STRENGTHENING DEVELOPMENT COMMUNICATION IN DEVELOPING COUNTRIES: A PROPOSED STRATEGY

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EXECUTIVE SUMMARY

In the next decade and into the 21st century, Third World nations are faced with the prospect of feeding, clothing and providing a reasonable quality life for rapidly expanding populations. The generation, transfer and utilization of technology to sustain this kind of agricultural development and economic growth, and the development of human capital through both formal education and non-formal extension education are prime considerations in achieving these outcomes. Development communication aimed at the deliberate promotion of these aspects of national development will be an important strategy.

National research and extension systems around the world have been highly effective in improving food and agricultural production and the quality of rural life. However, for developing countries, these goals are only partially accomplished and a considerable task remains.

The extension information delivery and feedback system has traditionally utilized face-to-face individual and group communication to reach farmers and farm families, and to communicate with its research counterpart. The World Bank's investment of over $2 billion on the Training and Visit System in the last 25 years in Asia and Africa is evidence of this emphasis. While this kind of communication has proven effective in getting farm families to use new knowledge and technology, it is expensive, time-consuming and resource-demanding. Therefore, the need is seen for harnessing modern communications technology and expanding use of the mass media to deliver information to the mass of the population.

The development of telecommunications capability around the world in the last three decades has been phenomenal. Developing countries are making progress in

communications capability through in-country development and/or multi-national arrangements.

Radio, television and other forms of mass communication have the potential to be used in a mass communication strategy in support of agricultural extension programs in developing countries. But, issues of an adequate communications infrastructure, production concerns, audience involvement in programming, and availability of trained agricultural media personnel in developing countries have to be addressed.

The Land Grant Colleges (LGCs) in the United States have highly competent communications professionals and agricultural media personnel who can assist in the development of communications capabilities of agricultural and communications professionals in developing countries.

It is recommended that AID consider the establishment of a Collaborative Communications Support Program (CCSP) in Food, Agriculture and the Environment whose primary purpose would be to harness the agricultural extension communication capability of LGCs and assist developing countries strengthen their capability to utilize communications media in disseminating food, agricultural and environmental information to farm families.

The CCSP would have three functions, namely training of communications professionals of developing countries, applied/adaptive communications research in those countries, and consultative activities for sharing new knowledge, technology and individual expertise.

The CCSP would be a partnership between LGCs and developing countries under the supervision of AID. One LGC would serve as the management entity. Cooperative

agreements would be drawn up between the partnering institutions for designating program participants and providing needed resources.

Other featured activities of the CCSP would include collaborative programming to apply mass communications technology in information dissemination, various forms of interchange among the selected professionals, long- and short-term training of developing country staffs, opportunities for graduate work, and involvement of the private sector.

Conceptual Approach

Development Communication is communication aimed at the deliberate promotion of one or more aspects of national development. In the Third World developing country context, development communication implies a mix of in-country and transnational/ multi-national/inter-agency communication networks designed to translate and communicate new knowledge and technology to disadvantaged populations. In suggesting a strategy for strengthening development communication, the approach taken by the authors in this paper is to begin with a discussion of the process of technology development, in particular the agricultural research and extension system which is designed to transfer and extend new knowledge and technology for agricultural development. Focusing on the educational mission of the extension system, the vital role of communications in technology development and consequentially, national development, will be discussed. The advantages and limitations of extension methods, the current status of worldwide telecommunications, and experiences with mass media (radio and television) educational programs and projects will be presented. Reviewing the current situation, and looking to future world problems and challenges in population, food, and the environment, an expanding role for telecommunications and mass media systems in Third World development is indicated. This will be discussed in terms of implications for development communication. The paper will conclude with a recommended strategy for harnessing international communications talent and resources to strengthen development communication.

Technology Development

The generation, transfer and utilization of modern technology is recognized as a key ingredient of development. As the newly-independent nations of the world broke

from colonial domination, they undertook these tasks using a centralized planning system which was institutionalized in the government or public sector. This was in keeping with the bureaucratic structures under which they had been governed. Simultaneously, the infrastructural needs of development such as production of goods and services, products marketing, transportation, communications, financial systems, and industrial growth became a logical part of this planning approach, as did the education and training of human resources needed to accomplish developmental goals. These components became an integral part of long-range (five or seven-year) national plans.

From a global perspective, technology has generally flowed from the developed nations of the western hemisphere to the less developed nations of Asia, Africa and Latin America. This implied that the recommended technology had to be tested and adapted, and the infrastructure and training to support technology transfer and utilization was appropriately designed. Because of the preponderance of rural and farming populations in developing countries and the significant role played by agriculture in their economy, international assistance emphasized developing infrastructure and technological systems to enable farmers to use improved genetic materials and scientific methods for increasing food production.

Technology and Agricultural Development

Agricultural development, in terms of technological flow, can be thought of as comprising a research system for generating new knowledge and technology, an extension system for extending and transferring new knowledge and technology, and a system of information use and feedback. Research institutions produce the information which is interpreted by extension personnel and extended to the ultimate user, namely the farmer/farm family and/or agribusiness personnel. The flow of technology through the

agricultural development enterprise requires a communications infrastructure wherein agricultural information is produced, adapted and disseminated in different ways to end users. Implicit in this situation is a system for ensuring information feedback by means of which farming situations and problems are relayed to researchers for solutions.

Extension Systems

National extension systems. Historically, national research and extension systems in developing countries have been segregated, with ineffective linking mechanisms. Limited or no feedback from farmers reduces the chance of research addressing real problems. There is also isolation from policy makers. Thus, research-extension-farmer interaction vital to agricultural development is either missing or underdeveloped. This situation persists despite evidence that technology development increases agricultural production. Returns to investment in agricultural research have been shown to be three to four times higher than returns to other agricultural investments (Ruttan, 1982). A number of countries have also shown a high pay-off on agricultural extension investment (Birkhaeuser, Evenson, and Feder, 1989) .

Typically, developing countries established comprehensive national extension systems to transfer technology and thereby improve agricultural production. This approach followed the concept of centralized government planning and, as Claar (Interpaks, 1988) suggests, was needed for reasons of centralized leadership, effective linkages with the private sector, and equitable farmer access to extension programs. National extension systems were geared to agricultural production goals and functioned as agencies of government mostly in service and regulatory roles with a peripheral educational role to implement a variety of government agricultural programs. Because of observed shortcomings in public sector extension, the Training and Visit Extension

Information and Management System (T&V) was initiated by the World Bank, and, to a limited extent, Private Sector Extension was established through private volunteer organizations, farmer organizations, farmer associations, agricultural cooperatives and commercial profit-making firms such as input dealers.

Since World War II, national agricultural extension systems have been supported by donor nations, private foundations and international agencies as part of the international assistance effort in agriculture and rural development. Leading this effort were the United States, the nations of the British Commonwealth, and selected European nations. Private foundations supporting agricultural development included the Rockefeller and Ford foundations. United Nations agencies include FAO, UNESCO and UNICEF. The World Bank initiated and has supported the T&V system of extension.

It would be informative to review some recent appraisals of agricultural extension worldwide to gain a perspective of contemporary concerns and issues.

It is recognized that national extension systems have had a positive impact on agricultural and rural development. However, progress has been limited by a number of external and internal constraints. External constraints cited include the lack of a strong and continuing commitment, at highest political levels, to policies and resource allocations essential to agricultural progress, inflexible and bureaucratic government structures characterized by separation of research and extension functions, duplication, archaic, discriminatory civil service rules, and insufficient government funds dedicated to agriculture. Extension systems are also plagued by internal problems which need to be addressed. First, there are no clear policies and/or legislative authority enunciated by governments to support extension systems which could inspire confidence and assure continuity. Second, there is a lack of flexibility and/or experimentation in designing

optimal, situation-specific extension structures. A third problem concerns the whole area of systematic program planning, implementation, management, evaluation and monitoring. Fourth, the use of effective and affordable program delivery methods is hindered by inadequate resources and lack of staff skills. The selection of competent staff, and subsequent training, support, and conditions of service is another serious problem. A sixth problem is ineffective networking, i.e., establishing necessary linkages with other agricultural and rural development services and facilities both in the public and private sectors. Finally, women, youth and the poor tend to be excluded from extension programs (FAO, 1989).

In Asia and Africa, women perform a majority of the tasks associated with production, processing and marketing of crops and livestock. However, they have been neglected in agricultural extension work by nearly all-male extension staffing patterns as well as exclusion from educational programs. For example, Sub-Saharan Africa, particularly in the past ten years, has experienced a tremendous increase in poverty, hunger, population growth and environmental damage. At least half of the people who could find answers to these problems have been completely ignored. Women produce more than 80 percent of the family's food in Africa. They also process and sell much of the food in the village markets, on the city streets and along the rural roads. In spite of these statistics, women make up less than five percent of the trained agricultural workers and a much smaller percentage of the leadership roles in government agencies which set the course of future agricultural development in these countries (Winrock International, 1989). It is obvious that we must somehow communicate our development messages through media specifically directed to women in villages and this may best be accomplished by including more women at leadership levels in the development process.

Rivera (1989) suggests that international agricultural extension is at a cross-roads. Globally, public sector extension was criticized in the 1980s for lack of relevance, insufficient impact, inefficiency, and inequity. A variety of strategies emerged in response to the criticism. The first strategy was a revitalization of public sector extension, which in the United States, for example, resulted in a set of new national program initiatives based on futuristic programming. A second strategy is institutional pluralism or mixed public-private extension systems. Examples of this include privatization of extension in the Netherlands, commercial and cost-recovery systems in New Zealand and Mexico, respectively, and the demarcation of helping roles for commercial, large-scale agriculture by the private sector, and small-scale farming and welfare systems by the public sector. A final strategy worthy of note is the encouragement of alternative diffusion strategies, including direct research-farming linkage. An example of this is the integration of the extension function into a research organization as in the case of "Frontline Extension" of the Indian Council of Agricultural Research in India wherein extension information is provided directly to farmers by researchers.

Rivera (1989) further cites the "adaptable models debate" - the US Cooperative Extension Model, the World Bank's T&V Model, the Farming Systems Research and Extension Model - and the "adaptable technology debate" - appropriate, sustainable, locally-developed, indigenous - as a strain on the decision-making apparatus of national extension systems. He recommends that long-term sustainability and flexibility guide policy and planning decisions.

Taking his cue from the United States Agency for International Development (AID) Administrator M. Peter McPherson's 1985 reference to AID's future focus in agricultural extension, namely targeted, innovative techniques rather than the broad-

brush, general approach of the past, Britan (1987) analyzed AID's innovative extension approaches in 266 extension projects initiated between 1975 and 1984. He found that most of AID's extension activities (a) relied on traditional training methods and technical assistance (b) did not focus on farmer organizations or farmer self-help, and (c) were isolated from overall agricultural development strategies and processes. On the positive side, it was apparent that (a) AID's earlier emphasis on providing decentralized extension services through agricultural universities warranted reconsideration, and (b) more innovative extension activities, such as mobilizing the private sector, applying modern mass communication, and selectively strengthening public extension had been planned and implemented in recent projects, which when completed and evaluated, could provide a useful basis for additional mission guidance. The study acknowledged that the World Bank's T&V System had enhanced agricultural productivity in some settings, but was less effective in countries with heterogeneous agro-ecological conditions. Furthermore, T&V's emphasis on centralized, national extension bureaucracies seemed to be inconsistent with AID's larger development strategy and involved recurrent costs that are beyond the means of many host countries.

In a broad-ranging review of AID's agricultural extension efforts since World War II, Cummings (1989) refers to AID's more recent support of selective improvements in public extension institutions, particularly the increased use of mass communications technology as exemplified in the Basic Village Education Project in Guatemala and the Communication for Technology Transfer in Agriculture Project (CTTA) in Honduras, Peru, Indonesia and Jordan. In both projects, a combination of mass media and personal contacts proved successful. The Guatemala project used radio and printed materials to complement direct contact between the extension worker and the farmer in successfully

transferring agricultural technology. The more comprehensive and long-term CTTA Project was conceptualized as a systematic technology transfer process to include developmental investigation, prioritization, validation, a transfer strategy with multiple conventional extension and communication elements, and a continuous participant feedback system. Evaluations of the Honduras and Peru projects have shown favorable results in changing attitudes, increasing agricultural output, and transferring knowledge through training of farmers, leaders, and extension workers. The technology transfer process envisioned in the CTTA Project, according to Cummings, holds out good promise for replication.

In a provocative commentary on the Sub-Saharan African extension experience, Belloncle (1985) decries the need for close supervision of farmers by a horde of extension workers and suggests a new participatory and experimental model which would instil confidence among farmers once they "understand where they are being taken". The model emphasizes group instruction, reliance on "pilot farmers" or "farmer-leaders", simplified recommendations tested on farmers' fields, and inclusion of youth and women as unique extension audiences contributing to agriculture in their own right.

T&V system. The T&V system was conceived by Daniel Benor and supported by the World Bank as a solution to the basic agricultural extension problem of effectively organizing and managing national extension services with the participation of, and in close cooperation with, the farmers themselves. It is based on intensive training of extension agents and on their regular visits to farmers. Several fundamental principles were implied - continuous practical agricultural training of all extension professionals, ascertaining farmer knowledges and developing new extension messages by linking with research, ascertaining farmers' needs and communicating agricultural knowledge to groups

of contact farmers and their followers once every two weeks, and managing the system through a fixed routing for farmers, extension staff and their supervisors, thus ensuring that extension agents actually visit farmers. The T&V System, initiated in 1974, has been applied nationwide in India, Indonesia and Thailand and other countries in Asia. It was introduced in Africa in 1982 and is in various stages of development in 30 countries on that continent. Worldwide, T&V can now be found in 79 countries. Since its inception the World Bank has lent $2.2 billion, or 45 percent of all lending on agricultural extension (Hayward, 1989).

T&V has its proponents and critics. As some examples of success, Benor (1989) cites a 25% improvement in yields of maize and coffee in Kenya, maize and rice in the Ivory Coast, millet in Burkina Faso, vegetables and millet in Mali, and cassava in Nigeria, with none or very little additional purchased inputs.

Roberts (1989) categorizes criticism of the T&V system into two sets of issues - "non-issues' and "truly contentious issues". T&V's success with the green revolution in wheat and rice where all conditions were favorable is contrasted with its much poorer performance in the absence of such conditions. This is seen, however, as a "non-issue' since T&V is only part of an optimum agricultural production system. The "truly contentious criticism" is that it often has a top-down orientation which curtails feedback.

Axinn (1988), in a particularly scathing criticism of T&V, cites the reports of Singh (1986) on T&V in Bangladesh, Feder and Slade (1982), Cernea (1981) and Shinghi (1985) on India, Nagel et. al. (1983) on the Philippines, and Adjid (1985) on Indonesia. These authors say the overwhelming disadvantage is the high long-term costs to governments of expanding and sustaining the accustomed size of extension staffs, plus the lack of actual two-way communication, and dependence on simple, low-cost technology

which, while most relevant to small farmers, is in short supply. He suggests that recipient countries accepted the method in exchange for World Bank loan assistance, without the wherewithal to sustain an expensive, intensive system of extension which does not benefit the mass of farmers.

In an equally vehement defense of T&V, Venkatesan (1989) insists that the system is financially viable, participatory and contributes to agricultural production.

Private sector extension. Private organizations can play a major role in communicating and promoting technological change. Farmers associations or cooperatives in Denmark, Holland, Taiwan, Malaysia, India and other countries have had remarkable success in organizing extension services for their members. For-profit private companies have also been very active in this regard. In the developed world, private companies play a significant extension role. There are similar examples in developing countries. The Kenya Seed Company, for instance, was a prime source of extension information because it wanted to sell more hybrid corn (Gerhart, 1975). The National Rice Growers' Federation and ALCOSA (vegetables) promoted successful production efforts in Colombia (Jennings, 1976), and Guatemala (AID, 1981), respectively. Another interesting approach supported by AID is funding of private agricultural development foundations in Ecuador and Peru to serve as catalysts promoting greater collaboration between the public and private sectors in research, extension and education (AID, 1989).

The constraints and potential of private sector extension in agriculture in developing countries are discussed by Claar (1988). He anticipates that the private sector in these countries is least prepared to help because it has not matured, but contends that its role can be meaningful in view of problems encountered with public sector extension such as inadequate finance, inefficient management, poor research linkage, and political

negatives. Some of the constraints he sees are product and commodity orientation rather than a holistic perspective, servicing only larger buyers, objectivity of information, and disguised cost of the service. However, he feels there is a place for private sector extension in developing countries in some form of appropriate public-private extension mix.

Technology Transfer and Extension Education in Agricultural Development

Technology Transfer and Extension Education have somewhat differing connotations in reference to agricultural development. Conceptually, both imply a connection or linkage of some sort, be it loosely defined and articulated or well-designed and implemented, with the technology generation or agricultural research apparatus. Theoretically, it would appear that both processes have a stake in seeing to it that technology is utilized by farmers, farm families and agribusinesses. In actuality, this is where the difference between the two processes lies.

In technology transfer, the chief interest is to disseminate information, to prescribe research-proven recommendations through some information-flow or communication process. Whether or not technology is used by farmers and others is not a concern. Therefore, the technology transfer system may be seen primarily as a one-way information delivery system, not receiving feedback from users about their situation, problems and needs, and not set up to promote technology adoption. An exception to this understanding of technology transfer is found in AID's Communication for Technology Transfer (CTTA) Project. Technology transfer in this project involves initial developmental investigation, prioritization, validation, transfer strategies with multiple extension and communication and elements, and continuous forms of feedback to all participants. These are akin to steps in the extension education process (Cummings,

1989). By contrast, the extension education process, because of its educational orientation and set-up, emphasizes the learning of new knowledge and technology by farmers and applying what is learned in the farming situation. The expectation here is that extension systems will be organized and will function to try to ensure this result. Therefore, the extension education process is intended to actively encourage adoption of technology, to interact with and link together researchers and users, stimulate need-based research, involve farmers and other users in programming decisions, and utilize non-formal educational principles and methodology to promote learning.

The Food and Agriculture Organization (1989) takes issue with the view that extension is essentially an instrument of technology transfer. It states that over-promotion of technology development alone as the answer to the problems of agricultural development has been replaced with the realism and recognition that, although essential, technology transfer is but one of the elements in the complex of policies, services and facilities needed for increasing productivity and improving the lives of rural people. Rankin (1989) endorses FAO's position and emphasizes that in addition to technology transfer, extension has a major educational role in the development of human capital.

Extension Methodology

An extension system in the technology generation-transfer-utilization process has traditionally utilized a mix of teaching methods, techniques and devices to reach technology recipients/users in a non-formal setting and get them to adopt new knowledge and technology (Verner, 1964). Teaching methods include interpersonal, one-on-one or group methods, and impersonal, mass methods, selected on the basis of desired behavior changes - knowledge, skills, attitudes, practices - user characteristics and the content of the message to be delivered. Teaching techniques supporting these methods include

field demonstrations, workshops, discussion groups, forums, etc. Useful teaching devices are mass communications media, such as radio, television, and print materials, and audio-visual aids. Because the classrooms of extension systems are homes, fields, and community centers in rural communities, geographically separated from one another and the knowledge/technology generation centers, extension workers have to travel to rural communities to conduct their educational programs. Educational broadcasts on radio have for a number of years provided a viable alternative to bridge the distance separating the research-extension system from farmers. More recently, satellite television broadcasts have emerged as a powerful, far-reaching educational medium. In fact, distance education for academic credit through radio, television and correspondence courses has been popular in the developed world. Distance education projects have also been supported by the World Bank in developing countries.

Distance Education

There are several reasons for the interest in and support of distance education. First, distance education is relatively inexpensive for the institution and the student making it accessible to many more people, both in formal and non-formal situations. Second, distance education can bridge great distances, both the physical distances created by geography, and the social distances created by cultural differences.

It would be useful to look at some country experiences with distance education.

One example of distance education in the formal setting is the Open University of the Netherlands. It has 37,000 students and uses written materials and broadcasts on radio and television to provide academic degrees which are recognized as equivalent to those awarded by regular universities and professional colleges. On the premise that isolation within one's national borders means lower quality, the European Association of

Distance Teaching Universities with 12 members in 10 countries is seeking to develop an European Open University in which courses offered by members are accessible to students based on their needs (Aarts, 1989).

Hawkridge (1988) reviewed 32 World Bank projects between 1963 and 1985 that included education via broadcasting (television and/or radio) and by correspondence in developing countries. Goals for these projects varied - to complement teaching in the classroom, either by enriching what teachers provided or teaching content beyond their capabilities, to take over teacher-less classrooms, to provide out-of-classroom education for adults - with the courses leading to qualifications (or equivalency) or not, as well as for non-formal education. Case studies of selected projects showed mixed success of the distance education component. Improved test scores in language and math were recorded, and large numbers of students passed tests and/or graduated. In terms of cost-effectiveness, broadcast lessons in classrooms, with teachers present, cost something extra. These extra costs were not high when only radio was involved, but rose if printed materials were developed and distributed. When television was introduced, the cost per student rose even further, depending on the professional quality of broadcasts. Radio broadcasts direct to adults for non-formal education were an add-on cost, but they did something that is very difficult to do any other way: they reached cheaply large numbers of people, usually scattered over a wide area. Hawkridge concluded that Bank investments were most beneficial when the borrowing country and the Bank agreed on the educational objectives of the distance education component, and that distance education was most effective when it was sharply focused on improving the quality of teaching available, when it was used to offer non-formal education to students who were

without teachers and classrooms, and/or when it met social demands and answered urgent needs for formation of human capital through education and training.

Hawkridge raises some searching questions as to why the World Bank has not been more active in supporting these efforts given its successful experience with distance education projects. He suggests that the Bank could reduce emphasis on capital investment on buildings and production of conventional textbooks, and instead support distance education broadcasts and texts.

From the above, it can be seen that distance education is becoming increasingly important in the developing world. Indonesia's open university has an enrollment of more than 100,000, and the **Sukothai** in Thailand has over 400,000 students. There is the same rapid growth in South Korea and India. There is an Asian Association for Distance Education (Aarts, 1989). There is also the possibility for a range of technological developments associated with radio and television in distance education. For example, interactive audio-visual teaching materials, such as video tapes and discs with instructions for practical exercises could be developed for formal classroom settings and for work in non-formal educational contexts.

Development Communication

Development communication is defined as communication which has as its purpose the deliberate promotion of one or more aspects of national development. The term itself originated at the University of Philippines, seen initially as an outgrowth of agricultural extension, and becoming eventually a process of translating and communicating new knowledge in various fields to disadvantaged populations. It implied a commitment on the part of development agencies to support a capacity for information

transfer within the system and to acknowledge the obligation to transfer that information to improve the quality of life (Brace, 1984).

In terms of media, the field of development communication envisions both the **kinds** of activities nations engage in for social development (distance education, transfer of agricultural innovations, public campaigns to improve nutrition) and the **ways** information is transferred (folk media, posters, print materials, radio, satellite-supported technologies).

The technology generation-transfer-utilization process applied to developing countries can be visualized as development communication since it is aimed at fostering communication among people for the purpose of bringing about development. This communication could be based wholly on in-country structures and processes. And this is likely to be the case as developing countries become less aid-dependent. However, because of the large current investment in foreign and international development assistance programs, this aspect of development communication is a mix of in-country and trans-national/multi-national/inter-agency communication networks. Obviously, the design of communications structures and communication processes is a vital aspect of development communication.

Before an extension education system which uses communication as a basic tool for development is established in a developing country, certain critical issues need to be addressed. One important issue is the approach to development, namely top-down or participatory, and the role of communication in this approach. Rogers (1978), in a critical review of the "dominant development paradigm", which used the top-down approach, has suggested a new development paradigm based on self-development and alternative communication strategies.

According to Rogers, the older paradigm dominating development of western nations stressed top-down planning, economic growth (through industrialization), individual profit and a capital-intensive technology to hasten development, and used as indicators of success, per capita income or total growth. Apparently, this approach did not work in many developing countries, as only marginal improvements were made and equality of economic access remained an elusive ideal. Rogers' new concept of development is "a widely participatory process of social change . . . intended to bring about social and material advancement including greater equality, freedom and other valued qualities for the majority of people through their gaining greater control over their environment" (Rogers, 1978, p 682).

In employing this new paradigm successfully, he suggests that the predominantly one-way flow of communication from government development agencies to people must change. Although the mass media system implied by the old paradigm may still be useful, it must respond to local problems and become the vehicle to communicate answers to locally initiated requests rather than design top-down communication campaigns, and publicize accomplishments of local groups so that others may profit from their experiences. He suggests a return to radio and the "little media" to reach wider audiences including the urban poor and villagers. He maintains that the "big media" (TV, satellite broadcasts, and computers) are too costly for most developing nations.

A similar view is taken by Brace (1984) who stresses the importance of evaluating communication to ensure feedback and avert the disasters inevitably implied by one-way communication. She notes that development communicators have accepted preliminary audience research, pre-testing, revision, formative and summative evaluation as integral parts of the process of communicating development information.

Other issues have been considered by Tiene and Futigami (1987), who propose general guidelines for designing effective educational media (broadcast) projects in the formal educational systems of developing countries. The guidelines appear to be apropos to the non-formal extension education system as well. They recommend pre-planning analysis of the situation in these countries, including issues of language in multi-lingual societies, cultural differences which can alienate non-targeted groups if not considered in broadcasts, administrative and project management difficulties, availability and maintenance requirements (including the influence of tropical conditions, availability of spare parts) of telecommunications equipment, accessibility of receive sites, and availability of trained personnel. For these reasons, they suggest that radio, which is one-fifth the cost of television and can reach remote areas, is the most likely choice for most developing countries.

In a similar vein, Kelly (1987) argues that an ethnocentric approach to establishing communication systems in developing countries is likely to fail. This approach, he maintains, assumes that increasing urbanization will lead to literacy, wealth, and increased participation, which are interpreted as progress. Proponents of this approach encourage one-way communication, whereby local people are given information through the media in order to bring them up to the standards of the assisting nation. Instead, he recommends that people in developing nations should not be treated as blank slates but in the light of their culture and ethnic values, and cites research wherein the use of intermediaries in radio broadcast instruction in Guatemala encouraged cultural exchange and thus proved more successful than straight-line instruction. Further support for this "cultural awareness and involvement approach" in development communication is provided by Lundu (1987, 1987a), who extols the value of the "indigenous communication system"

which depends largely on oral and visual aids over "exotic communication systems", and suggests that the needs of the information user be considered in communication planning, and by Mativa (1987) who advocates national planning based on utilizing the simple, traditional communication systems that are already in place.

Communication Systems

Individual and group methods of communication have proved effective in the evaluation, trial and decision-to-adopt stages of the technology adoption process as identified by Lionberger and Gwinn (1982), and the persuasion and decision stages of Rogers' innovation-decision paradigm (1983). The natural limitation of both methods is the small number of individuals who are exposed to the new technology. In contrast, the reach or audience coverage of mass methods of communication (radio, television, teleconferencing, print materials) is substantially greater, with a focus on creating general awareness and interest (Rogers, 1983). A good teaching mix of individual, group and mass methods of contact has generally been suggested to secure adoption of new knowledge and technology.

Earlier, reference was made to extension methodology traditionally utilized by extension systems to reach technology users. Given the basic, yet variable, conditions in developing countries of vast numbers of agricultural/rural clientele needing help to improve agricultural and food production, low levels of literacy and numeracy, inadequate infrastructures such as roads, transport, telecommunications, markets, etc. it is difficult to prescribe a common, uniform approach to methodological choices. Nevertheless, it is obvious that a communication strategy of reaching people en masse should receive strong consideration. To implement this strategy, telecommunications structures needed for developing countries will have to be assessed on a country and regional basis,

telecommunications personnel training will be required, and programming considerations evaluated.

Telecommunications

Telecommunications provides the backbone for the information infrastructure of a country, in the same way as the transport system provides the backbone of the physical infrastructure. It can be used not only to disseminate information of immediate importance on a national scale, but also as a channel for education, for strengthening the social fabric, and for enriching the national culture.

The sector in which the potential of telecommunications has been most neglected is agriculture. Farmers must not only grow food but must sell it effectively and must buy seeds and fertilizer. They also have use for information on weather conditions, outbreaks of disease and new agricultural techniques. Telecommunications services can help farmers on the one hand by assisting them to arrange for timely supplies, effective collection of produce and access to agricultural information; and on the other hand by providing the infrastructure for the transmission of instructional broadcasts to farming communities.

By providing the information links between urban and rural areas, and among rural residents, telecommunications can overcome distance barriers which hamper rural development. The ability to communicate instantaneously can facilitate the development process by increasing functional efficiency, effectiveness in reaching goals, and equitable distribution of benefits throughout society.

Before information is transmitted through telecommunications networks, the functions of information storage, processing and reproduction have to be managed. Technologies for these latter functions such as computers, VCRs, printers and copiers

may be combined with telecommunications systems. This combination of telecommunications and information technologies can provide services that are appropriate for developing regions.

Applications of computer communications include data broadcasting, information acquisition and management, electronic transactions, electronic mail, access to data bases, desktop publishing, and information exchange via facsimile. Small low-cost earth stations used with domestic satellites and terminals connected to INTELSAT (an international satellite system) bring voice and data communications to isolated regions. Advances in radio technology such as cellular radio and rural radio subscriber systems offer affordable means of reaching less isolated rural customers. Audio teleconferencing using thin route telephony has considerable promise. Satellite technology offers the possibility of reaching distant learners. Some examples of the use of satellites in distance education are the adult education programs in India, workplace continuing education technical courses in North America, the Learn/Alaska network which distributes educational programs to village schools where teachers can tape them on VCRs for classroom use, the use of radio to teach arithmetic to children and literacy to adults and television instruction in all school grades in Latin America.

The development of satellite systems over the last two decades has been phenomenal. In 1985, there were over 115 international and domestic satellites located over the equator capable of transmitting information to any part of the world (Gillick, 1985).

Developing the communications infrastructure to utilize satellite communication is a primary limiting factor. In a 1985 survey of satellite communication sponsored by the Maitland Commission, set up by the International Telecommunications Union of the

United Nations, it was estimated that $8 billion was being spent annually on communications infrastructure development. It was recommended that this amount be increased to $12 billion if developing countries were to make significant advances toward communications development. The survey provided the following additional information of significance:

1. Of the 600 million telephones in the world, three-fourths are concentrated in nine countries. Three-fourths of the world population lives in countries with 10 telephones or less for every 100 persons. Over half lives in countries with less than one telephone for every 100 persons (Gillick, 1985).

2. The INTELSAT international network, established in 1967, has 110 members, two-thirds from developing countries, offering a variety of services from sophisticated business applications to thin route services in remote villages (Pelton, 1986). In 1982, 171 countries and territories made use of INTELSAT's services, with over 50,000 hours of television transmission. Asia, Africa, the Arab states and Latin America used 20 % of this time, and there was an increase in intraregional traffic. Developing countries continue to lease satellite capacity, primarily as multipoint, receiving sites (Hulten & Hulten, 1985)

3. INTELSAT is no longer the sole satellite system for regular international communication traffic. National systems in the U.S., Canada, the USSR, Japan, India, and Indonesia, and regional systems in Europe, the Arab States, and Scandinavia are also involved.

Fiber optics technology is another significant development in the field of telecommunications. A transatlantic fiber-optics cable is soon to be commissioned. The United States is developing a National Research and Education Network (NREN)

among government, industry and academia to install what has been called "the interstate highway system of the information age". The major payoff of NREN will be near instantaneous availability of new information, allowing scientific collaboration and synergy at magnitudes far greater than today's, and shorter periods from research to commercial application (Knauth, 1989).

The micro-computer in conjunction with telecommunications networks offers another promising medium for development communication. While there may be limitations in using this technology mix for non-formal education in villages because of equipment installation/maintenance constraints, there is the potential of using it in formal classrooms and in professional training of research and extension workers. Additionally, by accessing existing agricultural information data bases, extension workers can quickly obtain accurate information on available technology appropriate for particular local situations.

David (1983-84) proposed using microcomputers linked to a satellite for classroom instruction at a number of sites. The computer is programmed by the teacher if capable or by a qualified programmer. A large TV monitor or screen is placed before the class. The teacher operates the computer and projects questions and answers on the screen for all students to view. Several computers in different locations can be connected to a central terminal.

A recent alternative to live television satellite technology is an audiographic computerized system, called telelearning, which connects a number of receive sites to a central transmitting site. A personal computer is enhanced with a Telewriter package consisting of an electronic tablet, a modem for voice and data transmission, and an audioconferencing set. This system uses standard telephone analog lines on a

communications bridge to establish live, simultaneous, interactive oral and written communication among sites. It is relatively low cost compared with live video programs, and has been found to be as effective as face-to-face classroom instruction (Verma et al, 1989).

Mass Communications

We shall now focus on communications media which can reach large numbers of people, either en masse or in large groups, through extension systems which have been established for agricultural development in the developing world. A recent global survey of staff time allocations to extension delivery methods revealed that 16 percent of time was devoted to mass media (Farmer, Swanson and Bahal, 1990).

Mass media emphasis in extension programs is on non-formal education, although opportunities for semi-structured or more formal settings could evolve depending on specific situations and educational design formats. Likewise, although the primary aim of mass media is to create awareness of new knowledge and technology, understanding and application of technology can be achieved by manipulating the learning environments.

Mass media that have proven useful in both formal and non-formal distance education in developing countries are radio and television. Open educational broadcasts have used these media with success. Innovative alternative formats have been used with radio such as radio campaigns and listening groups. Likewise, an alternative television format is narrowcasting. There is also some experience with audio-cassettes using tape recorders, and with video-cassettes using VCRs.

When compared to television, radio is still the predominant form of broadcast communications throughout the world. The British Broadcasting Corporation reported on the number of radios and television sets worldwide in 1985. There were 37 radios

and 15 television sets per 100 population throughout the world. Forty seven sub-Saharan countries reported 14 radios and only one television set per 100 population. Fourteen Southeast Asian developing countries counted ten radios and two television sets per 100 population. Twenty three countries in Central America, South America and the Caribbean Basin averaged 34 radios and ten television sets per 100 population (International Broadcasting and Audience Research, 1986). Although television is widespread in the developed world (72 sets/100 population in the United States) it has just arrived in the developing world, particularly in Africa and Southeast Asia.

A review of country experiences with radio and television shows the extent of their utilization in development communication.

Radio. Radio is the single, most widespread means of mass communications for a majority of the world's population. Even in the most isolated villages in developing countries where there is no mail, telephone or network of roads, radio is a reliable channel of communications. It is still a powerful development tool and has not yet been overshadowed by television. It is the only electronic medium still readily available to the masses at a relatively low cost. A one-hour color television program may cost 10 times more than the same amount of radio transmission. Furthermore, reception of the program can be accomplished with a transistor set which may cost as little as $5 (Misra, 1987).

A recent study showed that the mean number of educational activities completed annually by extension organizations worldwide included 94 radio broadcasts as compared to 78 farmer field days and 70 farmer training courses. In Africa, the mean number was 425; in Asia and the Pacific, 260; and in North America, 450. These numbers seem to

indicate that extension systems are using radio as their number one method of communication with clientele (Farmer, Swanson and Bahal, 1990).

Attempts to meet the goals of development communication with radio programming have been made through (a) open broadcasts, (b) radio campaigns, (c) listening groups and (d) two-way radio (Jamison and McAnany, 1978).

Dramatization, soap operas, and story-telling in open broadcasts are all common forms of motivating people to adopt new ideas and practices, by making them aware of the existence of innovations which might be useful to them. Awareness, of course, is a necessary step before any innovation can be adopted by an individual. Open broadcasts have the potential of reaching a larger proportion of the population than do organized learner approaches. However, if the goal is more than simple awareness, the chances of success in the form of changed behavior may not be high.

Listening group strategies consist of a combination of radio messages on a regular schedule directed toward organized groups of listeners who discuss and share ideas and experiences. This procedure combines the mass media approach with the more personal atmosphere of group discussion. This sharing of personal experiences likely will bring the radio listeners one step nearer to adoption of the information presented.

Radio campaigns concentrate efforts in a relatively short period of time and employ organized listening groups with trained group leaders and supporting printed material. Campaigns require precise planning and extensive coordination of activities.

In the case of two-way radio the strategy operates more like a telephone system with many interconnections. Although experience with this form of radio has been limited there are some cases where it has been successful. An example of its usefulness can be seen when specialists communicate with field staff. An emergency medical

technician in a remote area could communicate with a medical doctor in the city and receive specific instructions on how to treat an individual who has been injured.

Experiences with various strategies in radio communications have shown that the comparative outreach of organized listening groups diminishes, since more time and resources must be expended in organizing the audiences. However, the organized listening group strategy does bring about greater sustained change in the audiences reached (Jamison and McAnany, 1978).

A classic success story in the use of dramatization in open broadcasts is the British radio drama series entitled "The Archers - An Everyday Story of Country Folk." By 1987, this daily 15-minute radio program had been running for 30 years, the longest running radio serial in history.

Godfrey Baseley, the program's creator, had two primary objectives: (a) provide an information bridge between rural farm people and city or town dwellers, keeping the urban population better informed about agriculture and its many problems, and (b) transmit useful information to the farming community. Rather than use straight talk, Baseley used dialogue between carefully selected characters in a dramatization prepared by professional script writers. The drama featured a farm family of husband, wife, three children and one daughter-in-law. A prerequisite was that the drama would be about 60 percent entertainment combined with educational and informational material injected into an entertaining story. No scene within the episode would run more than six minutes and there would be no more than three scenes in a 15-minute episode. When the program was at its peak in 1955 it had a listening audience of about 20 million people.

FAO believes that an approach such as "The Archers" could be very applicable in developing countries where "there are strong oral cultures, and story-tellers are part

of the social scene." The approach would be effective almost anywhere since radio now reaches even the remotest regions of most of these countries. Problems do exist, however. Adequate resources to pay for such quality in radio may not be available. In addition, multilingual countries would experience the added cost of multiple translations which also would create some loss of effect in adaptation to the language of a specific audience (FAO, 1987).

FAO (1989) has also assisted rural broadcasting, particularly in Africa. Rinderpest control in Kenya, market information in Tanzania and general rural development in Mauritania are examples. The speed with which critical messages, such as those related to disease control, can be spread to a vast audience makes radio invaluable in support of agricultural extension, and agricultural and rural development in the broadest sense.

Nepal has been successful in broadcasting three 20-minute programs each week using dialogue between announcers in the studio. One program consists of two broadcasters answering questions sent in by listeners using dialogue between the two. Another consists of dialogue between farmers and an extension worker about seasonal farming topics. The third and most popular program is a serial entitled "The Old Lady and the Extension Worker" which is a discussion between a wise old farming woman and a young extension technical assistant (Clearinghouse on Development Communication, 1986).

A radio program with the aim of modernizing agricultural production in Bangladesh has achieved excellent results. The program entitled "My Country, My Land" is transmitted daily for 30 minutes on a national hookup. It is simultaneously relayed by regional stations. Radio clubs for farmers have been formed in each area of the regional stations. A one-band transistor radio has been furnished each club to allow

members to listen to the program and provide feedback to the station (Clearinghouse on Development Communication, 1983).

Smith (1982) reports two radio campaigns, one in The Gambia and one in Honduras, the objective of both being to promote the use of listrosol, an oral rehydration compound used in the treatment of diarrhea in children. In The Gambia mixing instructions of the compound were printed on an inexpensive flyer which also served as a lottery ticket. A national radio lottery complete with prizes was organized to increase distribution of the flyers. Taking advantage of mothers' interest in the lottery the flyers included color coded information about oral rehydration.

In Honduras, the notion was to popularize distribution points for listrosol. Local mayors selected the distribution points and a simple flag featuring a large red heart was placed in easy-to-see places at these points. Special radio spots featured the message, "To find LISTROSOL, look for the flag with the red heart."

Audio cassettes have been used to some extent to bring educational materials to learner groups. Miaros and Middleton (1982) report such an effort in Indonesia where classroom space is limited. Education was delivered to village learning groups in the form of radio cassettes and slide/cassette programs. Learning groups were attached to a mother school where students received class room instruction once a week.

In Mali, with only a 20% literate population, the oral tradition has long been used to transfer knowledge, and the audio cassette is used extensively. Villages across Mali are provided with two tape player-recorders, an audiocassette library and batteries. Each library contains 60 tapes in the local language, each related to the daily lives of the people. Each village selects a facilitator who maintains the tape collection and organizes

listening groups which meet 2-5 times weekly (Clearinghouse on Development Communication, 1987)

In developing countries where national and regional radio networks already exist broadcasters are establishing local radio stations. Programs can be developed locally by local people concerning local problems rather than handing down some professionally prepared program delivered by a stand-up broadcaster in an urban center (Foote, 1989). Local stations have been successful in India, Liberia, Peru, Ecuador, Bolivia, Sri Lanka, and many other countries around the world.

India, with one of the biggest national radio networks in the world, covering 98 percent of the population and boasting large regional stations (Misra, 1987) is planning to establish up to 70 local radio stations (Anjaneyulu, 1989).

Local radio permits transmission of messages in several different languages. For example, in Liberia, some local stations transmit in as many as six different languages. An evaluation in Bong County, Liberia, (Foote, 1989) showed that radio programs on fish farming were the source of information for fish farmers 59% of the time after the establishment of local stations as compared to 16% of the time prior to the establishment of these stations.

According to Stephens (1989) mini radio stations can be established in remote villages at a cost of between $200 and $2,000. Stephens points out that for $1,000 one can purchase minimum studio equipment, a transmitter and antenna, and a 30-watt solar-powered supply system that will give up to four hours per day of operating time.

Two major obstacles to radio exist in developing countries, namely uneven distribution of receivers, and batteries not readily available, too expensive or of poor quality. One consideration for overcoming these impediments is the installation of

coaxial cable to bring the signal into the home (Stephens, 1989). Another consideration is the use of a Dynamo radio which contains a nickel-cadmium battery (replaceable) that can be charged in a wall outlet or by cranking a built-in generator (Mackie, 1989). Retail cost of the Dynamo radio in the U.S. is $44.95. Also available on the market is a tape/talk cassette player. It has no battery but, like the radio, is powered by a built-in generator operated by turning a crank. Cost in the U.S. is $27.

Television. Although television has been used for educational purposes for the past 35 years, high production costs coupled with the need for a wide variety of special skills and expensive equipment have made it difficult for developing countries to venture into this area of mass communications (World Bank, 1981). In addition to the high cost involved, in many countries, few people have receivers and most of those are found in the cities. The main drawback to owning a receiver is that the TV receiver costs probably 20 times more than a radio.

Television affords many excellent features which deserve mention. For example, people who cannot read can benefit from television. Furthermore, a television demonstration can be as clear as a face-to-face presentation, except that the viewer cannot ask questions.

In the rural areas of developing countries, community viewing is the only possibility. Even then, there has to be a dependable power supply which is difficult to find in most developing countries. Broadcasting via satellite offers one of the most significant advances in video technology, but here again, the problem of a dependable power source at the receiving end still remains. The rising popularity of video cassette recorders (VCR) offers a viable alternative for taking television to any audience in the country (World Bank, 1981).

Production considerations mitigate against educational television (ETV) as compared to broadcast television (Hosie, 1987). A special problem in ETV has been the emphasis on hardware rather than on software, or the program itself, which is the real impact of ETV. Many of the problems of the Indian SITE experiment, for example, were attributable to the fact that only nine percent of the funds were spent on producing television programs. In fact, SITE hardware was assembled five years before the project started but TV programs began to be produced only a year before the satellite was operational. Considering the expense of ETV - $6,000 for a one-hour production - an interesting approach adopted by Canadian ETV is adapting commercially produced film to educational needs (Hosie, 1987). With regard to impact of ETV, it is important to ensure that programs are patterned on the nature of the topic and the needs and expectations of the target audience (Hosie, 1987) and to take care that programs are designed <u>for</u> and <u>in</u> developing countries thus avoiding even a subconscious hint of transposing a foreign culture (Awotua-Efebo, 1987).

In this same vein of tailoring programs to local needs, an innovative approach to programming is being adopted in Tanzania (McClellan, 1987). Top-down, centralized television broadcasting as presently used in Africa primarily entertains passive audiences. In contrast, decentralized or local television, referred to as "narrowcasting" because of its horizontal structure, brings television much closer to people allowing a sideward flow of communication - people talking to each other. In the Tanzanian experiment, farmer interviews were recorded on videotape and played back to government officials to reduce the communication gap. This experiment encouraged ordinary people to use narrowcast television to talk frankly about their problems, a step towards finding solutions. For instance, a peasant farmer speaking about his progress to a neighbor on video is much

more persuasive than a broadcast personality telling peasants what to do. McClellan points out that this kind of participatory approach requiring two-way communication is not always acceptable to local development planners, since people can criticize and become active, actions that may cause problems. He concludes that although decentralized television makes a lot of sense in African countries all but a few have made major financial commitments to building and operating highly centralized broadcasting systems. At the moment, therefore, expansion to narrowcasting may be unrealistic.

A study by Talabi (1989) indicates that there is a relatively high percentage of television sets in homes in Nigeria. Of 600 household heads contacted in Kwara State, Nigeria, 53.5 percent indicated that they had one television set. More than half the respondents without television sets said that they occasionally went to a friend, relative, neighbor or public recreation center to watch television. The researcher concluded that most homes in Nigeria had acquired one of the most potent items of modern technology - television. In view of the fact that television is available to a majority of families in Kwara, Talabi suggests that development specialists might use this medium to promote the diffusion of innovations.

China is a third world nation that has a strong television manufacturing capacity. China Central Television (CCTV) reaches half the households in China, perhaps 600 million viewers with more than 100 million sets (Hollstein, 1989). Television, however, remains a tool of the government and party and provides limited educational programming.

Peru's video based training had a successful experience with video tapes in training campesinos in the nationwide agrarian reform program. Tapes of 18 minutes duration

accompanied by simple print material were handed out. By 1981 more than 600 taped video lessons were prepared and 102,000 campesinos were reached. Production costs were $12/campesino. The Peruvian project has spun off projects in Mexico, Honduras, Paraguay and Brazil (Clearinghouse for Development Communication, 1987).

The Clearinghouse on Development Communication (1983) reports an unsuccessful experience with ETV in Sudan. Television sets and generators were set up in village clubs which also served as gathering places for organizing cultural, sports, and political activities. Forty six viewing clubs were set up with trained monitors to take care of equipment and lead discussions which might bring about adoption of ideas introduced to local conditions. Reasons cited for failure of the project were (a) ETV was not complemented by a field organization such as an extension service (b) two-way older men, and women were reluctant to enter the discussion, and (d) all producers of the programs were trained in London.

As mentioned earlier the number of VCRs is growing by leaps and bounds. A report in Intermedia, July/September, 1983 summarizes the availability of VCRs in developing countries at that time. Obviously, the number has grown since then.

VCRs are not available in the Chinese market at this time, although some VCRs have been brought in by individuals from Japan (Bo, 1983). None of these, however, is available to peasants who are just beginning to buy radio/cassette recorders. With a more enlightened agricultural policy on VCRS, Bo (1983) felt that peasants would be able to buy them as they came on the market.

At present 60% of Colombia's households have TV sets. However, only about 200,000 VCRs are in use because of very high cost (Cadavid, 1983).

At most, only about 30,000 VCRs have entered Egypt in the past few years. There are only five million television homes in Egypt. Egyptians usually view TV in groups of 5 to 10 (Aboubakr, 1983).

In the least developed country in the world, Ethiopia, only one percent of the population owns TV sets and those are the rich and the expatriates living in the capital city. Only 300 VCRs can be counted in the entire country (Coleman, 1983).

Home video is growing by leaps and bounds in Guyana with 15,000 VCRs in homes in the mid 1980s. The sets are owned by urban, rural and hinterland dwellers of every income bracket (Forsythe, 1983).

Although India has one car and one telephone for every 100 in America, it has one VCR for every 15 in America. There were 300,000 VCRs in India in 1983 and this figure is growing by 10% per month. The video invasion has extended into the towns and villages and has created a vast decline in attendance at the cinema (Partha Sarathy, 1983).

It is estimated that somewhere between 6,000 to 10,000 VCRs were in Jamaica in 1983 with accompanying color monitors. With an increasing number of video cameras and organized viewing clubs an expensive communications system once affordable only to the elite can now reach the masses who need education and information (Thomas, 1983).

In Pakistan, in every major city and town, and in every high income and upper middle class neighborhood, every other home has a VCR. However, with only 1.5 million of the 10 million homes having TV sets, access to VCRs is limited to a minority of the population. Between 250,000 to 350,000 VCRs exist in the country (Jabbar, 1983).

It is obvious that the extent of ownership of VCRs in developing countries ranges from none or almost none to a relatively high number. At present, most VCRs appear to be used for entertainment. However, the presence of this technology affords another opportunity for development communication.

Implications for Development Communication

In the next decade and into the 21st century, the nations of the Third World will be faced with the problem of feeding, clothing and providing a reasonable quality life for a rapidly expanding population. At the same time as attention is given to agricultural development for increasing the food supply, technological development and industrial growth will be needed to produce consumer goods and services. Preservation of the environment and natural resources in the face of development will also be of significant concern. A prerequisite for sustained development of the kind envisioned will be education and equality of opportunity for the population. An appropriate development communication strategy, well-articulated and implemented, will be imperative to ensure these outcomes.

Our review has shown that over the last several decades the Extension Education system has been highly effective in improving agricultural production by providing an educational and service link to encourage the use of research-based knowledge and technology. While much progress has been made in this regard in the developed world, a considerable task lies ahead for developing countries in terms of technology transfer and education of the farmer and the farm family.

Agricultural development must include a system which will allow technology to flow from a research system, through an extension system, to the ultimate users (namely

farmers, farm families, and agri-business personnel), and also ensure that there is feedback of farming problems to researchers for solution.

National research and extension systems in developing countries have traditionally been segregated with limited linkage and limited or non-existent feedback from their clientele. Private sector extension through for-profit companies has been criticized for bias in recommending products and procedures which they market. As a result, new extension models have emerged. One of these models, Training and Visit Extension, has been widely used in Asia and Africa with financial support from the World Bank.

Extension approaches based on individual and/or group contact with farmers and farm families, such as the Training and Visit System, are too expensive for the overburdened economies of developing nations. It would appear that a cost-effective alternative worth pursuing is the mass communications media.

Historically, national extension systems around the world, particularly the developing countries, have relied on individual and group methods of contact to organize face-to-face educational programs for farmers, farm families and rural communities. The mass media, which can bridge distances and overcome geographical barriers, have not been used to anywhere near their potential for several reasons. For one, development of the communications infrastructure is expensive and is generally a function of a resource-poor public domain. Second, extension systems do not have competence and experience in communications technology and media programming.

Despite these limitations, we have seen how radio, the most widespread and economical broadcast medium, has been used in a variety of educational settings and formats. Major obstacles to radio as a means of mass communication in developing countries are uneven distribution of receivers and limited availability of an inexpensive

supply of good quality batteries. Nevertheless, radio offers tremendous possibilities for expansion and innovative programming, such as local and regional level tailored programs, consideration of local needs and problems, involvement of farmers and farm families in broadcast ideas and programs, and horizontal messages, i.e., farmers talking to neighbors rather than vertical messages, i.e., farmers listening to a remote broadcast personality.

Television, by contrast, is much more expensive and complex to install, maintain, and program for than radio, and has seen more limited use. However, as we look to the future of this medium, it is likely to be an equally powerful educational tool in specific program settings. The rapid increase in VCRs around the world will further enhance the utility and flexibility of television broadcasting.

In trying to supplement the existing extension systems of developing countries with a strengthened mass communications capability, several critical issues must be addressed. The top-down development model of one-way communication flow has not worked. Upward flow of communication through local participation in programming and other means should be ensured. Another issue concerns the lack of trained agricultural media personnel. Generally, universities provide little, if any, agricultural extension or agricultural communications courses. Other issues include language in multi-lingual societies, cultural and ethnic differences within countries, and inadequate administrative and managerial leadership.

In general, communications technology in developing countries is weak in terms of hardware and software. Trained communications personnel are also lacking. To be able to deliver agricultural extension programs to the masses of the population, a cadre of competent agricultural media personnel will have to be built.

By contrast, the United States has a tremendous mass communications capacity in the public and private communications industry, and in the nationwide Cooperative Extension System (CES). CES educational programs make extensive use of broadcast and print media. CES staffs of the land grant colleges have competent communications professionals to produce needed educational materials for mass consumption. This wealth of available communications technology and human expertise can be harnessed to support development communication efforts.

Using telecommunications to organize a variety of formal and non-formal distance education programs has great potential in developing countries. The phenomenal development of satellite communication technology in the last two decades has opened up the world to all kinds of international/national communication possibilities and arrangements. The major drawback within a country is the expense of installing and maintaining expensive telecommunications systems catering to both general national needs and the educational needs of extension systems. As it is, communications systems and broadcast networks in developing countries are heavily state-controlled. This situation can be mitigated to some extent by the involvement of the private sector in both infrastructure development and programming.

The use of main frame and micro-computer technology, and sophisticated information management systems for developmental purposes is another area in which developing countries can become more involved. Extension professionals can benefit through electronic networking, accessing data bases, and professional improvement opportunities utilizing these technologies.

The farm family has to be the focal point of development work. Just including male heads of households as beneficiaries of extension programs will continue to ignore

the important role of women and youth in agricultural and rural development. In the developing world, women perform a majority of tasks on the farmstead. Likewise, rural and farm youth have to be involved to a greater extent in developmental activities to keep them in farming and agricultural-related industries. Any program of agricultural extension work, including mass communication programs, must include women and youth.

Efforts to strengthen development communication in developing countries should build upon the existing communications/agricultural extension infrastructure. Established national extension systems may feature one or more of a variety of extension approaches. The literature reveals that there are at least five such approaches - broad-based agricultural and rural development, farm family involvement through participation in program decisions, specialized targeted projects, commodity-oriented extension, and the Training and Visit approach. It is important that strengthened mass media programs become an integral part of these approaches.

Recommendations

Based on our review of the development communication situation and the implications derived, the following recommendations are being made for consideration by A.I.D.

1. That a Collaborative Communications Support Program (CCSP) in Food, Agriculture and the Environment be established between State Land Grant Colleges (LGCs) and developing countries.

2. That the primary purpose of the CCSP would be to harness the agricultural extension communication capability of LGCs to assist developing countries improve their capability to utilize communications media in disseminating food, agricultural and environmental information to farm families.

3. That the primary functions of the CCSP would be to (a) improve the communications capabilities of developing country staff through training, (b) conduct collaborative applied and/or adaptive research in communications, and (c) engage in consultative activities for sharing of new knowledge, technology and individual expertise.

4. That a network of the most talented LGC communications professionals be recruited to devote part of their ongoing responsibilities in their areas of expertise from across the media spectrum, i.e., radio, television, print, photography, and audio visual aids to perform three functions: (a) train selected developing country personnel in communications technology and methods, (b) collaborate with selected developing country personnel in program planning, execution and evaluation, and (c) undertake collaborative applied/adaptive communications research in developing country settings.

5. That developing country institutions be recruited through USAID missions to participate in the program by (a) designating the most talented communications professionals to serve as collaborators, and (b) providing resources and facilities for in-country activities.

6. That one LGC be selected to serve as the management entity to coordinate the program. This institution would work out agreements with other LGCs and developing country institutions.

7. That, besides training and research, the central features of the CCSP would include (a) collaborative programming by the participating LGC and developing country communications professionals to apply communications technology in the dissemination of food, agricultural, and environmental information, (b) regular and frequent interchange between the staff of the partnering institutions through personal contact and the use of

communications technology, (c) long- and short-term training for developing country staff, (d) opportunities for graduate internships in developing country institutions.

8. That the CCSP establish appropriate linkages with the Collaborative Research Support Program (CRSP) to strengthen the research-extension-farmer link.

9. That participating developing countries work out a practical system of institutional relationships among public and private sector agencies and universities involved in various facets of the communications infrastructure so as to maximize the impact of the program.

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