the instruction comes via radio. A monitor also assists in the class. An example of this is the Honduran radio school movement which is credited with having considerable potential for linking the rural lower-status population into the processes of national integration. In various ways, the radio school helped overcome "the physical and cultural isolation of Honduran campesinos."*

The school was also successful in communicating "considerable information regarding improved health and agricultural practices," but it had less success in getting the information actually put to use unless there was an accompanying action program such as a rural housewives club.

Other Simple Technology on the Frontier

Certainly one of the priorities for communication technology in rural development in the near future must be simplicity. Using visual materials tends to complicate things a bit, partly because visual production is generally more complex than audio alone; and partly because the cost of purchasing and maintaining projection equipment is higher than audio. This higher cost can be tolerated if the benefits are increased in at least the same proportion. Unfortunately greater cost may compel use of materials over a wider geographic area with the result that content usually must be made more general, and less local. But all visual production does not have to be costly.

We mentioned earlier that technology is not all hardware. It often involves techniques. Thus, it seems appropriate in this paper to highlight several interesting ways of creating visual materials for use in rural areas. These techniques are important because they can be carried out with relatively unsophisticated equipment and at low cost. This provides an opportunity to produce locally oriented materials—content that rural audiences can more easily identify with.

Battery-Powered Projectors

We now have low cost equipment that will allow filmstrips to be shown in villages even where electric power is not readily available. A simple battery operated filmstrip projector, called the Crusader, can be easily carried and operated by any field extension worker. It is not much bigger than an ordinary flashlight. The Crusader was developed and pioneered by Father Edmund McClear, who has spent 30 years working in the highlands of Guatemala on communication problems. He has recently found an alternate power system for the projector which will permit showing filmstrips for less than two cents an hour. He is also exploring ways of using audio cassettes to provide sound tracks for the filmstrips.

Filmstrips can be secured from ministries, educational institutions, and international organizations, but their shortcoming is that they usually are not local enough. One technique is to make filmstrips from existing "photo-novela" magazines. These magazines are extremely popular in Latin America and parts of Europe and Africa. They consist of stories told in series of photographs usually showing rather expressive people in various kinds of interaction. The dialogue is written in small spaces ("word balloons") in each photo.

The basic equipment for making a "film-novela" includes a 35mm camera and a copy stand. With these, one can easily copy some of the "frames" in the magazine, and produce the film strip.[9] Sound tracks can be recorded on cassette machines, possibly using local talent. Thus if the visual part is suitable for several localities but the language or dialect is different, locally produced sound tracks is one answer. This arrangement could also involve local people in the production. Not only may this insure suitable expression, but it may also generate profitable publicity. One way of increasing information flow from the audience would be to get some local people to help create the dialogue for the film novela. Of course the purpose is to make a sound track that goes with the pictures and which, at the same time, carries whatever development message is needed.

A variation of this technique is to start with a 16mm documentary of information film and, using a single lens reflex camera, shoot individual frames of the film. This converts a motion picture into a slide film. The advantage is that the latter can be projected in any rural area without the expense and logistics associated with "movies." Audio cassettes can be used to record parts of the original sound track, thus providing both pictures and dialogue from the 16mm film.[9]

Television

A little farther out on the horizon for most rural development programs is television. Yet in some places, television is already being used to bring information and education to rural people. India has televised agricultural and related programs to approximately 80 villages around Delhi for several years.[10] Ghana, Senegal, the Ivory Coast and Tunisia have used television to provide programs for farmers, fishermen and others on technical subjects as well as literacy. Clearly television broadcasts are reaching some areas. In the Ivory Coast, the government turned to the nationwide television network to, among other things, train farmers in modern agricultural methods so that this country could sustain continuing development. One of the important aspects of the project, which has been in operation since 1971, is that people in the most remote villages were able to take advantage of adult education instruction in local and national, African and world affairs.[11]

The difficulty with television broadcasting as a tool in development is that it is not usually tailored to specific areas; in fact, the expense of production and the pattern of TV set distribution usually encourages rather general content. Broadcast television also tends to be unsuitable for specific physiological information on sensitive subjects such as family planning.

However there is new equipment becoming available which will give development workers more of an opportunity to use television in their work. Low cost portable television cameras and video tape recorders (VTR) make it possible for extension organizations to go to the field and make their own programming. For example, it would be possible to video tape a successful demonstration plot, including interviews with farmers and agricultural specialists, and then play these "programs" for audiences in all the surrounding villages where the content applies. Actually using television this way makes it a different kind of a medium. It can be localized in content and "talent"; and it can be played for people at times convenient to local conditions. Of course, video tape can be played back an instant after the recording is made so, unlike film, a person can tell immediately whether the recording is suitable or not. Learning to use this kind of television equipment is very simple and some day should be part of the training offered to field personnel.

Recently the organization Population Services proposed using the low cost portable VTR equipment to directly involve local village people in the promotion of family planning.[12] Its plan is to secure testimonials of key village people on video tape and then play these back for others in the same and neighboring villages. The locally produced material would be used as segments of a longer program, parts of which would be recorded by the production people before they actually reached the village. One intent of the project was to "open the way toward a whole new area of communication research designed to test specific hypotheses about VTR effectiveness as a community development tool in developing countries" and also gauge the reaction of rural people to television.

Simple Motion Pictures

Another relatively new medium that presents the possibility of local production is 8mm film. I remember several years ago an Extension organization requesting foundation funds to have a film made on agricultural techniques that were relevant to a rather restricted geographic area. It seemed clear that the film would have little value after one or two years because it was so highly specific to the farmers in that region. And the cost of having a commercial producer make a film with such narrow use seemed unrealistic. The alternative was for the foundation to support a workshop on the making of "single concept" 8mm films that would be suitable for demonstration purposes. Thus, many Extension organizations could begin to make films for their peculiar soil, climate, and crop conditions at a fraction of the cost of commercially produced 16mm films. Unfortunately we

do not know of any effort yet to promote this kind of grass roots film production in a developing nation. Considerable experience in other places has demonstrated that students and community groups can use the new 8mm technology to produce films that communicate.

Given the high cost of film stock in many countries, 8mm films offer a promising alternative to other more expensive forms of film production, while at the same time getting local involvement and locally oriented content.[13]

Satellite Communication

As we move farther out on the communication frontier, we must consider telecommunication satellites. Of course, satellites are being used every day in international communication. Indeed, there are at least nine earth stations in Latin America. But we are concerned particularly with how satellites can be applied to development problems. We can get some idea by looking briefly at four cases: Pacific Islands, Brazil, India and Alaska.

In India, the government plans to emphasize agriculture, family planning and "national integration" in a satellite communication project designed particularly for rural areas. This is an experimental program scheduled for 1975. It will attempt to provide programming to community TV sets in 5,000 villages around the country. Two reception systems will be tested. One system will originate programming at a studio on the ground and then relay the signal via satellite directly to the village receivers. The second system (operating simultaneously) will relay the signal via satellite to television stations from where the programs will be broadcast in a conventional way to TV sets in villages surrounding the transmitter. Thus the satellite will be used as both a "Direct broadcast satellite" (the first system) and as a "distribution" satellite (the second system).

The advantage of the direct broadcast system is that it allows even remote villages—those out of range of a conventional television station to have television service. The Indian Space Research Organization (ISRO) has already fully demonstrated solid-state TV sets for use in unelectrified villages, the electronics necessary for direct broadcast reception, and various other electronics for the project. The challenge, of course, is to produce content that is meaningful to the vastly heterogeneous population in those 5,000 villages. This is answered, in part, by programming to only some of the areas at a given time. For such programming to be effective it is necessary to have a tremendous amount of local "infrastructure" such as monitors, Extension workers, or some other supplementary communication system to localize the satellite message. For example, if the satellite program deals with agricultural credit, it would be important that viewers also get information on local conditions affecting the availability of credit as well as procedures for acquiring it. Incidentally, audio cassette technology is one possibility for producing and disseminating the local message. What all this points to is a need to have an "integrated communication system"—and that calls for an immense amount of planning, preparation and cooperation among many agencies.[14]

Not all satellite communication projects require the sophistication of live television transmission. Pioneering efforts have been undertaken in the Pacific Basin and in Alaska which use a satellite for relaying radio and other services (e.g. slow-scan television) requiring relatively simple ground stations to pick up signals from a low power (ATS-1) experimental satellite. Among the many fascinating uses made of the satellite was a "biomedical project" in Alaska. The satellite linked 21 health aides with a public health service doctor who provided medical counseling and diagnostic services. Health education programs were also being provided to village inhabitants.[15]

Much exploration is being done to discover ways of using satellites in development. Stanford University and Brazil are collaborating on a project "aimed at gaining the appro- skills, knowledge and technical expertise, and the training of key personnel. . ."[16]

Satellite transmissions have been made on a regular schedule between Stanford and Brazil's Institute of Space Research. Ultimately the Brazilian government plans to have its own domestic satellite—probably in the middle of this decade—for use nationwide to provide greater educational opportunities for all Brazilians, including those in isolated rural areas.

One of the promising characteristics of satellite communication is that it allows people in remote regions to share more in national life. Just about two years ago the Honorable Robert Stanbury, Canada's Minister of Communications, visited the remote areas of his country in the Yukon and Northwest territories. His observations and thoughts are worth noting:

> I found that . . . people are looking forward to our Canadian satellite communications system. . . . The ANIK satellite will bring a new dimension in communications to many homes in the remoter parts of Canada. It will help them communicate by telephone with their neighbors and with the mainstream of life in the more densely settled parts of the country. It will give them live television for the first time as well as improved radio broadcasting services. People in the North expressed to me their keen expectation that the communication satellite will help them in very practical ways in their daily lives and bring them more closely into communication with their fellow-Canadians. . . . It seems that only a satellite can deal with the realities of the North—adverse climate and harsh terrain and great distances between communities."

Conclusion

So that is a bit of what the frontier of communications looks like. I have not dared to cover all that is new. Broadband cable communications systems, computer operated newspaper systems, holographic and lazer technology; these and many other recent developments will someday be felt in the countryside. But there are important frontiers to cross before that "some day" comes. And strangely enough, it may be that the most important things on those frontiers will not be the complex, sophisticated and expensive technology. Instead they may be the simple equipment and techniques that give rural people a chance, themselves, to have more control and be an important participant in the communication process.

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[3]World Bank data quoted by Milton Esman, "Popular Participation and Feedback Systems in Rural Development," paper presented at Cornell/CIAT Symposium on Communication Strategies for Rural Development, Cali, Colombia, 1974.

[4]Edward Spicer, (ed.), *Human Problems in Technological Change* (New York: John Wiley, Science Editions, 1952), "Corn and Custom: Introduction of Hybrid Corn to Spanish American Farmers in New Mexico," by Anacleto Apodaca.

[5]Royal D. Colle, *CSCS: An Experimental System for Communicating with Hard-to-Reach People*. (Papers in Communication #1, Department of Communication Arts, Cornell University, Ithaca, NY [1973]).

[8]Royal D. Colle, *Tele-Communications in Asian Development* Programs, (Papers in Communication #4, Idem.)

[9]Robert A. White, "The Adult Education Program of Accion Cultural Popular Hondurena. An Evaluation of the Rural Development Potential of the Radio School Movement in Honduras," Department of Anthropology and Society, St. Louis University, St. Louis, Missouri, and Center Loyola, Tegucigalpa, D.C., Honduras, n.d.

[10]Detailed instructions for making filmstrips starting with photo novelas and motion picture films are included in the following papers: Rivka Danziger, "Making Sound Filmstrips From Existing Photonovela Magazines," East-West Communication Institute, Honolulu, HI, 1973 (Mimeographed.) and Rivka Danziger and Sanford Danziger, "Making Sound Filmstrips from Existing 16mm Movies," East-West Communication Institute, Honolulu, HI, 1973 (Mimeographed.) A source of filmstrips appropriate for use in rural development is World Neighbors, (5116 N. Portland, Oklahoma City, Oklahoma, USA). WN also produces a newsletter called *Soundings* which provides descriptions of new materials available as well as new ideas in using audio and visual media at the village level.

[11]Another low cost technique which includes sound and visuals is "radiovision." Anna Fox, "An Experiment in Radiovision and Some Conclusions," *Educational Broadcasting International* Vol. 6, No. 3, September 1973. One drawback to radiovision, as in the case of any broadcast system is the problem of scheduling to meet the requirements of audience, station and agency.

[12]For a description and evaluation of India's experiment with rural television programming see: Chaman Lal, "A Review of the Delhi Pilot Rural Television Project and Its Lessons," Indian Space Research Organization, Department of Atomic Energy, New Delhi, India, 1970.

[13]Pierre A. Moser, "Television Brings Education to Ivory Coast Rural Areas," *UNESCO Features* No. 633 (1973).

[14]Population Services, Inc., "The Use of Video Tape Recorders as a Method of Directly Involving Local Rural People in Developing Countries in the Promotion of Family Planning," Chapel Hill, NC, 1972. (Mimeographed.)

[15]For an account of the use of 8mm films with low income audiences (but not made by them) see: Clifford Schefer, "Developing a Super 8mm Film System to Help Teach Nutrition to Low Income Audiences" in *Communicating with Low Income Audiences and Opportunities for Communication Research in Community Development*, Proceedings of the annual meeting of NCR-44, Regional Committee on Communications through Mass Media, University of Illinois, Urbana, Illinois, 1971. (Mimeographed.) Sol Worth and John Adair describe how inexperienced Navajo Indians were taught to produce films in "Navajo Filmmakers," *American Anthropologist*, Vol. 72, No. 1, February 1970. Several Cornell Scientists in the N.Y. State College of Agriculture and Life Sciences without special training are using Super 8 equipment to make short films for use in Extension and University instruction.

[16]For descriptions of the Indian satellite project see: Kenneth A. Polcyn, "The Joint United States India Educational Broadcast Satellite Experiment," *Educational Technology*, June 1972. Also: Kiran Karnik, "Spotlight on Software Aspects," *VIDURA*, Vol. 10, No. 1, February 1973. In the same issue of *VIDURA*, Erskine Childers and Mallica Vajrathon discuss the need to have a "development support communication" system to meet the coordination problems. See: "Communication and Rural Development."

[17]"Alaska/ATS-F, Health/Education Telecommunications Experiment," Office of Communications, Office of the Governor, State of Alaska, Juneau, Alaska, 1973. Information on the Pacific Basin project is in "PEACESAT, Project Description and Overview," available from PEACESAT Project, University of Hawaii, Honolulu, HI.

[18]Kenneth A. Polcyn, "The Proposed Brazilian Educational Satellite Experiment," *Educational Technology*, July 1972; and Colin J. Warren, "Education and Telecommunications in Brazil: Some Cost and Policy Considerations," Report for the Academy for Educational Development, Washington, D.C. 1973. (Mimeographed.)

[19]Robert Stanbury, Opening address, Symposium on Communications into the Home, The Royal Society of Canada, Ottawa, March 1972, p. 8. ANIK, The name of the satellite, is the Eskimo word for "brother."

Appendix

In the text, several simple relatively low cost systems were suggested for rural development communication programs. The following lists of equipment are intended to give a general idea of the cost involved in using these systems. Because there is such a great diversity of equipment available, as well as differences in import taxes, one must regard these figures as rough approximations. In listing particular models of equipment, we have tried to steer a middle course between lowest cost amateur equipment and expensive professional models. Emphasis has been placed on listing items that can be used by people without extensive training. One surely can find other manufacturers who provide equipment of comparable quality. This is a guide only.

Equipment for Audio (Sound) Production.

This equipment can be used for producing tape for distribution via broadcast or cassette technology. It can also be used for a simple production studio for "live" broadcasts.

Quantity	*Item*	*Approximate Cost*
3	Microphones, Electrovoice 635A and Switchcraft connectors	$200
1	Audio mixer board, Sony MX14 (6 inputs)	200
1	Portable transcription player Benjamin VP25B	250
1	Headset, Telex 820	20
1	Portable RxR tape recorder,* Sony TC800B	250
1	RxR tape recorder, Wollensak 6020 AV or VM 780 AV	170
1	Cassette tape recorder, Sony 110A	130
3	Microphone desk stands, University UDS 100	12
2	Editing kits, Editall KS-3	20
1	Cassette duplicator for RxR master, Wollensak 6030 AV	500
2†	Cassette copiers Wollensak 2760	600
x†	Cassette recorder/playback units Craig 2622 or Elgin RTC 5620 *each*	20-25
1	Cassette tape eraser	15

*RxR refers to reel-to-reel or "open reel"

†Quantities depend on size of project, i.e. the potential audience, and whether clients or groups are provided with cassette units. There is a large range of tape recorder models in the under-$50 cost range.

Quantity	Item	Approximate Cost
	Equipment for Message Distribution Via Low Power Radio Broadcast.‡	
	Broadcasting transmitter 1000/250 watt	$US8400
	Spare parts and accessories	2068
	Antenna	675
	Antenna accessories	350
	Equipment for Producing and Projecting Filmstrips	
	Single lens reflex camera with normal and telephoto lens, and a close-up lens kit. Tentax Spotmatic, Konica Autoreflex, Canon FT and F.1 series, and others in this price range are suitable.	US$400-500
	Copy stand	20
	Crusader projector (uses standard batteries)	12.50
	Long life rechargeable battery (optional, only one needed)	10.00
	Equipment for Super 8mm Film Production	
	Super 8mm camera. Good alternatives include Kodak XL55, Bauer C5XL, Bolex Macrozoom, and GAF. Includes tripod.	200-450
	Viewer editor with rewinds. Alternatives include: Hervic Super 8 Minette and Hannel Super 8	50-60
	Splicer, Bolex 732	50
	Sound projector, magnetic—to provide possibility of adding sound track after film is developed. Good alternatives include Bolex and Kodak Supermatic. The latter uses film cassettes.	400-500

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No. 48: Radio broadcasting serves rural development
No. 49: Radio and television in the service of education and development in Asia
No. 54: 8mm film for adult audiences
No. 62: Radio and television in literacy—a survey of the use of the broadcasting media in combating illiteracy among adults
No. 64: The role of film in development