TECHNOLOGY: CRISIS FOR RURAL AMERICA

by

Kenneth P. Wilkinson

Changes in economic and political structures and innovations in technology are altering the social organization of communities in rural areas for better or for worse. In many small towns and open country areas, where past trends have produced severe problems of social well-being, the prospects for the future are clouded at best. Hopeful signs, such as development of communications technologies to address problems associated with distance and scarcity of settlement, are appealing, but as yet few of the potential benefits have been realized. In fact, it now appears that without intervention new developments could bring a further reduction in rural well-being rather than an improvement.

Intervention is possible, however, and with appropriate actions, rural development could build on the potentials presented by these trends to address old as well as newly recognized rural problems. Analysis of the forces shaping the future for rural communities and of the promise and perils attending the new technologies is needed to encourage and direct the needed interventions.

TELEMATICS

At the heart of the rural crisis, and a key factor in determining the outcome of the crisis, is a cluster of technologies referred to in recent discussions as telematics:

> Telematics is the joining together of telecommunications, broadcast media, and computer technologies into a single infrastructure for developing, sending, receiving, sorting, and utilizing information (Dillman, 1991: 292).

These two essential components of telematics - telecommunications and computerization - are changing the way we think about the meaning of rural space, and the convergence of these revolutions has far-reaching consequences for rural well-being (Dillman, 1991). A recent report of the Office of Technology Assessment (OTA) entitled: "Rural America at the Crossroads: Networking for the Future" makes this point, but then cautions that unless the new technologies are deployed with care, rural communities are as likely to be hurt as they are to be helped (Congress of the United States, 1991). It is clear that the future well-being of rural America will be affected in crucial ways by the course of the current technological revolution in communications.

The technical core of this revolution is in the field of microelectronics, which has developed through a sequence of discoveries and inventions leading to the transistor in the late 1940s, the integrated circuit in the 1950s, the microprocessor in 1971, the microcomputer in 1975, and so on. The roots of this sequence go back several centuries to the dawning of the age of science and reason, but the pace of change has accelerated dramatically over the past two decades, as have the social consequences of these changes.

The major technological elements of this revolution and their potential for speeding the flow and increasing the volume of information exchanges are well-know. Fiber-optic cables, which carry up to two billion bits of information a second, dwarf the conventional copper telephone cables in capacity by a factor of up to 30,000 times; albeit at an installation cost per household of up to four times the cost of conventional lines (Ramirez, 1991). In combination with digital switches, which make possible advanced telephone services and computer-to computer applications, fiber-optic cables are channels of access to information and vehicles for participation in what has become a global network of exchange of goods, services, and ideas. Essential to full participation in this network are a number of specific services that currently are far from universally available, especially in rural areas, in addition to fiber-optic cables and digital switching. These include (see Parker et al., 1989) voice telephone service itself, which is still limited and often very expensive to provide and maintain in rural areas, single-party telephone access, reliable transmission of facsimile documents, access to competitive long distance carriers, local access to value-added

data networks, 911 emergency service with automatic number identification, cellular telephone service, touchtone and custom calling services such as call forwarding, call waiting and three-way calling. Communications infrastructure also includes cable television, which along with telephone services, can be the basis of interactive transmission.

The range of applications is endless and these applications not only could affect, but are now affecting businesses as diverse as farms, pharmacies, travel agencies, and investment firms, along with voluntary organizations, governments, schools, and, of course, libraries. Telematics is essential for economic development and is a key element in the matrix of forces that determine and constrain social well-being.

RURAL AMERICA

Rather than dwell on the wonders of telematics and what it can do - matters well covered elsewhere (e.g. Parker et al., 1989) - I want to comment on the social context within which it is being developed and on the challenge it poses for rural community well-being. In a nutshell, I want to argue that telematics, as part of a fundamental restructuring of society, despite its benevolent aura (the aura of progress and instant access), poses a profound threat to rural communities; and I want to argue that only firm and concerted action by advocates for rural well-being (including those who provide rural library services, about whom I will have some special comments) can counter this threat; that on their own, rural communities haven't a prayer in the telematics society of the future.

As a first step, however, one must ask, what is rural America and how is it that telematics could affect it so severely? What is *rural* about America? Conventional definitions of "rural" emphasize agriculture or other primary industries; but by this criterion there is not much left of what used to be rural America. The farm population is only five million in a nation of a quarter of a billion persons and is less than eight percent of the rural population. A broader concept than farming is needed to describe the economic and residential diversity of settlements outside American cities. Two dichotomies, rural-urban and metropolitan-nonmetropolitan, denote differences in local population

size and concentration. About 65 million people are rural and about 54 million live in nonmetropolitan counties. Strikingly, nearly half (45.9%) of the rural population is in metropolitan counties; and in fact more than a fourth of the farm population is metropolitan. Obviously, while a case might be made for talking about either the rural population or the nonmetro population as "rural America," we need to keep in mind that they are not the same.

Either way, though, we are talking about a large number of people - 65 million rural and 54 million nonmetro residents - even though few of them live on farms and even though many more Americans than these are urban or metropolitan.

A number of interrelated changes have transformed rural and urban segments of American society. One change mentioned earlier has been a sharp reduction in dependence on agriculture. In the 1800s, of course, farming was the typical way of making a living in all of America. Agriculture employed 71% of workers in 1830. By 1930, at the dawning of the technological revolution in agriculture, the percentage in farming was down to 21.2%. In the 1980s, as shown by data from the Current Population Survey (Series P-60, No. 166), farm employment was less than three percent. Significantly, there has been little change in this percentage since 1980, notwithstanding the farm financial and drought crises of the mid-1980s. It appears that the percentage of the national work force in farming has bottomed out and leveled off at just over two and a half percent.

Another view of this change is given by the current distribution of rural workers among major industry groupings (as of March 1989). Services now employ the most rural workers, followed by manufacturing and retail trade. In contrast, the traditionally rural industries - agriculture, forestry, fisheries and mining - now employ only about nine percent of rural workers.

As is well known, a major part of this transition occurred during the industrial invasion of nonmetro areas during the 1950s and 1960s. During this era, many firms sought and found abundant and relatively undemanding labor in the countryside. Among other things, this brought increased rural dependency on national and multinational systems and increased rural vulnerability

to shocks in the larger economy. In fact, by the end of the 1970s, when a severe national recession put an end to the national manufacturing boom, rural labor markets, which by then were dominated by manufacturing, received much of the impact. Furthermore, rural areas were slow to benefit from the national recovery after the early 1980s, which was led by growth in service employment.

The nonmetro population turnaround of the 1970s and the return to the general pattern of previous decades is shown by plotting the percentage of nonmetropolitan counties with declining population through time. The sharp drop in the 1970s in this percentage represents the turnaround, and the rise through the mid-1980s shows the return to the old pattern.

Overall, the recent past has been a period of stagnation and upheaval if not one of outright decline for rural and nonmetropolitan America. Economic trends tell part of the story. Rural distress is the message clearly displayed in the graph of metro and nonmetro unemployment from the mid-1970s through the late 1980s. Prior to the late 1970s, unemployment was mainly an urban problem in the United States; rural labor markets experienced high levels of underemployment, but the unemployment rate was higher in large cities. The recession of the late 1970s-early 1980s changed all that. Nonmetro unemployment now exceeds metro unemployment and no relief is in sight.

With unemployment goes poverty and inequality, the quintessential human capital problems of rural America, although unemployment is not the only contributor to either of these. The geography of family poverty in 1988 (as reported in Current Population Reports, Series P-60, No. 166) identifies the two major poverty pockets in the U.S., namely central cities of metro areas where 15% of families are in poverty and nonmetropolitan areas with 12.9% in poverty. These are in contrast to metro areas outside central cities with 6.4% in poverty and the national total of 10.4% of families in poverty. National totals also show that there is little difference between the poverty rates for farm and nonfarm families but a large difference between metro and nonmetro families.

Poverty rates for families by race and Hispanic origin also vary by geographic location. Among major population groupings, the highest poverty rate is for African American families in nonmetropolitan areas (35.9%), and

the next highest is for those of Hispanic origin in nonmetropolitan areas (31.7%). Thus, the problem of racial and ethnic inequality in America, which often is addressed only as an urban problem, has its most extreme manifestation beyond the metropolis in small towns and rural areas.

These statistics give ample evidence of the "social cost of space." An appreciation of this cost can help to clarify the contemporary demographic and economic situation in rural America and to interpret responses to the restructuring that is occurring in the rural economy. The trends overall show a pattern of rural distress, and this pattern, more than anything else, justifies the search for an effective approach to rural development.

The social cost of space is a factor in rural well-being worldwide. Surveys in many nations show that severe rural problems, such as poverty and inadequate services, tend to persist despite considerable rural economic development. Patterns of rural stagnation and decline are found in more and less developed countries alike. Upwards of three-fourths of world poverty, as indicated by income and/or nutritional statistics, is rural poverty. These trends show a complex array of rural problems and leave little doubt that space has social costs.

In the modern world, the social cost of rural space has three principal sources. The *friction of distance* inflates rural costs of goods and services and depresses rural access to needed resources. The *political economy of space* makes rural communities vulnerable to exploitation in the system of world capitalism. The *isolation of space* impedes community mobilization for self help. The upshot is a pattern of rural distress with four obvious components, namely *lack of jobs and income* to meet basic needs, *inadequate services* in either public or private sectors, *inequality* among communities and among different groupings of population within communities, and *depressed community action capacity*, which can be identified as perhaps the most insidious and potentially restrictive of all the problems now facing rural America.

The consequences of the social cost of rural space are seen directly in indicators of aggregate well-being such as poverty rates, absence of essential services, income inequality, and the like; but these direct indicators of rural

suffering, important as they are, tell only part of the story. Society suffers also, not just its rural component. Societal consequences of rural problems can be seen directly in an analysis of indicators for the society as a whole which show instability and loss of opportunities for well-being and indirectly in an analysis of the direct effects of these problems on community interaction and viability.

The effects of rural conditions on indicators of well-being for entire societies are well documented, especially in studies of the United States. Demographic instability, reflecting changes in migration patterns, but also reflecting trends in fertility and mortality, is one such indicator. Rural and urban population totals have been rising and falling rapidly over recent decades in response to a number of changes. The changes have included boom and bust cycles in mining, forestry and fishing; the modernization of agriculture (i.e. mechanization of large-scale agriculture and the virtual collapse of small-scale agriculture); the changing geographic distribution of manufacturing industry; the shift to services as the growth sector of American economic life; and changing residential preferences of an increasingly mobile middle class. While a high level of demographic mobility might imply a high level of adaptivity in pursuit of changing opportunities, it also implies that society is unable to meet the needs of people in the places where their lives have been rooted in the past. Rural depopulation is of contemporary concern in areas such as the coastal fringe regions of Europe and the midwestern United States, and metropolitan concentration of population is a major threat to social stability in a number of nations. Similarly, population growth in excess of growth in access to resources and problems of infant and child mortality continue to threaten the stability of many societies and of depressed regions, such as the rural South, within societies. How do rural conditions figure in all this? The answer is quite clear: by and large, rural problems are the major causes of demographic instability in the world today.

Spatially-based hostilities between rural and urban sectors give another indication of the consequences of spatial inequality in access to resources. One school of thought sees the "spatial dialectic" as an essential feature of capitalist development and argues that capitalism creates a system of spatial animosity by using space as a tool in the struggle to exploit labor. Other writers reject the

notion that space competes with class as the unit of conflict but agree that capitalist development, as it defines and manipulates local labor markets, takes advantage of, and reinforces inequalities and antagonisms between spatial units such as town and country, city and suburb, developed and less developed regions, and so on. Conflicts also are noted from other perspectives between rural and urban interest groups in rapidly urbanizing rural areas, such as in the prime agricultural area of the eastern United States. Case studies in many settings around the world have documented political, economic, and social problems that tend to arise at the interface between rural and urban sectors of society (see Wilkinson, 1989).

Rural-urban differences in social well-being also are recognized as a cause of a deficit in what some have called the "human capital" requirements for societal development. Low levels of rural educational attainment, limited employment skills and experience of rural workers, high incidence of health and mental health disabilities in rural areas and related conditions limit the attractiveness of rural labor markets to outside investors, especially in less developed regions where investments might be most needed (Beaulieu, 1988). Persistence of underdevelopment in these regions, coupled with the cost of transfer payments to them, retards the development of the society as a whole.

Social and psychological distress in rural populations, long ignored in policy on the mistaken assumption that stress is mainly an urban phenomenon, now is being recognized as a major threat to societal stability. In the United States, for example, the National Institute of Mental Health has established a new program of research on mental disorders in rural populations to respond to the evidence of "increasing stress for Americans living in rural areas" (United States Public health Service, 1991: 2). This problem has two prongs. One is the declining quality of life in small communities and open country neighborhoods which greatly increases the risk of personal and social disruption, and the other is the difficulty rural communities have in providing services because of high rates of poverty and the large geographic areas over which services must be organized. The upshot is a crisis of major proportions in the countryside and a clear threat to the well-being of both rural and urban segments of the national population.

The community, which I argue is the proximate setting for social well-being and the keystone of societal stabilization, is where these social consequences of rural problems converge and have their most serious effects. Demographic instability disrupts community relationships and can interfere with local social interaction in many and obvious ways. The spatially-based animosities that grow out of rural-urban inequalities can provoke conflict and separation where cooperation and contact are needed to solve problems that cut across rural and urban community segments. Deficits in rural human capital can prevent development of jobs and income in entire local labor market areas and restrain community efforts to find a niche in changing regional and world economies. The disproportionate incidence of distress in rural areas and the limited rural ability to respond with appropriate remedial services is a community problem, not just a problem of the individuals and families in small and dispersed settlements. The community, in its rural and urban dimensions, is disrupted by these consequences of rural deficits; and it is the community, therefore, that must be the focus of efforts to address these problems.

THE TWILIGHT OF HIERARCHY?

Enter the global information society with its base in the telematics revolution and its promise of a new set of rules about access to the resources that support social well-being! An essay by Harlan Cleveland (1985) in the journal, Public Administration Review, argues that the sudden dominance of information as a resource is demolishing established assumptions about the hierarchies that structure modern societies. Information, he notes, has several qualities that differ sharply from characteristics of resources that have been the basis of social organization in the past. In particular, he says:

1. Information is expendable.
2. Information is not resource hungry.
3. Information is substitutable.
4. Information is transportable.
5. Information is diffusive.
6. Information is sharable.

These remarkable qualities mean that, unlike energy and other physical resources, information is not subject to the laws of thermodynamics. Its ultimate purpose or use is to organize things or people, arrange them in ways that make them different from the way they were before" (1985: 187), and its unique qualities as a resource mean that it organizes things and people in new and potentially liberating ways. Thus, he says (1985: 187) about the past:

> The inherent characteristics of physical resources ("natural" and man-made) made possible the development of hierarchies of power based on control (of new weapons, of energy sources, of trade routes, of markets, and especially of knowledge), hierarchies of influence based on secrecy, hierarchies of class based on ownership, hierarchies of privilege based on early access to valuable resources, and hierarchies of politics based on geography.

And, he continues, in light of the ascendance of information as the basic resource of the future (1985: 187):

> Each of these five bases for discrimination and unfairness is crumbling today - because the old means of control are of dwindling efficacy, secrets are harder and harder to keep, and ownership, early arrival, and geography are of dwindling significance in getting access to the knowledge and wisdom which are the really valuable legal tender of our time.

The "passing of remoteness" as a basis of inequality, Cleveland maintains, is the culmination of these crumbling out-moded hierarchies (1985: 195):

> Once you can plug in through television to UN votes or a bombing in Beirut or a Wimbleton final; once you can sit in Auckland, or Singapore, or Bahrain and play the New York stock markets in real time; once you can participate in rule, power and authority according to the relevance of your opinion rather than the mileage to the decision-making venue - then the power centers are wherever the brightest people are using the latest information in the most creative ways.

This change in the fundamental rules of access, he argues, raises the prospect for people rather than places to be the basis of community. In a phrase with direct implications for the theme of this conference, he says (1985: 195):

> those institutions which exploit the electronic answers to remoteness may be "catching a wave" in the twilight of hierarchy.

THE INFORMATIONAL MODE OF DEVELOPMENT AND THE RESTRUCTURING OF CAPITALISM

A recent book by sociologist Manuel Castells, entitled *The Informational City* (1989), provides critical counterpoint to Cleveland's optimism. Technology, he reminds us, does not develop in a vacuum, but in the context of the structure of class and power relationships that define the capitalist mode of production. In agreement with Cleveland's analysis, Castells observes that the ascendance of information as a basic resource is associated with a fundamental restructuring of society. Castells' critical analysis, however, disagrees with the assessment that hierarchies are crumbling in the face of the liberating qualities of information and information technology. Quite to the contrary, he maintains, the accelerated development of information technologies is part of the quest for a new model of socio-economic organization that had to be established to achieve the basic aims of the capitalist system in the wake of the global political and economic crisis of the 1970s, those aims being, now as always (1989: 23):

> to enhance the rate of profit for private capital, the engine of investment, and thus of growth; to find new markets, both through deepening the existing ones and by incorporating new regions of the world into an integrated capitalist economy; to control the circulation process; and to assure the social reproduction and the economic regulation of the system through mechanisms that would not contradict those established to achieve the preceding goals of higher profit rates, expanding demand, and inflation control.

The new model of capitalism that began to emerge in response to the crisis of the 1970s, he says, has three major features, namely: (1) The appropriation of higher profits through higher productivity, lower wages, reduced social benefits, less protective working conditions, decentralization of production to regions characterized by lower wages and more relaxed regulation of business activities and dramatic expansion of the informal economy; (2) increased state activism in support of capitalist development; and (3) accelerated internation-

alization of all economic processes, to increase profitability and to open up markets through the expansion of the system.

In brief, Castells argues that the "informational mode of development" represents and contributes to the overpowering of labor by capital. Organizationally, he says, this leads to concentration, not to decentralization of knowledge-generation and decision-making processes in high-level organizations. It also leads to down-grading of the power of such groups as organized labor, that have agendas other than profit making, and to the transforming localities from communities into mere localities where labor and other resources can be sought and used to produce profits. Thus, from Castells' viewpoint, the information society is producing, not an end to hierarchies, but an increase in inequality, especially in rural-urban inequality.

TELECOMMUNICATIONS AND RURAL DEVELOPMENT

Somewhere between the perspectives set forth respectively by Cleveland and Castells has emerged a body of literature by rural sociologists outlining specific impediments to realization of the potential benefits of modern communications technologies in rural areas (see Dillman, 1991; Wilkinson, 1989). A most comprehensive analysis of the "Non-technical Barriers to the Use of Telecommunications Technologies for Rural Development" is a report by Louis E. Swanson of the University of Kentucky prepared for the Office of Technology Assessment of the United States Congress (Swanson, 1990). In the report, Swanson observes that the factors that have constrained rural economic and community development in the past will continue to pose formidable barriers to utilization of telecommunications technologies to increase rural well-being in the future. These constraining factors include low educational levels, limited capital resources, cultural biases in favor of traditional economic activities, inadequate economic and social infrastructure, and other problems associated with the friction of space. These might be reduced but cannot be eliminated by the new technologies. In concluding his analysis, he cites four dilemmas that dampen the optimism that the new space-shrinking technologies will close the gap between urban and rural settlements in modern societies:

(1) Most rural areas are already far behind in gaining access to the new information technologies;

(2) Rural communities typically lack the specialized leadership and organizations that would be needed to take full advantage of new and highly specialized technologies.

(3) Rural acceptance of the new social patterns associated with new information technologies is likely to lag behind their acceptance in more urbanized settings.

(4) Nothing inherent to the new technologies assures increased social and economic equality; indeed, it is just as likely the new technologies will reinforce old patterns of metropolitan exploitation of rural resources.

TOWARD RURAL COMMUNITY DEVELOPMENT IN TELEMATICS SOCIETY

Notwithstanding Harland Cleveland's optimism about the emergence of the community as people instead of the community as place in the information society, observers from many perspectives would agree that a major challenge is to retain and revitalize the local community. Castells, for example, who sees the suppression of places by a network of profit-seeking information flows as a grave threat to social well-being, argues that the trends can be reversed if localities can be helped in their quest to retain community identity and assert community interests as they move to take advantage of opportunities in the global networks. In particular, he calls for the mobilization of local governments, agencies and groups to seize control, as it were, of these opportunities. He writes (1989: 353):

> Citizens' data banks, interactive communications systems, community-based multimedia centers, are powerful tools to enhance citizen participation on the basis of grassroots organization and local governments' political will. On line information systems linking local governments across the world could provide a fundamental tool in countering the strategies of flows-based organizations, which would then lose the advantage, deriving from their control of asymmetrical information flows.

In other words, Castells sees a crucial role for what many at this conference would call library functions - certainly among the key library functions of

the future - in empowering and facilitating community development and assertiveness in the face of powerful global forces that threaten to wipe out the local community as a force in the well-being of people. Swanson (1990), building upon this same theme, comments on the enormous but largely undeveloped advantage for development possessed by communities that have public libraries and institutions of higher learning. The community library can become a gateway to telematic society; and, of crucial importance, it can become an agency of community empowerment and development in an age and setting wherein community empowerment and development seem to be the last hope for rural well-being.

The heart of the rural problem in modern society is that community development requires things the current rural trends do not ensure. One is that people must be able to meet their daily needs together in a local territory. Their localities must be local societies. Large rural-urban fields and space-free networks, which appear prominently on the horizon, simply cannot fill the bill on this requirement. Many needs can be met and close relationships can be maintained in these fields and networks, but only face-to-face interaction on a regular basis is conducive to community formation. Community arises only in local social interaction, and the crystal ball shows decreasing opportunities for local social interaction in the future of rural areas.

Another thing required for community is community action. This in turn requires opportunity and capability, the opportunity for people to participate in and lead collective efforts to solve local problems and the capability to do so effectively. The trends suggest that neither of these will be in abundance in the future of rural areas. Most of the decisions on big issues in the future of the rural settlements - issues concerning employment, the provision of services, and government regulation - will be made elsewhere leaving the opportunity for local actors to work together only on smaller issues. Capability means both the ability to mobilize and organize for action and the capacity to actually make a difference on the issues engaged by the action. Libraries can help build local action capacity.

Essential steps in the process of building this capacity are suggested in the extensive literature on community action and self-help (Wilkinson, 1991).

The first is to create the opportunity for people to participate, not simply as recipients or clients of the actions of others, but as the main players in the process of identifying and tackling community problems. Second, even with opportunities provided, rural community development faces the formidable task of overcoming the legacy of hegemony in rural-urban power relations and the pervasive quiescence of disadvantaged rural groupings (such as farm workers, small farmers, minorities, women, the poor, the elderly, and others) to the wishes and even the perspectives of more powerful groups. Overcoming rural quiescence requires education as well as opportunity. Third, there is the problem of rural organization. Traditionally, rural life is not highly organized, at least not formally; new modes of organization are required to break out of entrenched patterns of patronage and exclusion and to focus collective efforts on problems common to all local groupings. Mobilization of resources - local ones, such as people, ideas, materials, and money, but also resources outside the locality - is a fourth essential step. Informed decision-making is the fifth step (and here is where libraries can help best); rural participants in community decision-making need assistance in gaining access to the information and to the analytical paradigms necessary for making sound decisions about community goals and action strategies. Finally, the most important step is action itself: community action builds the capacity for subsequent community actions as it creates networks, roles and a pool of shared experience. The process of community development, conceived of as a process of capacity building, can be self-sustaining if all of these steps are possible. It is obvious to me as a general principle of rural community development - and others at this conference can spell out specific mechanisms for implementing this principle - that rural and small libraries must play a leading role in making sure these steps can be taken by community actors in rural areas. Libraries as community information agencies can contribute directly and substantially to revitalizing the community in rural America.

The information society, with its technological base in telematics and its global political economy, can be the twilight of inequality for rural America, or it can be the twilight for community in rural America. What will make the difference at this crucial juncture? One thing is the library. The community

library can be a key player in deciding the outcome of the current crisis of community in rural America.

Kenneth P. Wilkinson was Professor of Rural Sociology at The Pennsylvania State University in State College, Pennsylvania. He died unexpectedly in 1993.

Bibliography

Beaulieu, Lionel J. (ed.), (1988). *The Rural South in Crisis.* Boulder, CO: Westview Press.

Castells, Manuel, (1989). *The Informational City.* Oxford, England: Basil Blackwell.

Cleveland, Harlan. (1985). The Twilight of hierarchy: Speculations on the global information society. *Public Administration Review. 45.* pp. 185-195.

Congress of the United States. (1991). Rural America at the crossroads: Networking for the future. Washington, D.C.: Office of Technology Assessment.

Dillman, Don A. (1991). Telematics and rural development. In *Rural Policies for the 1990s.* (Cornelia B. Flora and James A. Christenson, eds.) Boulder, CO: Westview Press. pp. 292-306

Parker, Edwin B., Heather E. Hudson, Don A. Dillman, and Andrew D. Roscoe. (1989). Rural america in the information age. Lanhorn, MD: University Press of America.

Ramirez, Anthony. (1991). Some doubts on rewiring of Japan. *New York Times,* November 9.

Swanson, Louis E. (1990). Non-technical barriers to the use of telecommunications technologies for rural revelopment. (Draft) Report to the Office of Technology Assessment, United States Congress.

United States Public Health Service. (1991). Program Announcement: Research on mental disorders in rural populations. Washington D.C.: National Institute of Mental Health.

Wilkinson, Kenneth P. (1989). Information access in rural areas. In *Agricoltura e Politiche di Sviluppo.* (Girolamo Sineri, ed.). Milano: Franco Angeli. pp. 231-43.

Wilkinson, Kenneth P. (1991). *The Community in Rural America*. Westport, CT: Greenwood Press.