

Broadband and Rural Development Efforts in Alabama's Black Belt: A Review of Current Literature

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Abstract

Broadband is widely perceived as an important instrument for accessing vital resources, such as jobs, education, and health care in this information driven society. Yet, some rural communities in the United States lagging behind in access. Rural communities remain disadvantaged by ongoing gaps in internet availability, particularly in the Alabama Black Belt, a 24-county area known for its rich soil, high rates of poverty, and predominantly African American population. To evaluate the current state of broadband infrastructure and its implications for rural development in the region, this study synthesizes 12 recent peer-reviewed articles, policy briefs, and other publications (2015–2026). The results show that although middle-mile connections have been enhanced by large public investments, such as the \$2.5 billion Alabama Fiber Network, sizable areas remain underserved or unserved. Extreme differences are highlighted by statistics, such as Greene County's pitiful 0.02% high-speed coverage at the 100/20 Mbps benchmark. Beyond infrastructure, research shows that broadband is a crucial social determinant of health, affecting telehealth access and health literacy. Inadequate connectivity also impedes STEM career pathways and educational attainment. In addition to ongoing empirical research into the intersectional barriers of race and rurality, the review concludes that reducing the digital divide necessitates a comprehensive approach that addresses affordability, digital literacy, and the "urban mindset" in policy design.

Keywords: Broadband access; Health Care Equality; Socioeconomic Inequities; Rural Development; Digital Divide and Alabama Black Belt

Introduction

Broadband internet has changed over the last ten years from being a luxury to a basic need, especially after the Covid-19 pandemic intensified societal dependence on the internet [1]. According to Early and Hernandez (2021) and Kelly and Sisneros (2020), broadband is now crucial for providing individuals with access to essential services, including healthcare, job opportunities, education, and valuable information [1,2]. Despite its vital role, significant gaps in broadband availability persist in the US, with rural areas facing the most severe problems [3-5]. The Alabama Black Belt region stands as a prominent example of this digital divide, consistently reporting some of the lowest connectivity rates in the nation [6].

The Black Belt, which includes 24 counties in Alabama, gets its name from its distinctive black, fertile soil. The area is characterized historically and sociologically by a population that is primarily African American, as well as systemic issues like high rates of poverty, few economic possibilities, and low levels of education [7,8]. Public health is impacted by these

socioeconomic characteristics; the region has far worse health outcomes than non-Black Belt counties, and these differences get worse as the proportion of Black citizens rises because of things like unemployment, poverty, and rurality [9]. The region's lack of high-speed internet connectivity, which impedes development, lies at the heart of these issues [6,10].

Because it determines the viability of economic opportunities, healthcare delivery, and educational access, broadband availability is increasingly recognized as crucial to rural development. According to recent research, rural areas' engagement in the digital economy is limited due to lower broadband penetration than in urban areas [11]. The main way to access services like telehealth, virtual learning, and workforce innovation, all of which are essential for stabilizing and expanding rural communities, is through high-speed infrastructure [9]. These communities are essentially denied access to the resources needed to raise their standard of living.

This paper reviews twelve key documents, including academic

journal articles, policy briefs, and institutional reports, to examine the state of broadband in Alabama's Black Belt. The review is organized into two primary sections: a thematic analysis of current findings and a discussion of the implications for future research.

Methodology

To identify literature focused on broadband connectivity and rural development in the Alabama Black Belt, this review used a thorough search across Google Scholar and Google. Terms like "broadband access," "broadband availability," "rural development," "Black Belt," and "Alabama" were among the search parameters. The search was limited to articles published from 2015 to 2026 to ensure the results are pertinent to the current situation in the area.

138 documents were found in the first search, and they were filtered based on whether they specifically addressed broadband in the Black Belt. A significant percentage of these results were eliminated because they were duplicates or lacked regional specificity. Only 10 papers met these requirements. Only two of the 20 additional documents identified by a later Google Scholar search were deemed pertinent after screening. In the end, 12 documents were selected for this study because they met the strict inclusion criteria.

Findings from Relevant Literature

The literature shows that the Black Belt's broadband infrastructure expansion has been both progressive and consistently unsuccessful. According to recent reports, "last-mile" connectivity remains a major obstacle for many residents, even though the "middle-mile" infrastructure is almost complete.

Public Investment and Progress

Through federal assistance and legislative action, Alabama has made significant strides in financing broadband development. The state has coordinated significant expenditures through the Connect Alabama Act (2021) and the Alabama Broadband Accessibility Act (2018), according to Katsinas et al. (2026). Since 2018, almost \$2.5 billion in federal and state financing has been allocated, according to Fisher (2025) and Taglang (2025) [12-14]. The 3,500-mile Alabama Fiber Network, which is almost finished and currently offers middle-mile coverage throughout all 67 counties, is a key accomplishment of this initiative [13].

In numerous counties, this investment has resulted in measurable gains. According to Katsinas et al. (2026), Choctaw, Perry, and Greene counties, which formerly had nearly no coverage, have improved to 24%, 27%, and 58% at the 100/20 Mbps standard, respectively. Nevertheless, the Black Belt as a whole still lags behind these regional achievements [12]. Compared to 87% statewide and 94% nationally, only 76% of Black Belt residents have high-speed internet connectivity on average [12,14].

Persistent Disparities and Service Gaps

Even with the financial inflows, certain areas remain virtually disconnected. Greene County still has "negligible" coverage of 0.02% at the 100+ Mbps speed tier, according to Katsinas et al. (2023), despite recent improvements. The Black Belt attains only 74% coverage, well below the 86% state average, even at the lower Federal Communications Commission (FCC) standard of 25 Mbps [6].

There has also been criticism of the "infrastructure-only" approach. According to Katsinas et al. (2026), the FCC's shift from 25 Mbps to 100 Mbps, which essentially reclassifies previously "served areas as "underserved," poses a threat to progress. Additionally, there's a chance providers won't keep their end of the bargain, leaving the most isolated and remote areas without connectivity [14].

Broadband As a Social Determinant of Health

Broadband's role as a social determinant of health (SDH) is a major issue in the reviewed literature. Lack of internet connectivity exacerbates already-existing health disparities in the Black Belt, where chronic conditions like diabetes and cancer are common.

Health Literacy and Digital Engagement

In their study of health literacy among 180 African American adults in the area, [15] discovered a high correlation between reduced health literacy and limited internet access. Just 25% of individuals used the internet to support lifestyle improvement, compared with nearly 50% who sought health information. This implies that although there is a need for digital health solutions, their efficacy is limited by unstable access and a lack of digital skills.

Further investigation by [16] revealed that social media use and higher education were important determinants of online health information-seeking behaviors. However, low use of technology for health was associated with higher levels of social isolation, suggesting that social networks influence one's adoption of digital health. The researchers observed that overall participation in digital health remains low, primarily due to intersecting infrastructure and socioeconomic challenges.

Barriers to Telehealth

The necessity of the internet for healthcare was highlighted by the COVID-19 epidemic. Although telehealth visits at the University of Alabama at Birmingham (UAB) increased to 230,000 during the pandemic, 40% of these sessions were audio-only because patients lacked broadband, according to Archibald (2020). Patients are unable to fully benefit from visual consultations, which are often necessary for precise diagnosis and monitoring, due to the digital divide in telemedicine [19]. Lee et al. (2023) used a socioeconomic determinants of health paradigm to show that only 60% of rural African American Alabamians surveyed had access to the internet at home [17,21]. They found that restricted access to technology was significantly predicted by factors such as food insecurity and lower levels of education, further exacerbating health inequities.

Workforce Development and Education

Modern education requires a broadband connection. However, Alabama's rural schools face structural obstacles that were worsened by the shift to virtual learning.

The Experience of Rural Schooling

Rogers et al. (2023) used teacher focus groups to examine the difficulties rural Alabama schools face. According to their findings, students experienced significant learning loss due to virtual learning being severely hindered by poor broadband and inconsistent device connectivity. Teachers stressed that state policies are often developed with an "urban mindset," resulting in one-size-fits-all solutions that fail to account for geographic isolation and rural poverty [18].

STEM Career Routes

The digital divide also has long-term effects on the workforce. To understand the extent of underrepresentation of low-income African Americans in STEM (science, technology, engineering, and mathematics) fields, Drummonds-Whiteside (2022) conducted a narrative investigation [20]. The study found that exposure to STEM learning opportunities is constrained by limited access to broadband and digital tools, prolonging cycles of exclusion from high-growth economic sectors.

Self-Efficacy and Technology Acceptance

Sullen (2024) investigated the variables influencing Macon County residents' adoption of technology and computer self-efficacy (CSE) [8]. The study found that although age and income are associated with CSE, people's actual use of technology and their perceptions of its usability are the best indicators of whether they will adopt new technologies such as videoconferencing. This implies that improving digital skills and cultivating a positive attitude toward technology are crucial for adoption, rather than merely providing infrastructure.

Research Gaps

One of the primary limitations of this review is the scarcity of academic research focused on Alabama's Black Belt in the last decade. While institutional reports and policy briefs offer useful information, there are still few empirical, peer-reviewed studies on the relationship between digital inequality, rurality, and race [12]. To properly understand the intergenerational effects of the digital divide, future studies should encompass all 24 Black Belt counties and include a variety of demographics, including families and young people.

Conclusion

The examined literature recommends several crucial avenues for enhancing rural development and broadband equity in the Black Belt. To guarantee long-term sustainability, they advise the state to move beyond the current Broadband Equity, Access, and Deployment (BEAD) funding. Among these are:

- Mitigating Provider Defaults: Preparing for situations in which ISPs in remote locations neglect to fulfill contract obligations [14].
- Digital Literacy and Affordability: Expanding device-access initiatives and funding digital literacy programs for all age groups [12]. According to Taglang (2025), cost and a lack of knowledge about subsidy programs are the main reasons why 20% of families do not have a broadband subscription [14].
- Holistic infrastructure planning, integrating broadband planning with additional important needs, such as water, sewage, and transportation. According to Katsinas et al. (2022), the "mediocre" state of rural roads and the wastewater crisis in Lowndes County are equally urgent problems that impede the region's overall development [4].

The future of Alabama's Black Belt is linked to internet connectivity. A successful broadband deployment is not just a technological achievement but also a long-term workforce and health plan that gives locals access to vital services and the ability to participate in the global economy (Katsinas et al., 2026) [12]. The "last mile" remains a formidable obstacle for the most vulnerable people in the area, even as recent investments have greatly expanded internet deployment.

Expanding infrastructure alone won't be enough to close the

digital divide; tackling the societal factors that hinder technology adoption is also necessary. Alabama may start to address the systemic and historical inequalities that have long impeded the Black Belt's growth by combining infrastructure deployment with digital literacy, affordability initiatives, and context-specific policy design.

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