Appendix
Field Journal

Background

One cannot undertake a study of rural development without attempting to understand the people, their cultures, their environments, their problems, and their hopes and aspirations. Americans pride themselves on their individuality, and the differences among the people of a State or a region are often as great as between the States themselves. There are common values shared by many, but the ways that these values enter social and political discourse are often very different among communities. An outsider can only hope to sample this diversity; to understand it, one must live it.

The project staff chose four States to visit in the course of the study: Kentucky, New Mexico, Washington, and Maine. These States were selected for geographic balance, ethnic and economic diversity, and contrasting approaches to the development of the telecommunications infrastructure.

Kentucky is a Midsouth State that relies heavily on the infusion of foreign investment for economic development. Its educational system is undergoing substantial changes, and State leadership is placing major emphasis on telecommunications to bolster education. Parts of the State face an economic and social crisis; other areas prosper with the assistance of Japanese automobile and electronic manufacturing.

New Mexico is a Southwestern State with a significant Hispanic and Native American population. Its economy is based largely on natural resources, and the Federal Government plays a major role in the economy through the operation of military and Federal research laboratories. Much of the undeveloped land is owned by the Federal Government. The populace largely lives apart from one another in enclaves of their own, with only nominal contact among the various cultural groups.

Washington is a Northwestern State that shares a common border with Canada-America's largest trading partner-and is a gateway for exports to the Pacific Rim. High-technology aerospace, nuclear, and computer-related firms contribute significantly to the economy of western sections of the State. Agriculture, forestry, and grazing are staple economies for the eastern section. Urban areas of Washington are developing so rapidly that decentralization of business to rural areas has become a development strategy.

Maine also borders on Canada, but has only one narrow common border with another State (New Hampshire). It is the most sparsely populated New England State. Natural resources, particularly timber and fisheries, play an important part in Maine's economy. The Federal Government also contributes through military bases and defense industries. Maine is placing great reliance on telecommunications to deliver educational services to small communities and scattered institutions. Perhaps more than any other State, Maine is depending on telecommunications for its social and economic future.

During the course of the visits to these States, OTA staff met with economic development professionals, telephone company representatives, politicians and activists, educators and academics, business people, and "ordinary" citizens in a number of communities.

The sections that follow are narrative impressions of what OTA staff experienced in their visits to the four States, and are not analytical. Each successive section, Kentucky through Maine, builds on the impressions and understanding gained in the previous States. Thus, this journal is the sequential log of the experience gained by OTA staff as they encountered the views of those with the most at stake in revitalizing rural America.

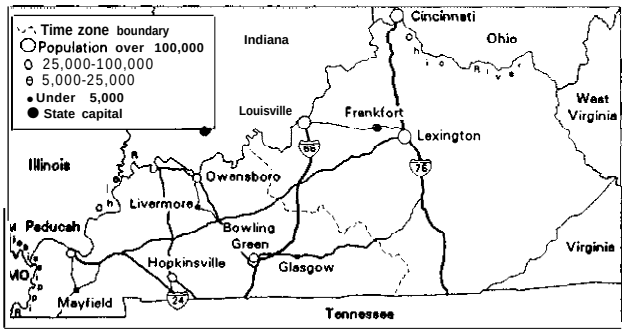
Kentucky

The Commonwealth of Kentucky's economic base, like many other rural States and communities, is in transition as agriculture production is consolidated and the coal mining and tobacco industries are crippled by mounting national health and environmental concerns. In addition to representing the rural Midsouth, Kentucky reflects aspects of Appalachia, the Ohio Valley, and the Midwest. Furthermore, Kentucky is an example of a State with a history of unionization and with an economic base that does not require high education levels.

We contacted a broad base of people to get a cross section of opinions and perspectives-educators, elected and appointed officials, businesspeople, telephone executives, regulators—across the State. Covering approximately 600 miles in 6 days, we spoke with more than 60 people in Paducah, Mayfield, Hopkinsville, Owensboro, Livermore, Bowling Green, Glasgow, Lexington, Frankfort, and Louisville. However, we were unable to visit some of the most depressed and isolated areas of Appalachia in eastern Kentucky (see figure 1).

A State of Crisis—From our discussion with a gathering at the Purchase Area Development District, rural America-not just western Kentucky-was characterized as being desperate and in a state of crisis. ''Do we want rural America?" Charles Terrett, the Superintendent of the Fulton County School District, asked, 'or do we want urban America with a wasteland in between? Fulton County Judge James Everett called measures to salvage

Figure I—Map of OTA's Field Study in Kentucky



SOURCE: Office of Technology Assessment, 1991.

rural America "a matter of survival. " Rudy Weissinger provocatively declared that rural America no longer exists at all.

Not everyone was as alarmist. The neighboring area development district boasted of 3½- to 4-percent unemployment; others were encouraged by the prospects of new industries locating in the State, assisted by the State and programs such as Certified Cities. A growing mutual interest between Kentucky and Japan-such as the State floating bonds on the Japanese market and the attraction of Japanese electronic and automotive firms-bodes well for future development. And a humbly encouraging milestone for Ohio County-a McDonald's franchise recently opened in Beaver Dam.

The Importance of Education for the State's Development—The dominant theme throughout the Commonwealth was the importance of education (socially and economically) for the State's future. The State's Supreme Court recently declared the public secondary school system unconstitutional, and most of those we talked with regard this decision as positive, if embarrassing, and a step in the right direction.[1] The decision seems to punctuate a groundswell among the Commonwealth's citizenry that an aggressive and innovative strategy for improving the State's education is critical to Kentucky's future. This commitment to education is evident throughout. Examples of this include Kentucky Education Television's facility to deliver science and foreign language programs via satellite to secondary schools, and tele-education programs for community colleges fed from university courses.

The focus on education is based on the assumption that by providing better education, Kentucky can draw well-paying skilled jobs and foster social and cultural amenities, such as fine arts and health services, that will help attract new companies.

Others are more cautious. We were told that the Supreme Court ruling presents a potential problem for higher education, because funds that must be directed to redress the public school crisis will siphon funds from colleges and universities. The community colleges in particular stand in peril. Despite soaring enrollment, community colleges receive only 64 percent of the funds they need to operate optimally, according to a formula established by the Council on Higher Education. This limitation strains faculty and staff.[2] Kentucky ranks among the bottom third States in Federal monies for higher education, a circumstance possibly related to the fact that it is one of the few States that does not have a Federal research center.

It was said by some that the clamor for education is a smokescreen, that the improvement of general education endangers one of Kentucky's major assets, a benign and pliable workforce. One of Kentucky's salient attractions for companies like Toyota is its proximity to Detroit, and its eager nonunion workers outside the coal regions.

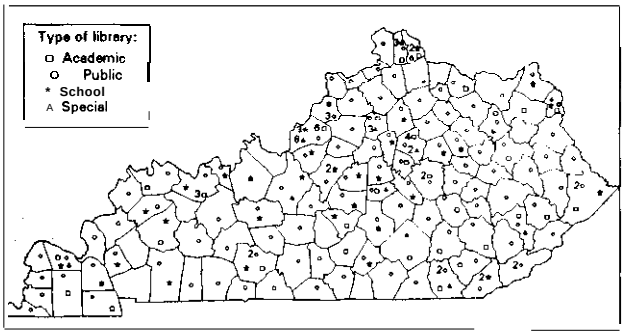
The Marriage of Communications Technology With **Education-Educators in particular see** telecommunications as an important tool to broadening and strengthening curricula. Almost to a person, education is seen as a key factor in any strategy for developing the State's economic position. Telecommunications is an integral part of these plans, insofar as satellites, fiber optics, and microwave facilities can deliver distance-learning programs to schools that lack the resources to draw able teachers and offer diverse, well-grounded curricula.

The best example of distance-learning in the State is Kentucky Educationa1 Television's (KET) notable, highly visible, and well-funded operation that broadcasts courses inside and outside the State. If KET's service does not suit a community's needs, the land-grant colleges and the regional universities offer similar tele-education programs through one-way video and two-way telephone lines. For example, Murray State delivers third- and fourth-year courses over two-way interactive video to students at Paducah Community College.

[1]Since the visit, the State legislature, to which the court explicitly attached the blame for the failure to provide equitable and affordable public education to all the State's citizens, has acted vigorously to address this problem. It passed a substantial tax increase--$ 1.3 billion over 2 years-in order to entirely revamp the organization and administration of the public schools In effect, greater efficiency and responsiveness will be accomplished by instating a Commissioner of Education (in place of the Superintendent for Public Instruction) and streamlining the Department of Education. The Education Reform Act stipulates that the State Board for Elementary and Secondary Education (to be created) will establish performance standards for both schools and studenta, as well as a system of rewards to foster compliance. Principles and local schools districts will nevertheless be afforded considerable autonomy in determining how they will meet those standards.

[2]The State legislature, in the Education Reform Act of 1990, has allocated additional funds for higher educational well so that the community colleges will operate with at least 80 percent of the funds that the Council on Higher Education estimates are needed.

Figure 2—The Kentucky Library Network



SOURCE: The Kentucky Library Network, March 1990.

Distance learning is, in some instances, becoming a big business. Large public and private grants are at stake for distance leaming, as politicians ply a **can't-miss campaign for better education. Despite a promising start-such as KET's network-distance learning is still relatively untested and may raise some treacherous political and social issues, particularly with regard to the origination and control of programming.**

New technologies, particularly telecommunications, have tremendous potential for contributing to education through libraries. Western Kentucky University has a facsimile network throughout its service area to expedite the search and retrieval of materials, and the Lexington Public Library is involved in a similar project (LEXNET) to tap the resources of the University of Kentucky's libraries (see figure 2). The Kentucky Library Network for example (with some 200 participating library branches), plans to create an electronic card catalogue. Finally, new technologies offer opportunities for libraries to expand and streamline their resources through, for example, CD/ROM and access to online information databases.

Better Jobs—Kentucky currently enjoys relatively high employment, so the goal of development now concentrates on bringing in better jobs. Signs of Kentucky's overall economic growth or recovery are evident everywhere, and one of the most significant indicators is the drop in the State's unemployment rate, which, at 5.0 percent in July 1990, was below the national average. Many of the new jobs are low-wage service industry jobs, so the challenge now is to improve the quality and the salaries of jobs.

Internecine Rivalry-on its State road map, Kentucky proclaims itself "The Uncommon Wealth." Presumably, this provocative pun refers to the State's uniquely contrasting topography and to the large number of counties, both of which contribute to the State's uncommon political factionalism. There is open rivalry and a sense of territorialism among universities and the land-grant colleges, each believing in its own superiority for

Photo credit: Mark G. Young

Overlooking Bowling Green, KY

best serving the community. There is friction between KET and higher education institutions over the effectiveness of their distance-learning programs. Similarly, the delicate issue of bypass sparked a discernible (and understandable) tension between the two major telecommunications players, South Central Bell and the Kentucky Emergency Warning System (KEWS). Finally, there is a surprising lack of communication among the various Area Development Districts with regard to mutual strategies for development and resource sharing. As a consequence, the factionalism of the State seems to draw attention and energy away from a concerted statewide development strategy and instead to focus on picayune turf battles.

There are, however, notable exceptions to this general observation. In order to avoid (or at least blunt the effects of) another severe recession, a group of citizens from the Purchase area in western Kentucky enthusiastically embraces the potential for new technologies (particularly telecommunications) to strengthen their economy by improving education and job training, by providing new jobs, and by making existing services more efficient. On the premise that rural communities must involve themselves globally in order to survive, they stress that ''regional partnerships' between private enterprises and government are critical if rural communities are to afford advanced technology since the marketplace tends to discriminate against small customers.

Duplication of Services and Infrastructure-Kentucky has virtually two communications networks: the public communications network of the phone companies and the Kentucky Emergency Warning System (KEWS), a State agency that handles official State communications, such as for police dispatches, and which ensures a back up to the public network in emergencies.

The ***Involvement of Japan—The*** **foundation of the** State's development strategy is to court new foreign

industry and investment-primarily the Japanese. The location of automobile manufacturing and electronics plants, such as Toyota in Georgetown and Sumitomo in Morgantown, are triumphs for the towns and counties as well as the State. Kentucky was the first State to issue bonds on the Japanese bond market-further evidence of the Japanese mystique.

Technical and Technological Assistance and Standards—Many of the people we talked with were informed about and comfortable with modern technology, but this level of knowledge was likely and apparently not representative. Jack Eversole, Executive Director of the Barren River Area Development District, quipped, "we don't know enough to be ignorant." The need for technical assistance to overcome the general fear or distrust of technology was identified as an important factor for modernization. Development involving modem technology runs the risk that rural folks, less familiar with technology, might be induced to invest in equipment that would soon be obsolete. In some instances, a system exists, but the expertise to use it does not. Jenny Boyarski, Librarian at Paducah Community College, noted that "technology has brought the world to the people, but we do not have the people to take it out.'

Apprehension That Development Implies Urbanization-The notion of "development" is very tricky because it is not obtained without a price. Communities know that development is the only alternative when the status quo means doom, but most are cautious and want to control development to avoid the negative effects that accompany urbanization of rural areas. Chief among the fears is the urban blights that might afflict rural communities-principally pollution, higher incidence of crime, divorce, juvenile delinquency, and teenage pregnancy. Ways must be found so that participation in the modem age can be achieved while preserving rural values and a rural lifestyle.

Telecommunications Less as a Business Tool— Kentucky's Certified Cities program enables communities to measure and publicize their capacity to host new industry. The program has added telecommunications to its criteria, but the large industries that Kentucky targets are not typically the information-intensive firms; and those firms that do require advanced communications services often install their own networks. The service industry jobs that are expanding are not the high-technology or high-skill positions that need data services.

The mission of Kentucky's Rural Economic Development Authority is to assist the "commonwealth's depressed counties '' in attracting and accommodating new manufacturing projects. The current administration has identified telecommunications as a valuable resource for strengthening and diversifing the economy. The Authority commissioned a study on the potential and procedure for attracting information-based industries to the State. The Economic Development Cabinet, in conjunction with South Central Bell, has moved to incorporate telecommunications-related industries in State development strategies.

Photo credit: Mark G. Young

Near Mayfield, KY

Triage-The issue of a strategy of triage for developing rural America-where money and resources are targeted to those communities able to survive and prosper-is sensitive because it runs counter to the sense of social welfare and justice. Although politically dangerous, triage is a pragmatic strategy for dealing with rural regions and communities that are in economic decline.

The profile of the community that can benefit from telecommunications is taking shape. Ironically, those communities most in need of innovative development strategies are least able to assess the role of telecommunications in economic activity because other essential services take precedence. Healthy communities that could strengthen their positions through advanced communications systems and services are usually least interested in anything that might upset their successful balance. The communities in the middle-those with the opportunity and the incentive for dealing with the impending crisis-are the ones that cherish what telecommunications and new technologies may bring.

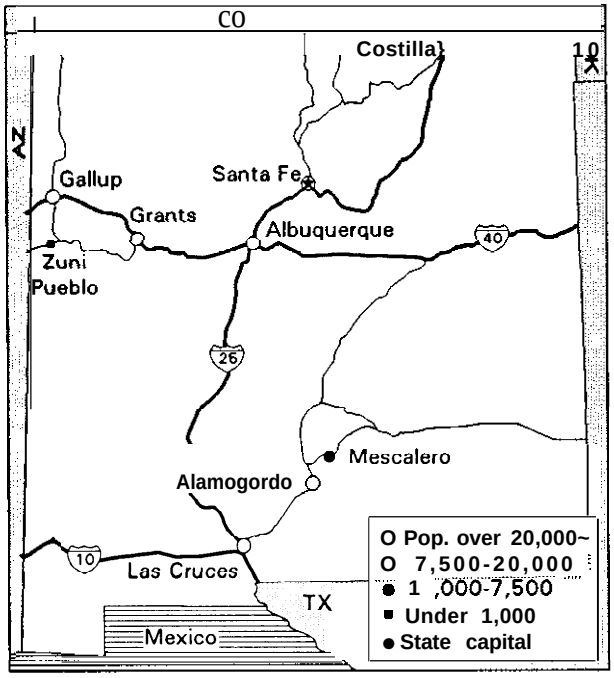
New Mexico

New Mexico, with its cultural heterogeneity, its substantial nonmetropolitan population, and low standings in most economic indicators is representative of the Southwestern United States. Fifty-one percent of the population lives in nonrnetropolitan areas (as compared to the national average of 23 percent), Hispanics account for 33 percent of the State's citizenry and Native Americans for 7 percent. Its vast tracts of sparsely populated territory are typical of the Southwest. Much of it is ruggedly

Photo credit: Mark G. Young

Zuni Indian Reservation, NM

Figure 3—Map of OTA's Field Study in New Mexico



SOURCE: Office of Technology Assessment, 1991.

mountainous or arid, which creates difficult obstacles to development and spawns a new set of communications priorities. New Mexico's topography also creates unique opportunities for development.

We allotted 8 days to cover New Mexico, much of which we spent in Albuquerque and Santa Fe meeting with government officials and representatives from the University of New Mexico and the telephone and utility companies. We visited a modest effort at indigenous economic development in Costilla, a stone's throw beneath the Colorado border. From Costilla, we went to Grants to see how a community faced with the decline in the mining industry handles economic development, to the Zuni Indian Reservation, and then to Gallup. We then flew to Alamogordo, to learn about the State's southern half as told in Mescalero and Las Cruces (see figure 3).

Traditional Society-New Mexico's eternal problem is water. In a region where irrigation is at a premium, the control of water and where it goes determines power and wealth. Such a political order begs the question of the potential for development (economic and social) because of the entrenched and unidimensional hierarchy. For example, on the basis of our experience in New Mexico, it is clear that the State retains a patriarchal social and political order. The movement of women into business, academia, and politics is a relatively recent phenomenon, therefore women may be less prone to protect the status quo and more likely to welcome development. Our experiences in New Mexico and Kentucky appear to bear this out.

The history of New Mexico began long before its statehood in 1912. Originally inhabited by Hispanic ranchers and Indians, these deep-rooted, land-based peoples are profoundly distrustful of outsiders and culturally predisposed against wholesale economic development. Earlier exploitation of Native Americans in the name of progress has made development anathema to many Indian Nations. They fear that improvements in infrastructure will destroy traditional tribal communities. "Economic development—for whom?" **they ask.**

For tribal peoples, the conventions of money and time are of less significance than in general society. The Zuni Indians, for example, leave the marketing of their jewelry-and a healthy portion of the profits—to outsiders, even on their pueblo. We were told repeatedly that they have a different sense of-even disregard for—time.

Not all tribes, however, are averse to entrepreneurship and development. The Mescalero Apaches sit on spectacular land and are harnessing this resource for tourism. One leader of the Mescalero Apache tribe is purported to have said: "the Zunis make jewelry, the Navajos make blankets, the Apaches make money. "

Cultural Heterogeneity-The State is comprised predominantly of three major cultures. New Mexico's diverse cultural base, with its profound distrust of

outsiders and the rivalries and misunderstandings among them, hinders economic development. The Angles, Hispanics, and Indians are settled in closed, autonomous communities with little movement among them. For example, the effect on education of the research facilities of Sandia or Los Alamos National Laboratories does not reach far beyond the enclaves themselves. Even among the Native Americans, we were told, there is little cooperation. While the All Indian Pueblo Council serves as a political organization for the 19 pueblos, each tribe retains and cultivates its autonomy on its own land.

Education and Development—In contrast to Kentucky, where education and economic development and telecommunications and quality of life are tightly interwoven, the importance of education in New Mexico for overall quality of life-if not for economic development—is less obvious in development policy. As a strategy for economic development, Kentucky, for example, embraces a redoubled dedication to strengthening education as a means to attractor nurture high-technology, information-intensive industry by both providing an expert workforce and an environment to satisfy it.

Despite one of the highest per-capita concentrations of Ph.D.s in the country as a result of defense research facilities, there is apparently little transfer of technology to the State at large. There is no emphasis on higher education needed to match high-technology jobs. (Cultural separation affects this, since the stress on education centered in the research enclaves has not permeated the other communities.) We heard repeated boasts that New Mexico's labor force was highly skilled and highly motivated. However, the industries that New Mexico attracts require less skilled labor than those in Kentucky.

Infrastructure-In New Mexico, the potential for economic development is shaped largely by the State's topographic and demographic characteristics. Because much of the State is ruggedly arid and mountainous, the population and infrastructure, including a modem telecommunications system of fiber optics and digital switching, is concentrated along the fertile Rio Grande valley. While this imbalance promotes development along the river, it creates problems for the flanks of the State, which are less accessible for telecommunications, roads, water, and electricity. US West has a program to defray the expense of installing telephones to remote rural communities, but even so the small scale and rugged topography slow modernization. Many of the independent telephone companies have modem equipment that equals or surpasses US West's digital and fiber network.

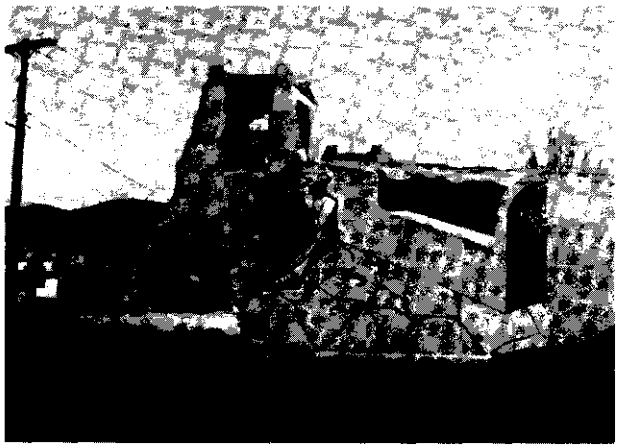


Photo credit: Mark G. Young

Mural in Taos, NM

Access to Capital-Telecommunications is not a major barrier to development, but access to capital and markets is. State Representative Nick Salazar pointed out that the lending history of agencies such as the Small Business Administration discourage bankers from funding telecommunications projects.

Politics as a Key Economic Bottleneck-Local communities depend heavily on political patronage and connections for industry or government contracts. Politics is a major factor in economic development in New Mexico. One development official noted: "Instead of governing, government provides jobs; instead of educating, education provides jobs. "

The development strategy for Grants, for example, once a prosperous uranium mining town, includes locating a branch of the State's highway department and bids for a large Federal penitentiary (the third such facility and second public one),[3] a new State armory, and a new convention center. Carlsbad, as well, was bidding for a hazardous waste disposal contract. Meanwhile, the northern town of Costilla had a hard time locating funding because, as one of its leaders said, it lacked a political connection.

State Awareness of Telecommunications-me State is aware of the potential for telecommunications to improve economic development. The New Mexico Economic Development and Tourism Department names investment in the public infrastructure as one of four strategies for economic development: "Telecommunications should be considered a crucial infrastructure capability that can serve economic development and deliver

[3]According t. an article in *Business Week* that describes the allure for New Mexico's rural areas for the location of prisons, ' 'Much of New Mexico's vast desert is unzoned, so prison entrepreneurs consider the state a prime location Three other correctional companies have been scouting rural sites there." A facility that Corrections Corp. of America plans to build in Estancia, NM, "will employ 80, with an annual payroll of $1 million." *Business Week,* "As Prisons Go Private, The Neighbors Go To Court," June 11, 1990, p. 28.

educational and other public services. ” It has inaugurated a program called One-Stop Shop whereby small businesses throughout New Mexico can access an online database with information about the State and its communities, such as maps, tax rates, licenses, and regulations. It is too early to know who the main users of this service will be: whether the small local firms will become aware how (and if) One-Stop Shop may strengthen and expand their businesses, or whether it will be a tool for industrial recruitment. TechNet, a telecommunications network that the State created in the early 1980s to link the State’s major universities and Sandia Labs, receives mixed reviews.

Problem of Leakage-If technology benefits those who know how to use it, what happens to those who do not? Is it a neutral or negative factor? Or does the fallout of technology apply beneficially to everyone? Insofar as improved communications can help locate new capital and new markets, it has potential for small communities and small businesses. However, communications technologies can also have negative effects due to financial and cultural ‘‘leakage’ as outsiders capitalize on these technologies. The small entrepreneur in search of financing is likely to be less able to use telecommunications to find capital than the banker is able to use it to find better markets outside the State to invest capital.

New communication technologies may breakdown the autonomy of the indigenous cultures. Children with access to better educational resources through distance-learning techniques may be induced to leave home to complete their education, thus removing them from their cultural heritage.

There are instances where technology may preserve rather than erode culture. The Zuni Middle School, with the support of Apple Computers, is creating a program to put its language on hypercard. While most of the Zunis are familiar with the spoken language, it is rare that they know it in written form.

Industrial Insularity-An interesting hypothesis heard in New Mexico was that, unlike most other States, it is buffered from national economic decline related to manufacturing because by the time it was admitted as the 47th State in 1912, the industrialization of America had long been under way and had largely passed by New Mexico. It is thought that because the State’s traditional land-based cultures were largely undisturbed by industrialization, it is less likely to follow current national trends, such as the crisis faced by many rural communities as manufacturing moves overseas and farms are consolidated.

The Relation Between Poverty and Development—E it is true that poverty is a state of mind as much as an economic and material condition, then one must ask “poverty by whose definition?” As Ted Jojola of the

Photo credit: Mark G. Young

Historic neighborhood in Las Cruces, NM

University of New Mexico pointed out, the common statistical indices that categorize people as impoverished are immaterial to those with different values and priorities. The Acoma Indian Tribe turned down a lucrative movie opportunity that interfered with sacred religious rituals. The Tribe’s attitude toward development shows the priorities of people who choose to live in rural areas by design and not default.

Reinforcing what we learned from Kentucky, our experience in New Mexico suggests that those most able to undertake economic development and use telecommunications and modem technology are those neither the worst nor the best off. For the depressed communities, the basic need for electricity, water, and food takes precedence over planning for the future. These troubled areas typically are troubled because of a marketable natural resource or, as is often the case in the rural Southwest, for lack of water. The infusion of new communications technology can only accomplish so much in the face of such obstacles.

Who Else If Not the Phone Company ?—There is **a** consensus among the people we visited in New Mexico that restrictions on telephone companies from manufacturing equipment, providing information services, and from delivery of broadcast video are stifling to rural communities. Rural areas strain as they are unable to generate economies of scale to warrant a broad range of efficient and modem services. The vertical integration of the utilities is considered the best chance for obtaining adequate service.

The prosperity of utility companies is tied to the prosperity of the areas they serve. It is clearly in their interest to develop markets where they do not exist and strengthen ones that do. Therefore, **a** major initiative for development in New Mexico is coming from US West and Plains Electric. Plains Electric, for example, is

delivering satellite television to rural areas of the State not served by a cable system to slow the trend of families moving from farms. Plains plans to hire an economic development coordinator to supplement the State's agency, which, according to Plains, lacks adequate personnel and money to recruit industry. US West, meanwhile, provides $2 million per year to defray the costs of connection to remote customers as a result of a 1987 bargain with the New Mexico Public Utility Commission. In addition, US West is involved in hearings regarding a $20 million fiber optic education network linking the 2-and 4-year colleges to be built beginning as early as 1991.

Public Utility Commission Policy—Economic development is not a part of the statutory duty of the State regulatory commissions, but regulatory and pricing policy directly impacts rural telecommunications infrastructure and the possibilities for development. Universal service is intended largely to benefit remote rural citizens, therefore, it is a priority of the New Mexico Public Utility Commission (PUC) to bargain with US West to leverage the extension of telecommunications services to rural communities for more generous pricing schedules in metropolitan areas. The New Mexico PUC is elected, not appointed, and therefore is directly accountable to the populace, so the cost of telephone service is a primary issue for its constituents.

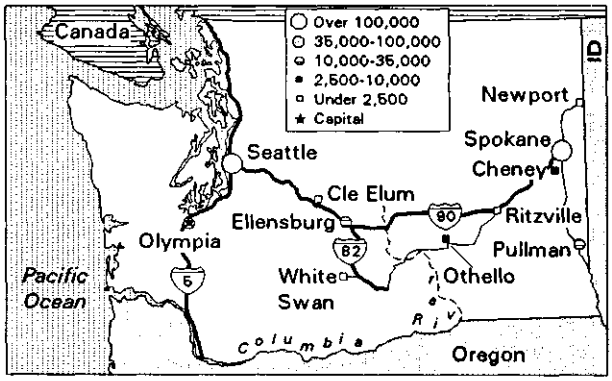
But, the current definition of universal service may not be adequate for rural citizens to have comparable access to information technologies as urban customers, especially as deregulation and competition has introduced rapid modernization.

Postal Service: Early Communication Technology—While we presume the current and foreseeable state of telecommunications (fiber optics, digital switching, integrated broadband networks) we were surprised (and humbled) to find that some rural areas lack even the most basic communication technology-postal service. Many of the areas without an addressing system are barely inhabitable and undevelopable, while some communities may choose to preserve their rustic character. The expense of an addressing system for outlying areas is a major impediment to development.

Washington

The level of thinking in Washington at the State and local levels about the use of information technologies for rural economic development is well advanced. The tension between rural and urban, characteristic of many States, is acute in Washington, where this dichotomy poses significant problems for State policymakers. The educational level is a barometer of the citizenry's ability to make use of technology for development. Washington's high standard of education contrasts with other States where education has not been a priority. Washington's economy, which depends substantially on exports, is flourishing despite the decline of natural-resource-based activities that contribute significantly to the State's economy.

Figure 4--Map of OTA's Field Study in Washington



SOURCE: Office of Technology Assessment, 1991.

A conscious effort was made to heed the perspectives and concerns of the "ordinary" citizen in Washington, a strategy that flushed out previously muted issues. Using Spokane as a hub for the first ***2 days, we*** traveled south to Pullman and Washington State University and north to Newport. We stopped in Othello for one planned and several impromptu conversations on the way to White Swan, where we convened a meeting with interested officials and citizens from around the lower Yakima Valley. We then traveled to Olympia to learn the issues and objectives of the various players at the State level, and finally to Seattle (see figure 4).

Prosperity-Over the past 5 years Washington State has enjoyed a robust economy, with opportunities for economic development. Washington as a whole benefits from a diverse and balanced economic base, including forestry and agriculture, as well as high-technology industries, such as aerospace and software development. The State is fast gaining a reputation as an eminent wine-producing region, and vineyards are conspicuous along the Columbia River. A very scenic State whose landscape features the Cascade and Olympic Mountains and the Pacific coast, Washington also features one of the few deep-water ports on the west coast. As trade with Japan and the countries of the Pacific Rim increases, Seattle and the area surrounding Puget Sound are booming. The State is also benefiting from the free trade pact with Canada The abundance of rainfall for much of the State and the system of dams to provide energy and irrigation for the central plains makes this arid area fruitful. Other parts of the West have suffered from droughts for several years, but Washington's agriculture has thrived.

Nevertheless, there are pockets that do not equally share in the prosperity, particularly the rural and remote areas whose economies are heavily or entirely based on natural resources. The natural-resource-based industries are on the whole in decline or stagnant. Washington's apple industry, for which the State is famous, has been unsettled in recent years by overproduction and the use of the pesticide Alar. In Penal Oreille County, the northeastern most county with borders on Idaho and Canada, agriculture, once significant in the region, is now reduced to hobby farming; in the meantime, the dominant timber industry likewise declines.

Many agricultural- or timber-dependent communities are seeking new ways to support their local economies. Tourism and retirement, both taking advantage of rural Washington's quality of life, are major elements in an effort to attract diverse, small, balanced, and usually "clean' enterprises. The town of Leavenworth in central Washington is a successful model of tourist-based development patterned after a Bavarian village. The Department of Community Development, meanwhile, is working with the town of Forks on the Olympic peninsula to help it recover from a collapsing economy based on timber. Plans for retirement communities, which help stabilize the economy through steady income, are often hampered by inadequate health care in rural areas.

Development Philosophy—Policyrnakers in Washington have developed a mature economic development philosophy. In contrast to New Mexico where opportunities are few by comparison, or to Kentucky where recessions follow booms in fast succession, the prosperity has permitted policymakers "the time to intellectualize," in the words of the Director of the Department of Economic Development. They have taken a holistic approach to development, in which the recruitment of industries is part of a broader agenda that aims to create conditions to support and nurture a diverse, balanced, and strong economic base. Washington is able to attract "clean" high-technology industries such as software design and biotechnology.

Rural Development as *Seattle's "Growth Managemerit"* -Ironically, the problem facing Washington policymakers is not so much the need for economic development, but rather the need for ''growth management. Recently, Seattle has been recognized for its treasures without the problems usually found in big cities. However, Seattle is developing its own problems as a consequence of rapid growth-strains on highways and housing for example-thus "growth management" is a high priority. The need to control growth has triggered an appreciation of how the State's rural areas can share in the State's prosperity and contribute to its expansion. Rural economic development is an important partofa''growth management" strategy for spreading Seattle's prosperity throughout the State.

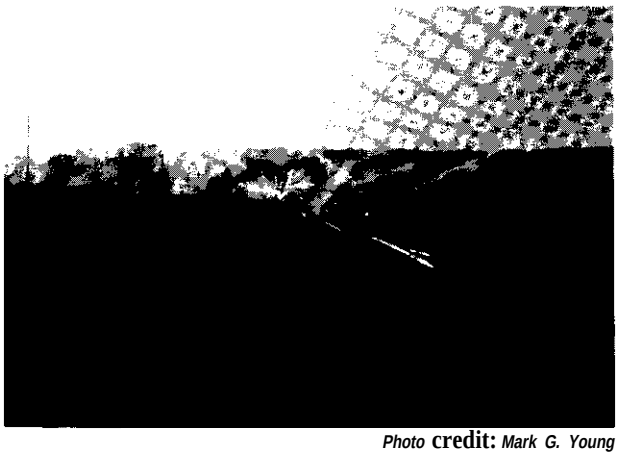


Photo **credit:** *Mark G. Young*

Irrigating fields in White Swan, WA

Governor Booth Gardner created a Growth Strategy Commission to investigate "economic diversification" and ways to balance growth in the State, while the legislature commissioned a report on the potential for urban companies to relocate parts of their operations to rural areas. Telecommunications is seen as a vital resource that would enable distant and small communities to share in the prosperity.

The studies concluded that telecommunications was a necessary part, but not sufficient on its own to foster economic growth in Washington's outback. This conclusion is reached in other reports, such as 'Telecommunications and Rural Development" by the Partnership for Rural Improvement of the Community College of Spokane, which notes that while communications per se will not guarantee development, the absence of adequate communications reduces the possibilities for development. Small cities rather than remote or small villages most likely benefit from the relocation of businesses from urban to rural areas with the help of telecommunications.

Washington's rural easterners cautioned that because this recent awareness of urban-rural linkages is caused by the overgrowth of Seattle, those promoting these linkages may not be sensitive to the needs and desires for development in eastern Washington. Many of Washington's citizens east of the Cascade Mountains feel more allied with the citizens of northern Idaho and western Montana, than of western Washington. In some areas, such as Okanogan County in north-central Washington, economic development in most any form is welcome. Others, such as some residents of White Swan, a small village on the Yakima Indian Reservation in the lower Yakima Valley, favor slow and controlled growth. Some want no growth at all.

The State's interest in rural development to solve Seattle's growth problems does not always appeal to local

economic development professionals. The relocation of a large firm (more than 50 employees) can threaten to dominate an area and upset its balance. These local development "guerrillas'' -as one describes herself and her colleagues-are more sensitive to the needs and desires of the community.

Sense of Community-Despite the east-west and rural-urban schisms, there is a remarkable degree of community throughout Washington and a sense that, despite some exceptions, the State functions as a unit: this contrasts to the insularity of New Mexico and the factionalism of Kentucky. The common phrase ''forging sectoral linkages" reflects the notion that the State's economy is the sum of its parts: that the fortune of Seattle depends on and contributes to the fortune of Spokane, which depends on and contributes to the fortune of the nearby communities and towns. The word ''networking" was often mentioned to describe the key to a community's success, and one citizen noted that "everybody is facing the same problems, so everybody has to work together. " Frequent and casual reference to the transformation of Eastern Europe showed an awareness and sophistication that indicated that their own communities must participate in the larger, global community.

Environment-Economic development in rural Washington involves delicate environmental issues. Washington State has a large and active environmental community. Recently, the tension between the environment and jobs has been fought over the issue of the protection of the State's ancient forests-the habitat of the spotted owl. Efforts to halt or interfere with logging threaten the communities that depend on the timber industry. Those primarily concerned with development see the spotted owl as a symbol of how the concern for a bird is taking precedence over people's lives and livelihoods. In reaction to the tumultuous times for the timber industry, the Park Service has emerged as a new player in development by more actively promoting tourism in park facilities.

Financing Development—The difficulty of securing capital, 'as elsewhere, is cited as a significant impediment to development. Because the banks serving rural areas typically are branch facilities of large banks, their interest in and knowledge of small rural businesses is limited. Small entrepreneurs in Washington face another financial burden. By State law, public credit cannot be extended for private use. Finally, communities that border Idaho must compete for businesses against a more generous tax structure across the border.

Regulatory Policy-while development advocates believe in the "Field of Dreams" credo-"if you build it, they will come"—the State Utilities and Transportation Commission (UTC) which regulates telecommunications, operates under the maxim: "if you build it, somebody has to pay for it." UTC, with its obligation to ensure that each

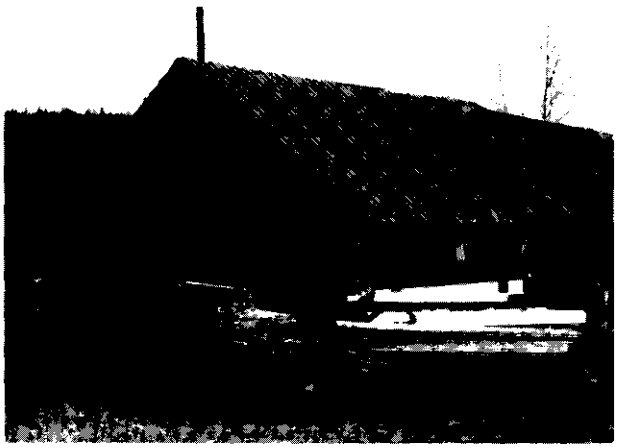


Photo credit: Mark G. Young

Cle **Elum, WA**

customer has an appropriate level of service at a fair cost, is cautious not to encourage (let alone mandate) the deployment of technologies or services whose applications have not been demonstrated. But market-orientation may tend to shortchange rural areas. The experience in Europe, according to Bill Beyers, Professor of Geography at the University of Washington, is that technology deployment and development premised on market forces tends to work against rural areas.

The general consensus throughout the State seems to be that the existing communications infrastructure is sufficiently sophisticated to handle most foreseeable applications. Nevertheless, there are complaints about "dirty lines" degrading service and interfering with data transfer. UTC has the goal of single-party, touch-tone service to a high proportion of multi-party lines in both rural and urban areas by the end of 1992. A major issue for rural telephony is the cost of service, especially when calls to the local school or to a neighbor a few miles away often involve a toll charge, and when the rate for basic service is $30 or $40 per month. Extended area service (EAS) is a mechanism to redraw exchange boundaries to match the patterns of regional commerce and reduce the cost for rural communities to communicate with the town or city on which it depends. However, the savings accrued to rural customers and businesses is largely taken at the expense of the small independent telephone companies whose settlements from the pool of long-distance tolls is reduced at the same time the traffic on their networks increases.

Education and Development—Like Kentucky, Washington State is unequivocally committed to education for future progress, and here too telecommunications serves an important function in strengthening educational opportunities. The Satellite Telecommunications Educational Programming (STEP) network, for example, adminis-

Photo credit: Mark G. Young

University of Idaho, in Moscow

tered by Educational Service District 101 in Spokane, provides programs taught by educators specially trained for broadcasting to schools, both rural and urban, in 12 States. With the unique visual capabilities of television, STEP is able to present course material in innovative ways. A class in Japanese, for example, maybe presented with a Japanese music video to help students understand the culture and its idiom. Although its curriculum is limited to six classes geared to college preparatory students-calculus, Japanese I and II, advanced English, and Spanish I and II-it also delivers inservice programming for teachers. Washington State University in Pullman provides courses to branch campuses through its WHETS facility, which links them by a two-way audio and video microwave system.

Although STEP targets rural schools with limited facilities and teachers there are barriers to the delivery of education to small and remote rural communities and school districts, because of the expense of installing and subscribing to the programming.

Demand for Information and Technology-The need to effectively and efficiently communicate with distant and foreign markets is important because much of the State's products are exported. The awareness of the strategic importance of information and telecommunicationsfor continued economic growth throughout the State is very high. As an example, Telephone Utilities of Washington, which operates 43 exchanges in the State, has joined a consortium of independent telephone companies that will offer the advanced switching technology of common channel Signaling System 7, Several people noted that the use and demand for cellular telephony would be large in rural areas, especially among farmers. Gonzaga University in Spokane recently received a $10 million grant from the United States Department of Agriculture (USDA) to build a high-technology library to provide information as a tool for agriculture. Finally, the Palouse Economic Development, with a $100,000 grant from the Department of Community Development, has launched a project to help local businesses market goods abroad, a project for which telecommunications is indispensable.

Maine

Maine aggressively embraces telecommunications as an important way to overcome its isolation, its size, and its low population density. Improving education statewide through the use of telecommunications is the centerpiece of the State's development approach.

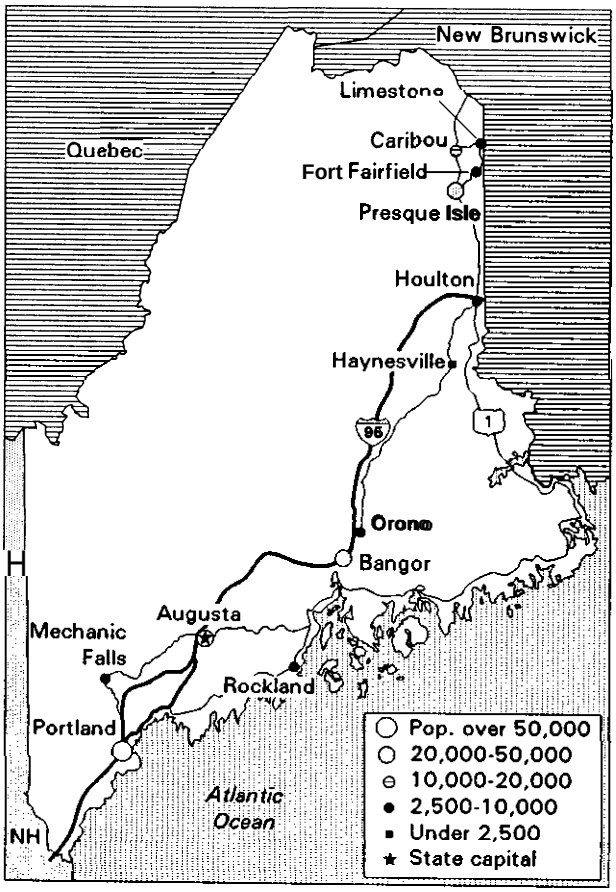
The largest of the New England States, Maine is the most sparsely populated State east of the Mississippi, with density ratios that match some large Midwestern States. In addition, nearly two-thirds of the State's 1.2 million citizens live in nonmetropolitan areas, typically in one of its nearly 500 small towns and villages. Despite recent growth, the State's economy is sluggish, with an average per-capita income at $13,954 in 1987, compared to the national average of $15,481.

Starting in the north, we visited Presque Isle and several of the surrounding towns before traveling south through Houlton and the small lumber town of Haynesville on the way to Orono and Bangor. The Telephone Association of Maine's annual meeting in Rockport provided a unique opportunity to speak with many players in telecommunications, with an emphasis on the perspectives of the local independent telephone companies. Finally, the staff went to Augusta to speak with the State officials and see the University of Maine's Interactive Television network in operation, then onto Portland to meet with New England Telephone and the governor's advisor on communication and economic development (see figure 5).

Economically Remote—Although geographically, culturally, and topographically opposites, Maine and New Mexico share several important characteristics with regard to economic development. Both are sparsely populated and relatively large. Maine's geographic isolation parallels New Mexico's cultural isolation. Sharing most of its border with Canada and the Atlantic Ocean, it is the single State to border on only one other State (New Hampshire). Just as New Mexico is divided into pueblos and remote enclaves, Maine is organized into small towns and villages. Both States have been relatively unaffected by larger, national economic trends and events.

But while many New Mexicans believe that the State is not yet ready to make full use of its resources, "Downeasters" welcome the change to participate on a national or global level. They are increasingly less content to remain economically isolated, particularly as the free trade agreement with Canada puts Maine at the crossroads of an important connection between Quebec, the Maritimes, and the United States' Northeastern cities.

Figure 5-Map of OTA's Field Study in Maine



SOURCE: Office of Technology Assessment, 1991.

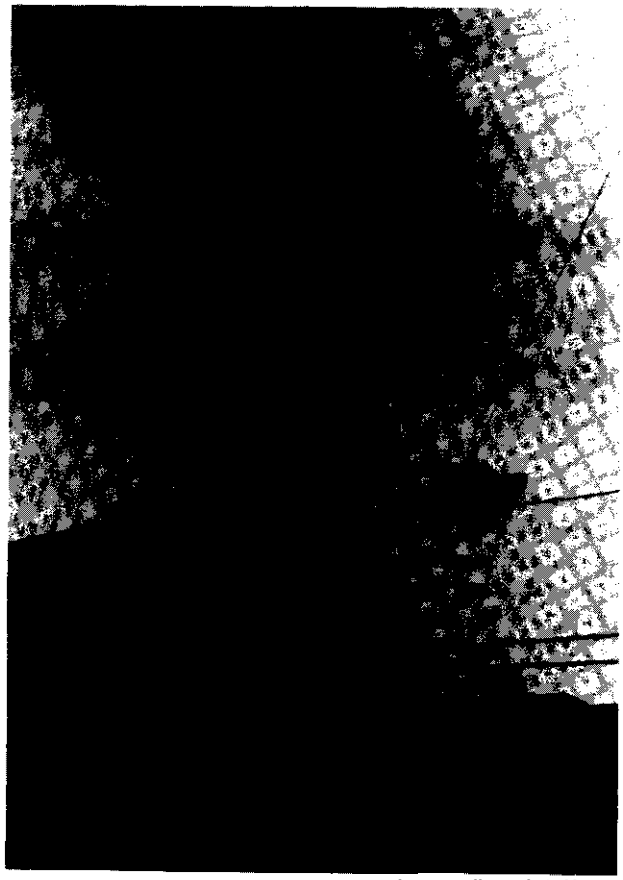


Photo credit:Mark G. Young

A church spire, Presque Isle, ME

Rural Poverty-As in Washington, the economic growth that Maine has had in recent years is not distributed evenly throughout the State. According to the Deputy Commissioner of the Department of Community Development, the rich areas become richer, but the rural areas remain poor. While Portland and southern Maine have recently been successful in attracting service industries such as advertising agencies and insurance companies from around southern New England, northern Maine's economy, dependent largely on timber and potato farming, remains stagnant. Aroostook **County, at Maine's** northern 'crown,' faces a health care crisis as its population, many of whom are uninsured, can no longer support the four regional hospitals serving a county the size of the State of Connecticut.

Cooperative Development—The presence of Loring Air Force Base in Limestone, several miles north of Presque Isle, greatly benefits Aroostook County's economy. The base, like others around the country, stabilizes the regional economy and enables the community to afford educational facilities that would otherwise be beyond its reach. However, as residents realize that closing or descaling the base is a "when" not an "if" proposition, communities and business leaders are trying to find and create their own opportunities for development. Eight communities around and including Presque Isle qualified as one of the State's four Job Opportunity Zones. Although the Job Opportunity Zones are intended to provide opportunities and incentives for growth, the incentive of State support led communities to evaluate their resources and potential for development and to cooperate where they might ordinarily have not.

Local business and community leaders in Aroostook County have formed an ad hoc committee-Leaders Encouraging Aroostook Development (LEAD)-to tackle development issues that they believe are not properly treated by the Regional Planning Commission. Because transportation—including roads and highways, air access, and railroads-is such a vital element to development in remote rural areas like northern Maine, LEAD is working to reauthorize and release State funds to extend Interstate Route 95 to Presque Isle. LEAD, along with the University of Maine at Presque Isle, was instrumental in securing

a grant from the Maine Science and Technology Center for a CAD/CAM system to be installed in one of Maine's four Research and Productivity Centers on the campus of the University of Maine at Presque Isle.

Telecommunications and Development Sanctioned From the Top-The former chairman of the National Governors Association's Subcommittee on Telecommunications, Governor John McKernan has championed the importance of telecommunications for the State's future welfare, and his fervor paces the State's economic development philosophy. In particular, his and others' commitment to telecommunications-assisted education is becoming a reality, as Maine is in the process of building a community college system based on interactive television. In addition, Rich Silkman, the Governor's advisor for State Planning, similarly supports telecommunications as a means of overcoming Maine's isolation and sparse population. Communications provides a way to recapture "space-specific rents" in rural areas, which have been declining as natural resources such as metal or wood are devalued.

Ken Gordon, the Chairman of the Public Utilities Commission, explicitly stated his view of the fundamental connection between communications regulation and economic development in an address before the Telephone Association of Maine. While pointing out that the State has a reasonably modem communications network with a high degree of digitization and fiber deployment, he noted that the State is hampered by high intrastate toll rates and by ''rather modest marketing efforts' on the part of the telephone companies. In an effort to align communications and economic development goals, Chairman Gordon hopes to frame regulation to protect all parties-customers and small telephone companies included—without intrusive, detailed involvement by the PUC into the forces of the market.

On the other hand, the legislature, with the recent labor strife in the paper companies and the telephone company, is more cautious about development and technology and prefers keeping regulation in place. Representative Herb Adams warned in a speech before the Telephone Association of Maine that "technology is not an endless friend," citing the increasing incidence of junk fax and computerized telephone solicitations, and that often technology takes on a life of its own and becomes unresponsive to the consumer.

Overall, the support for the role of telecommunications in economic development among the State's leaders and the cooperation among these key policymakers seems greater in Maine than in any other State we visited. One resident explained this in terms of the State's small population. The State's leadership is comprised of only 200 people. They often socialize together and work out issues on an informal basis.

Photo credit:Mark G. Young

Mattawamkeag, ME

The Environment and the Role of the DEP—Aware **that the** State can ill-afford the status quo, most of Maine's residents support economic development. However, there is significant tension over the extent and nature of development, which appears largely over environmental issues. As in Washington State, timber is perhaps the most important resource for Maine's northern communities (much of the land in the north is owned by paper companies) and so pressure on logging industries tends to ruffle the feathers of citizens whose livelihoods are at risk.

The villain, from this perspective, is the Department of Environmental Protection (DEP)--dubbed by one resident "nature Nazis"—who have assumed the role of surrogate zoning board to monitor the sale and use of property in the absence of strong local governments. DEP has become influential in economic development. Viewed by some as bureaucratically sleepy, the DEP is resented by many in rural northern Maine, who feel squeezed by rules and regulations mandated from policymakers in Augusta.

However, the DEP's efforts to preserve the State's environment spring largely because much of the needed infrastructure-e. g., roads, bridges, and sewage treatment—is in disrepair and cannot support further development. In some cases, in order for a business to move, another one has to move out lest it exceed the capacity of the sewage plant. According to Jack Dexter, the President of the Maine Chamber of Commerce and Industry, regulation and the exhaustive regulatory process make it expensive to do business in Maine, especially for small businesses.

Concerns for the State's environment are likely to provide strong incentives in the future for the deployment of modem communications, according to Curt Sweet of the University of Southern Maine. As the condition of rivers and lakes in the State deteriorates and as logging

companies are slow to replace harvested forests, the importance of an economy founded on nonpolluting, information-intensive industries is expected to become an important priority. Furthermore, Maine, along with the rest of the Northeast, is slowly losing industry to the west, where as we were told, public policy for the past decades has focused on developing inexpensive power sources.

Education, Telecommunications, and Economic Development—As in Kentucky, the low level of skills among Maine's residents was cited as a significant barrier to development. However, the State has, until recently, been hamstrung in its ability to adequately educate and train its workforce because the community college system has only been operating 1 year. When the commitment was made to create the community college system 10 years ago, an ambitious telecommunications-based system was seen as the most efficient and effective way to improve education in the State. The Education Reform Act of 1984, recognizing the relationship of education and development, provided additional impetus for a telecommunications-based network.

From the seven branch campuses of the University of Maine System which are connected by two-way, fully interactive video and audio, courses will eventually be broadcast to more than 200 high schools, university centers, and technical schools throughout the State-one within 12 miles of every resident. The system is intended to be used for college, secondary, and elementary level coursework as well as for adult continuing education.

Though still in its infancy, the success of the Community College of Maine's ITV network will in large part depend on the efforts of local educators to help their communities realize its potential. For very distant or isolated communities, ITV opens up new avenues for delivering education and other invaluable social services. There is some reluctance, though, among superintendents and teachers who fear that the success of such a system could imperil their jobs.

Independent Telcos and Rural Development—In Maine, just as in Kentucky, New Mexico, and Washington, the small independent telephone companies in general have more advanced switching and transmission equipment than the regional Bell affiliate, New England Telephone. However, this potential advantage can rarely be exploited because the small local telephone companies, for lack of the personnel and expertise, must rely on their Bell counterpart to set protocols and to popularize services. They are also limited in offerings because many of them are unable to afford the expense of filing service applications before the State Public Utility Commission. With regard to involvement in local development, the simple answer is that they lack the resources to market their communications wares and to help their customers take advantage of the network. There is also a built-in incentive for local telephone companies to limit growth, because as their business customers expand, they become targets for the larger phone companies to pick off.

The prominent issue for rural telephone companies in Maine involved the treatment of long-distance pricing and in particular the policy of extended area service. Because the independents rely heavily on the settlements from the pool of long-distance in order deflect the usually high cost of providing local service, efforts to reduce toll rates threaten to cut into this important subsidy.