

Rural Broadband At A Glance 2013 Edition

Introduction

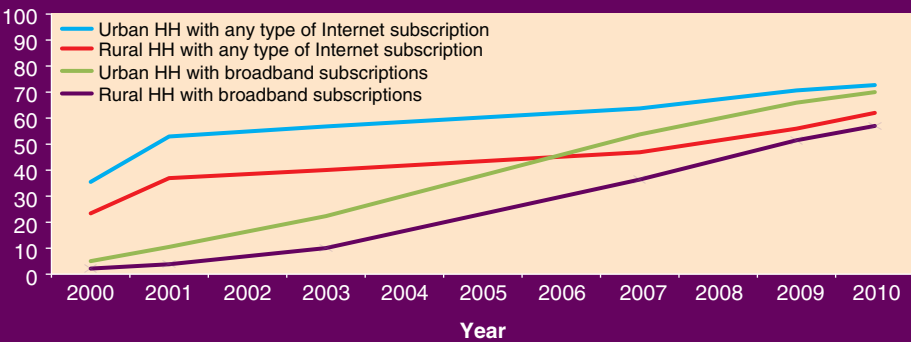
With the growth of the digital economy, more economic activities are taking place on the Internet, potentially reducing geographic constraints, increasing efficiency, and improving growth prospects for rural communities. Rural America, however, may be at a disadvantage in reaping the benefits of this growth because rural households are still less likely to subscribe to the Internet than are urban households. By 2010, only 62 percent of U.S. rural households and farms had home subscriptions to the Internet, compared with 73 percent of urban households.

Broadband technology has become the technology of choice for Internet users (wherever it is available)—96 percent of urban and 92 percent of rural household Internet subscribers use broadband. Nevertheless, broadband Internet connections (which offer higher speed Internet access than dial-up connections) are not available as often, nor used as readily by rural households as by urban households.

While both increased availability and increased use may be desirable from a rural development perspective, most Federal programs have focused on making the Internet more available to individual households. Only \$250 million of the \$7.2 billion allocated by the American Recovery and Reinvestment Act of 2009 (stimulus bill) specifically targeted the goal of increasing Internet use among nonadopters who are able to get broadband service.

Household Internet subscribers, 2000-10

Percent of all households



Note: HH means households. As used here, urban and rural areas are synonymous with the Office of Management and Budget's definitions of metropolitan and nonmetropolitan areas, respectively.

Source: USDA, Economic Research Service calculations based on U.S. Census Bureau Current Population Survey data.

Broadband Is Dominant but Not Universally Used

Starting from nonexistent subscription rates in the early 1990s, the rural Internet subscription rate more than doubled between 1998 and 2001 (from less than 4 million households to 8 million households). Yearly gains in household Internet subscriptions, however, have slowed considerably since 2001. Early adopters (both urban and rural) relied heavily on dial-up Internet connections, but use of broadband technologies expanded rapidly starting in 2003 (see box “What is Broadband”). Nonetheless, not until 2007 did the majority of the Nation’s households gain Internet access using broadband technologies. The majority of rural households did not use broadband technologies until 2009.

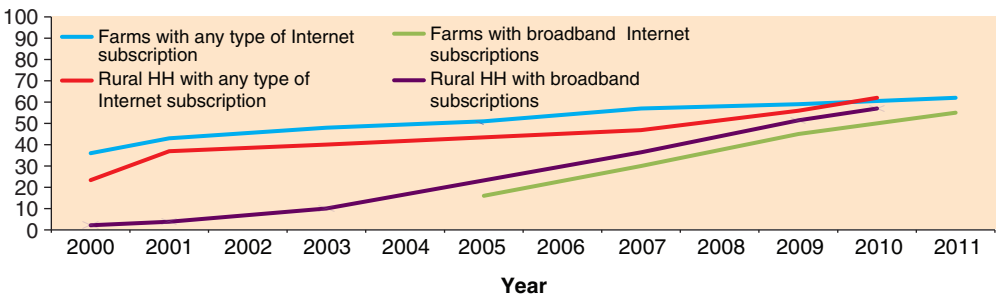
During this period, broadband technologies evolved rapidly, leading to increases in speed and capacity for existing land-line systems and the introduction of new fiber optic, wireless (a form of radio signal), and two-way satellite (direct between satellite and the home) Internet services. Accessing the Internet through broadband technologies has become increasingly necessary for even the most common household Internet tasks due to the rising sophistication of websites and their products and services. For example, the heavy graphic content of many websites makes such common online tasks as banking, shopping, registering a car, and completing research for homework assignments frustrating (if not impossible) for those relying on dial-up access.

The rapid decline in the use of dial-up access shows the importance of broadband technology to Internet users wherever broadband is available. A household that subscribes to the Internet is now most likely to use high-speed access; 96 percent of urban household subscribers have broadband, as do 92 percent of rural households.

Farmers were early rural adopters of the Internet; farm Internet subscription rates were initially above those of rural households as a group when dial-up was the dominant means of access. Broadband access rates for farms, however, have been below those for rural households as a group, reflecting the more isolated locations typical of farm households. Nonetheless, by 2010, farm and rural household Internet and broadband use rates largely converged as broadband became more available across the country.

Farm and rural household Internet subscribers, 2000-11

Percent of all households



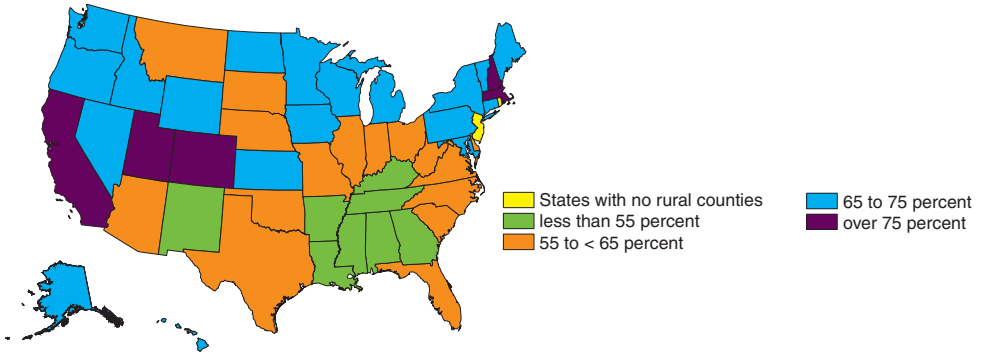
Note: HH means households. As used here, rural areas are synonymous with nonmetropolitan areas, as defined by the Office of Management and Budget. Rural and farm HH data came from different sources that surveyed different years, although rural households also include the majority of farm households that are located outside of metropolitan areas. Source: USDA, Economic Research Service calculations based on USDA, National Agricultural Statistics Service, June Agricultural Survey, and U.S. Census Bureau Current Population Survey data.

Rural Household Subscriber Rates Vary Across the Nation

By 2010, 73 percent of U.S. urban households had home subscriptions to the Internet, compared with only 62 percent of rural households and farms, according to Current Population Survey (CPS) data. Rural Internet subscriber rates, however, are not uniform across the country. On average, rural households in the Northeast and West are more likely to have some form of in-home access to the Internet, while households in the rural South are the least likely to subscribe. The regional disparity in subscriber rates reflects, to some degree, demographic differences such as income, education, and age (see Dwivedi and Irani, 2009; Flamm and Chaudhuri, 2007; and Stenberg and Morehart, 2012).

Among rural households that use the Internet, broadband adoption rates are lowest in Appalachia and in several areas—such as Michigan and South Carolina—that experienced the highest unemployment rates during the Great Recession of 2008-09. Rural broadband adoption rates are uniformly below corresponding statewide urban rates.

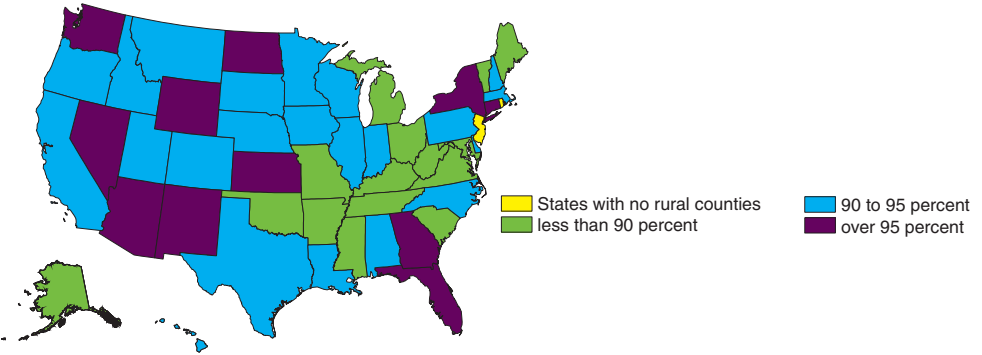
Rural households with any type of Internet subscriptions, 2010



Note: As used here, rural areas are synonymous with nonmetropolitan areas, as defined by the Office of Management and Budget.

Source: USDA, Economic Research Service calculations based on U.S. Census Bureau Current Population Survey data.

Rural household Internet subscribers with broadband access, 2010



Note: As used here, rural areas are synonymous with nonmetropolitan areas, as defined by the Office of Management and Budget.

Source: USDA, Economic Research Service calculations based on U.S. Census Bureau Current Population Survey data.

Why Don't All Internet-Using Households Subscribe to Broadband?

The reasons households do not subscribe to the Internet are similar between rural and urban households, with lack of interest being the principal reason. The primary reason cited by Internet subscribers for not having broadband service, however, differs across incomes and between urban and rural areas. For rural households, lower broadband subscriber rates may stem from availability problems in rural settings. While broadband availability has become more prevalent in rural areas, many challenges remain for expanding service to households in remote areas. Rural areas have, by their very nature, low population density, and lack the economies of scale that more densely populated urban areas enjoy. This makes the delivery of broadband Internet services more costly per customer for communications companies. Mountainous terrain and increased exposure to harsh weather in some rural areas can also drive up the per customer cost of delivering broadband service.

Limited availability of broadband service, however, is not the only reason that rural households have not upgraded to broadband technologies. Nationally, the largest percentage of Internet subscribers who do not have home broadband connections are those who report they do not want it (either because they are not interested or because it is too expensive). Since national statistics generally reflect the responses of urban residents—who often have access to a range of broadband connectivity options—they do not necessarily reflect conditions facing rural residents. Indeed, rural residents are more likely to cite a lack of availability in the area as a reason for not having broadband.

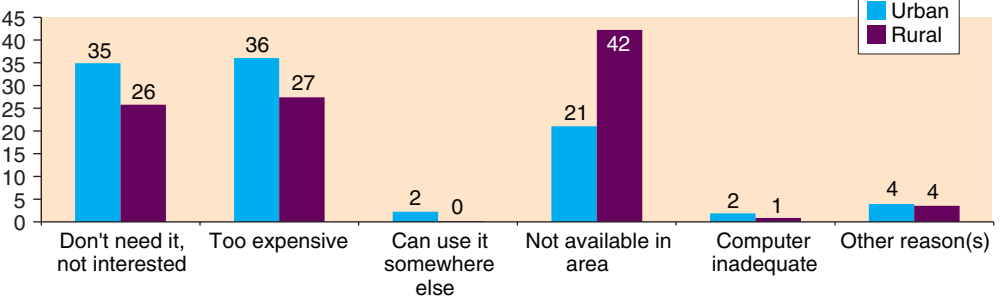
Service cost is another major reason cited by rural (and urban) residents for not having broadband Internet access. Generally, as household income increases, both urban and rural residents are less likely to state that broadband is too expensive. Higher income rural households more often cite availability rather than cost as the primary reason they do not have broadband service.

The higher incidence of rural households claiming that a lack of broadband access is a problem in their area helps account for lower broadband subscription rates in rural areas at all household income levels. Nonetheless, household income (which directly affects broadband affordability) is arguably the most significant factor in household broadband use, though education, age, and other variables also have an effect.

While rural household Internet and broadband subscription rates (at any given income level) generally fall below corresponding urban rates, rural areas gained broadband subscribers faster than urban areas from 2009 to 2010. This relative gain may be attributed to Federal broadband programs that encouraged the geographic expansion of broadband coverage, as well as technological innovations and competition that may have led to a decrease in the cost of broadband technologies.

Primary reasons given by online households for not having broadband, 2010

Percent of non-broadband households



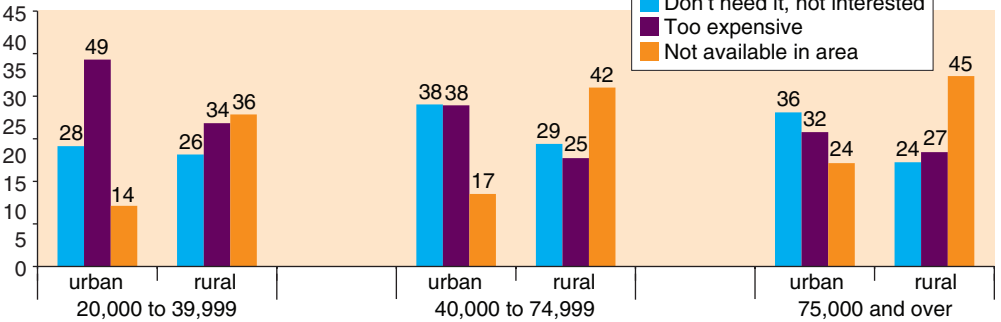
Primary reason given by household for not having broadband

Note: As used here, urban and rural areas are synonymous with the Office of Management and Budget's definitions of metropolitan and nonmetropolitan areas, respectively.

Source: USDA, Economic Research Service calculations based on U.S. Census Bureau Current Population Survey data.

Selected reasons cited as most important for online households that do not have broadband (by income), 2010

Percent of all online households without broadband



Household income (dollars)

Note: As used here, urban and rural areas are synonymous with the Office of Management and Budget's definitions of metropolitan and nonmetropolitan areas, respectively.

Source: USDA, Economic Research Service calculations based on U.S. Census Bureau Current Population Survey data.

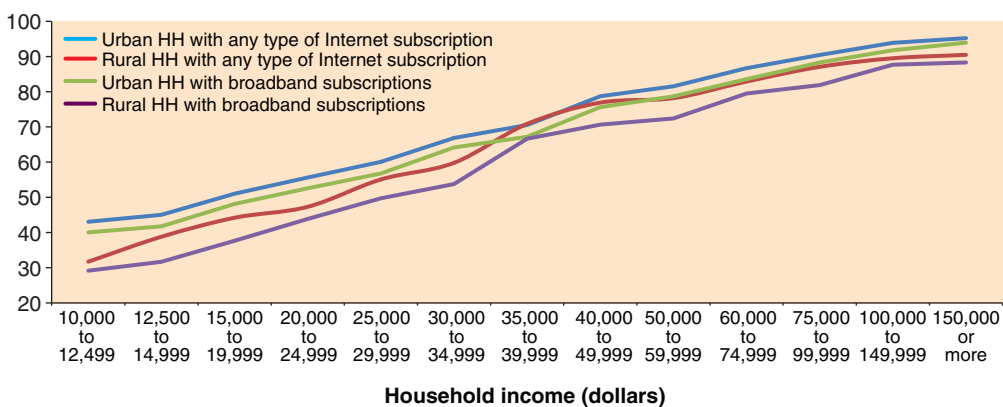
Government Policy Encourages Broadband Internet Access and Use

The provision of U.S. broadband Internet infrastructure and services is largely privately financed. Nonetheless, because of its perceived economic and social benefits, several public programs and policies aim to encourage greater investment in rural areas. Government broadband policy falls into two categories: (1) programs that encourage investment in hardware and software for broadband networks, and (2) programs that encourage greater use of the Internet. Most Federal programs have focused on spurring investments, although many education and extension programs exist at the State and local levels that introduce individuals to the Internet and teach them how to use it.

Increasing broadband availability is more expensive per customer in rural areas than in urban areas, but private service providers have been expanding service in many areas. Federal and State government policy has helped drive increases in broadband availability in rural areas, generally by leveraging private-sector funds.

Rural and urban households with Internet subscriptions by income, 2010

Percent of all households



Note: As used here, urban and rural areas are synonymous with the Office of Management and Budget's definitions of metropolitan and nonmetropolitan areas, respectively.

Source: USDA, Economic Research Service calculations based on U.S. Census Bureau Current Population Survey data.

USDA's Rural Utilities Service (RUS) has been the lead Federal agency for increasing broadband access in rural areas through four programs:

(1) RUS's traditional rural telecommunication program for improving or expanding infrastructure. The program lent over \$5 billion to rural telecommunication service providers for improving and maintaining their communication infrastructure between 2001 and 2010. As part of the loan application, RUS requires that communications facilities receiving RUS financial assistance be capable of providing businesses and households with broadband Internet service.

(2) RUS's broadband loan program (authorized by periodic Farm Acts—the Food, Conservation, and Energy Act of 2008 being the latest), which lent over \$1 billion to rural providers to build broadband-capable facilities over the last decade.

(3) The Community Connect Broadband Grant Program, which services rural communities least likely to receive broadband service, has provided over \$122 million in grants during the last 10 years.

(4) The joint U.S. Department of Commerce (USDoC), National Telecommunications and Information Administration and USDA RUS-administered broadband programs resulting from the 2009 stimulus bill provided more than \$7.2 billion over 2 years. The USDoC administered \$4.7 billion in grants for all parts of the country, while the USDA-RUS administered the remaining \$2.5 billion for rural service providers and used these funds to leverage \$2.3 billion in grants and \$1.2 billion in loans. Most of the funds were used to provide new broadband systems, though \$250 million was set aside for programs that directly attempt to encourage broadband Internet use.

The Federal Communications Commission has also recently established the Connect America Fund to subsidize broadband service in rural areas (shifting funds from the traditional phone service program). Nonetheless, questions have arisen about the effectiveness and desirability of this and other broadband subsidy programs, as they have for other government programs subsidizing private-sector activities.

Conclusion

While research suggests that broadband has potential economic value for rural communities, variability in the availability and use of broadband infrastructure across the rural-urban landscape remains a challenge. Rural households are almost as likely as urban households to use the Internet, but they are less likely to use broadband. The lack of universal availability of broadband service partly accounts for the lagging usage rates of rural households, although ongoing technological changes and government programs have been improving broadband service availability and quality in rural areas. A major source of the shortfall in rural broadband subscriptions, however, is household preference (driven, to a certain extent, by affordability).

More Federal, State, and local programs are starting to address this issue since broadband's perceived economic benefits cannot be fully achieved unless it is used. There is also a growing perception that the higher the proportion of households that subscribe to broadband, the greater the benefits for the national and regional economy (through reduced service delivery costs, increased access to market information, and increased educational opportunities, for example).

What Is Broadband?

The Federal Communications Commission (FCC) has been the arbiter of the definition of broadband in the United States. The FCC originally defined broadband Internet service as providing a minimum 200 kilobits (kbs) per second. This is much faster than dial-up service, which has a maximum speed of 56 kbs and can be as slow as 14 kbs in rural areas. In 2010, the FCC redefined broadband to include any telecommunication technology providing 4 megabits per second (mbps) downloading data and 1 mbps uploading data. The ever-changing technological capabilities of Internet access service make economic impact analysis and discussion of broadband Internet service challenging. In the Current Population Survey data used here, the controversial issue of speeds actually attained at any given time is not addressed, and any technology capable of attaining the FCC criteria is considered broadband.

Data Sources

Data in this analysis are primarily from the U.S. Census Bureau's Current Population Survey (CPS). The CPS surveys a nationally representative sample of households in both rural and urban areas and included a supplement on "Internet and Computer Use" in its August 2000, September 2001, October 2003, October 2007, and October 2010 surveys. Additional data resources include USDA's June Agricultural Survey, which has provided information on Internet and broadband adoption by farm households since 1997.

References

Dwivedi, Y., and Irani, Z. (2009). "Understanding the Adopters and Non-Adopters of Broadband." *Communications of the ACM*, 52(1): 122-5.

Flamm, K., and Chaudhuri, A. (2007). "An Analysis of the Determinants of Broadband Access." *Telecommunications Policy*, 31: 312-326.

National Telecommunications and Information Administration & Economics and Statistics Administration. (2011). *Digital Nation: Expanding Internet Usage*. U.S. Department of Commerce.

National Telecommunications and Information Administration & Economics and Statistics Administration. (2011). *Exploring the Digital Nation: Computer and Internet Use at Home*. U.S. Department of Commerce.

Stenberg, P., and Morehart, M. (2012). "The Existence of Pent-up Demand for Rural Broadband Services: An Exploration." *Entrepreneurship, Social Capital and Governance*. Karlsson, C., Johansson, B., Stough, R. (Eds.), E. Elgar Publishing.

Stenberg, P., and Morehart, M. (2011). "Toward Understanding U.S. Rural-Urban Differences in Broadband Internet Adoption and Use." *Adoption, Usage, and Global Impact of Broadband Technologies: Diffusion, Practice and Policy*. Yogesh K. Dwivedi (Ed.), IGI Global.

Stenberg, P., Morehart, M., Vogel, S., Breneman, V., Cromartie, J., and Brown, D. (2009). *Broadband Internet's Value for Rural America*. Economic Research Report No. 78. U.S. Department of Agriculture, Economic Research Service, August. <http://www.ers.usda.gov/publications/err-economic-research-report/err78.aspx>

Further Information and Contact Person

For additional information on this topic, please contact **Peter Stenberg** at stenberg@ers.usda.gov or **202-694-5366**.

Cover photo credits: Shutterstock and Comstock

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and, where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.