



2021 Opportunity4All Essay Competition Series
Expanding Broadband in Rural Communities

Sponsored by – Charter Communications

Coordinated by – UF/IFAS Extension, 4-H Youth Development

Essay Topic: Opportunity4All Essay #2 - Impact of Connectivity on Rural Communities

Technological innovations have greatly shaped agriculture throughout time. From the creation of the plow to the global positioning system (GPS) driven precision farming equipment, humans have developed new ways to make farming more efficient and grow more food. Agriculture is often high tech, ranchers, farmers and others use science and technology to collect data, analyze efficiency, monitor growth and quality, and more to save money and yield better crops. However, in order to access these technological advancements, ranchers and farmers need access to reliable, high-speed broadband.

In the first Opportunity4All essay, 4-H members across the state discussed the impact that technology and broadband issues have on Florida's rural and agricultural communities.

Building from that, please discuss the opportunities and challenges of equal and accessible broadband connectivity in small and rural communities. What challenges hinder deployment and how does connectivity enable technology that enhances the food and agricultural enterprise for all Floridians, resulting in greater food safety, increased efficiency for lower prices, and reduced environmental and ecological impacts?

The first two essay topics in this series have brought in a total of 47 entries from 27 counties in Florida. The research and writing that these 4-H members took on within two weeks is astounding. While you will be hearing the top three from the second essay topic during the Real Rural Tech Talk, we wanted to make sure all the work for this competition was recognized. By clicking on the names below, you will be taken to that essay within this document. To see the entries from our first essay competition, please go [HERE](#).

[Anna Steed, Hillsborough](#)

[August Speisman, Duval](#)

[Jessica Conti, Escambia](#)

[Jessica Morris, Seminole](#)

[Ryleigh Rhoden, Bradford](#)

Opportunity4All Essay

By: Anna Steed

Over the past fifty years, the agriculture industry within Florida and throughout the world has dramatically transformed, being shaped most radically by technological advancements. However, along with the tremendous implications of technological advances come the importance and necessity of having reliable broadband connectivity. Recently, the agriculture industry's technology has allowed for substantial increases in Florida's food and agricultural enterprise. In the process of immersing broadband networks throughout Florida's vast rural communities come the challenges faced in day-to-day struggles and issues seen within internet-lacking agricultural communities and the successes that would be achieved with broadband input in these communities.

Although the outcomes of having broadband connectivity in rural agriculture communities are ideal, many factors in place pose hindering challenges, as "rural populations often have to contend with less reliable and slower internet than those living in towns and cities" (Smith). Today, it is seen across the border that farmers and ranchers depend on broadband just as they do highways, railways, and waterways to distribute their goods throughout the world (American Farm Bureau Federation). The efficiency of broadband use in the agriculture community outweighs other practices; however, "approximately twenty-five million Americans lack high-speed internet (or "broadband") access, 96% of whom live in rural areas" (Expanding Broadband Access to Rural Communities). To achieve full broadband coverage would mean spending millions of dollars, and the chief obstacles to having connectivity are the quality of the internet and affordability (Smith). While the price of installing efficient broadband is high, the benefits seen in productivity, profitability, and the environment outweigh the costs of imputing

reliable connectivity. Because there are many challenges in distributing broadband in rural communities, using companies with the proper management and tools will increase the outcomes of giving rural communities the broadband access and reliability they need.

As the agriculture industry relies more and more on technology's efficiency, it is essential to discuss the extreme benefits that technology provides the enterprise. According to the National Institute of Food and Agriculture, farmers rely less on the sole use of human resources for watering, fertilizing, and pesticide distribution, turning to technology that uses minimum quantities and targets specific areas and plants for increased production. "These advanced devices and precision agriculture and robotic systems allow businesses to be more profitable, efficient, safer, and more environmentally friendly" (National Institute of Food and Agriculture). With broadband access, a plethora of technological devices and assets become available to farmers, and these devices are what is changing the agriculture industry. "In its basic form, connectivity increases productivity by reducing inefficiency" (Waits). Not only do technological devices help ease the work that goes into the agriculture business, but the use of information technology as well. According to researchers and professors at the University of Florida, information technology use involves organizing and planning the synchronization of needs between various groups. This technology, such as market trackers and price calculators, is vital to members of the agriculture industry. They provide information that is relevant and important to all aspects of businesses. Technology is also crucial in the consideration of ecological issues. Having water, temperature, and pesticide measurements calculated is vital for helping the environment and maintaining food and farm safety. Using this technology helps eliminate simple mistakes and can save time, and promote conservation of resources. Today, more and more farmers are using precision agriculture techniques and making decisions that impact the

water, fertilizer, and care of plants. Businesses that rely on agriculture are seeing technology in their profitability, using market trackers and price calculators, and promoting environmental safety, all of which require broadband to function well.

Another aspect of broadband connectivity and the outcomes of having a reliable network are the impacts that it will have in the future. Having precise calculations and technology to monitor crops is essential in the overall production and cost of food in Florida. According to a report from ING, using tech to improve processing and packaging in the agriculture industry can improve food's overall shelf life and safety. Robotic machines that rely on broadband and the internet also eliminate some significant safety issues for some dangerous food industry jobs. It is important to many farmers in Florida and worldwide to consider the future of agriculture and the planet. Choosing broadband networks that support green, environmentally friendly technologies is essential for the benefit of everyone and the planet.

Ultimately, it is connectivity that will significantly impact Florida's rural areas, allowing growth in the agriculture industry and many other industries. Without a doubt, technology is unlike any other man-powered device seen in the agriculture world. Providing broadband across the state will increase connectivity, efficiency, and profitability in all aspects of the agriculture industry. The use of technology should be encouraged: for monitoring, safety, and prediction, which cannot be provided as fast or as well anywhere else. The benefits of installing technology access outweigh other hindrances, and it is essential to consider that technology is beneficial, and not just a waste of energy and money. With the help and access of broadband, technology innovation has led to advancements across the border, benefiting all aspects of production in the agriculture community, from producers to consumers and everyone in between.

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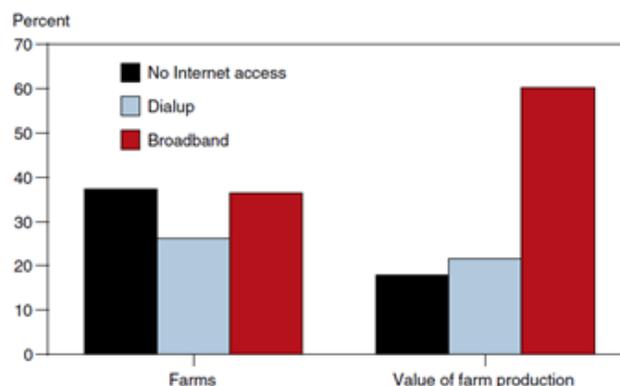
Why Broadband is Vital to the Food and Agriculture Industries

By: August Speisman

Throughout the nation, rural adults are 12% less likely than those who live in urban areas to have access to home broadband (Perrin, 2019). When farmers cannot access the internet, they miss out on many important opportunities. Even when farmers can access broadband, not all types are created equal, and many cheaper sources of internet, such as DSL, or Digital Subscriber Line, are not as reliable. This is not only problematic for the people living in those areas, but also harms the health of the planet and everyone who lives on it. While there are many challenges facing the expansion of faster internet, such as fiber, they can all be overcome. High quality broadband is essential in today's digitized world, and not providing it to farmers in the food and agriculture industries can be devastating not only to them, but also everyone else.

To begin with, people in the food and agriculture industries miss many vital opportunities due to simply lacking high-quality broadband internet, many of which have been exposed to the public eye by COVID-19. One major problem is healthcare. Smaller communities lose \$370,000 a year without access to telehealth (Stenberg, 2007), which hurts farmers. The chart below shows why broadband is so important on farms: when those farms have access to quality internet, their sales skyrocket above all those who do not. When rural communities are provided with broadband, it evens their playing field with urban and suburban communities that already have it.

Distribution of farms and value of farm production by Internet use, 2007



Source: ERS analysis of 2007 ARMS (USDA, NASS and ERS).

However, not all sources of internet are created equal, and cheaper forms of broadband, like DSL, are much slower and less reliable than cable and fiber. Fiber is the fastest of the three main types of broadband, which also includes DSL and cable, and although it is expensive, it is worth the cost, as fiber is about 100 times faster than DSL (Sparklight). Unfortunately, there have been several problems with deploying fiber, but they can all be fixed with enough effort. The main issue is that extending fiber over long distances is difficult and expensive. However, help from government subsidies, policies and other sources can fix this problem (Canevaro, 2018).

John Harley, an oyster farmer in Wakulla County, explained why having access to broadband he can “count on all the time” is so important. He said that although his DSL feels like it is “lightning speed” compared to old dial-up, it is still not always reliable. The internet went out when he was printing out shipping labels to ship oysters to a restaurant that is a significant income source for his business. He had to go to the library to print out the labels, which cost him a significant amount of time and “it was just a mess”. Although other sources of broadband, such as cable and fiber, may be more expensive, they are much more reliable, especially in rural areas. Another thing that he, along with a honey farmer named Jeff Lawhon, who is also based in Wakulla County, stressed was that they did not “feel real informed” about all the different types of internet and the government’s impact on them. The government must explain these differences to rural communities so they understand what their best options are.

Providing broadband access to rural communities is not only important for those who live there, but also everyone else. If farmers have access to the internet, the amount of fuel burnt will reduce by 40 percent, the amount of water used will decrease by 20 to 50 percent, and the quantity of chemicals used on the soil, such as from fertilizers, will be slashed by up to 80 percent.

The effects of broadband also include a 7.5% decrease in those at risk of hunger and, using blockchain technology, tracing the path of the food you eat should take no longer than two seconds (United States Department of Agriculture (USDA), 2019)! With rural access to quality internet, the planet and all of us who live on it are healthier.

In conclusion, fast internet is a necessity nowadays, and not having it can severely harm farmers. Without broadband, those in the food and agriculture industries cannot access many opportunities to support themselves and their families. In addition, the DSL that people in rural areas often use is slower and less reliable than other sources of broadband, such as fiber. Providing internet access to rural regions is not only important for those areas, but everywhere else. Even when there are obstacles to deploying high-quality fiber, in the end all the work will be worth the effort. If everyone works together to contact local officials and friends about why rural broadband is important, we can finally provide farmers with the quality internet access that they have needed for years.

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Opportunity4All Essay

By: Jessica Conti

The Internet is no longer a “nice to have” it is a critical part of our personal and professional lives. Living in a rural area of Escambia County, Florida; where the internet is patchy has shown me how important accessible broadband connectivity in small and rural communities is.

With the past year, Covid19 may have a silver lining as the dark cloud of the pandemic has highlighted the increased awareness that the current system for supporting access to high speed broadband in rural areas has failed. This is not going to change, the crisis has sped us forward and highlighted that there is a large internet access problem, especially in rural areas.

Rural broadband is essential to farmers and ranchers – many of the latest yield maximizing farming techniques require broadband connection for data collection and analysis performed both on the farm and in remote data centers. However, 29 percent of US farms have no access to Internet according to the USDA report, “Farm Computer Usage and Ownership 2017.”

America’s farmers and ranchers embrace technology that allows their farming businesses to be more efficient, economical, and environmentally friendly. Today’s farmers and ranchers are using precision agricultural techniques to make decisions that impact the amount of fertilizer a farmer needs to purchase and apply to the field, the amount of water needed to sustain the crop, and the amount and type of herbicides or pesticides the farmer may need to apply. These are only a few examples of the

way's farmers use broadband connectivity to achieve optimal yield, lower environmental impact and maximize profits.

Farmers and ranchers rely on broadband access to manage and operate a successful business, the same as small businesses do in urban and suburban America. Access to broadband is essential for farmers and ranchers to follow commodity markets, communicate with their customers, gain access to new markets around the world and, increasingly, for regulatory compliance.

Across the agricultural production cycle, farmers and ranchers can implement digital technologies as other modern businesses are doing, enhancing agriculture by driving decision-making based on integrated data, automating processes to increase operational efficiency, improving productivity with tasks driven by real-time insights, augmenting the role of management in the business of farming, and creating new markets with extended geographic reach.

Together, new technologies and ways of working combine to improve yields, reduce costs, improve labor efficiency, and increase revenues through great market access. Planning, Production and Market Coordination.

Connected technologies can improve profitability for producers, prosperity for agricultural communities and boost national competitiveness for the industry, especially for small producers and those in specialty crops and livestock who can benefit most from understanding and utilizing all the data their farms and ranches generate. This will take dedicated efforts to unlock the potential value for stakeholders. Harnessing the promise of e-connectivity, digital technologies, and

data will require new ways of working, new skills, and new tools, and additional action can accelerate their development, at USDA, in land-grant universities, and within industry.

What is the USDA committed to doing –

Broadband and Next Generation Precision Agriculture are critical components to creating a rural America with access to world-class resources, tools and opportunity, and USDA is committed to tackling the challenges that limit full realization of this potential.

USDA is taking early action to see where incisive government support can accelerate impact. USDA has launched an internal working group of relevant Mission Areas to analyze opportunities across programs and support coordination and action for the specific initiatives

Policy

USDA will work with other Federal agencies to remove barriers to broadband deployment and precision technology adoption and advocate for standards that facilitate scale.

Funding and Financing

USDA will continue to play its traditional role in improving access to capital where private markets are unable to do so at sustainable rates or levels. USDA is coordinating with, and providing technical assistance to, other Federal agencies making investments in rural broadband. In particular, USDA plans to launch already

appropriated infrastructure funding and will adjust existing programs, to the extent allowed by law, to recognize and encourage Precision Agriculture adoption.

Incubating

USDA will look for opportunities to test and scale the use of precision technologies where they can improve delivery of existing mission areas.

Planning

USDA will help local communities understand how specific resources and strategies fit their context, identifying patterns and models that can help accelerate deployment and adoption

Researching & Education

USDA will engage producers and other constituents to provide access to resource and local support a USDA offices and assets.

Rural broadband has become a national priority to address the e-connectivity gap and deliver increased economic and societal benefits. The American economy stands to capture substantial gains from e-connectivity through adoption of Next Generation Precision Agriculture. USDA's analysis estimates that connected technologies are poised to transform agricultural production and create a potential \$47-\$65 billion in annual gross benefits to the United States.

If Internet infrastructure, digital technologies at scale, and on-farm capabilities become available at a level that met estimated produced demand, the

US agriculture industry would realize benefits equivalent to nearly 18 percent of total production based on 2017 levels.

Unlocking this potential value requires America to scale adoption of connected next generation precision agriculture technologies and expand its rural broadband internet infrastructure.

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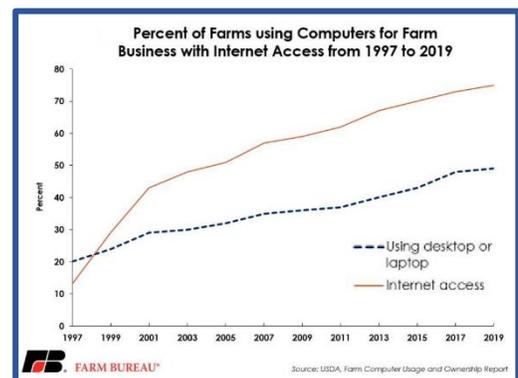
Cultivate Connections;

A look at what restricts internet deployment and the ways it could help agrarian communities in the United States.

By: Jessica Morris

Did you know that the USDA predicts a 649% revenue increase in premade salad pack sales over this decade because of new online marketing techniques by producers? They also estimate GPS-connected alignment technologies in row crops such as cabbage could result in a \$13.1 billion gross benefit annually in sales for the agricultural portion of America. These are only some of the numerous benefits that have been gained from spreading broadband network to farmers. This shows that networking could improve the quality of life for farmers and their consumers if broadband internet was extended to cover their farms. And yet, over 8% of people in Florida are without broadband access, mainly in rural areas where farms are common, and 7% of total people in the United States are deprived as well. But how, exactly, could this hinder agricultural farms? After all, they're not the most high tech of places, right?

Well, actually, farming can be one of the most technical industries of all! According to a survey report in 2019 by the USDA, a little under 50% of farmers use the internet to conduct farm-related business, and this number has been on a steady rise since 1997. Especially now with the pandemic sweeping the nation, both small family farmers and huge agricultural corporations need to be able to reach customers. Not only that, but to farm, you need supplies! The same research paper by the USDA also reported that



24% of farms order vital resources such as seeds, soil, chemicals, replacement parts, and animal feed online.

Now, you may be asking yourself, “If there’s so many benefits to getting internet access to farms, why don’t all farms have internet access?” Well, to expand the internet access, you need cell phone towers. And building a tough metal structure that huge *has* to be super expensive. However, there are most likely some other problems with expanding the broadband network, so it’s time to go straight to the source; internet companies.

Among those that responded to my requests for a discussion, Xfinity and Verizon both granted me an interview to discuss the network expansion problems. Verizon’s representative, Ms Francine Smith, was able to answer several of my questions about cell towers. In particular, she presented several unconsidered problems about building new cell towers that restricted the speed it could be built.

“Price is one problem, yes. But also, each new tower we build we have to get the land deeds to, and terrain also has to be taken into account. I know sandy areas and rocky zones can be very tough to build in properly so the time to build a proper tower so it stands as long as it needs can limit the speed of construction.” – Francine Swift, Verizon Representative

This correlates with information from an article by AGL media group, who interviewed tower construction workers in Louisiana who work on building towers in the expansive swamps, which is similar to Florida’s terrain. According to the article, the unstable conditions with the mud can cause towers to take almost 3 times as long to build, bringing the time from six to twelve months to a possible two years or more. Xfinity’s representative, Mr Aaron Johnson, also had some insight to give on this situation;

“Before we even start building, we have to get permits from the local government to ensure we can build, and depending on how fast their filing system is, we can wait up to a month or two before we get the green light.” – Aaron Johnson, Xfinity Representative.

Despite the problems with expanding the broadband, it marches forward slowly nonetheless, bringing opportunities to all within its grasp. One of the largest communities it benefits is the agricultural community, as mentioned prior. Being able to market goods, purchase supplies, and grow your business online helps you reach more people and gain more profit for all the hard work of the farmers. Access to the internet can also help future farmers who live on that land—Being able to document the soil PH value, crops that grow best, and analyze the entire farm scientifically can help farmers in the same area as you and farmers in the future know what is best and learn from mistakes of others. But to be able to share information like this in the most efficient way, internet is required. The final person interviewed was Mr Colin Holt, representative of John Deere, the biggest farm equipment producer in the world, and he had this to say;

“A lot of our new line of Precision Ag equipment is really nifty when it’s booted up to the internet—It’ll set you the best path to till or plant on and keep you straight when driving, tell you how far you’ve driven, how much gas you have left or if there are any equipment malfunctions—It’s basically a really fancy car made just for planting, and you can upload all the information to our database when you’re on Wi-Fi!” – Colin Holt, John Deere Representative

Overall, continuous improvement to agriculture will cause more efficient production, but to get to that point we must be patient and willing to allow internet providers to build the best internet grid possible, which will take time. Spreading the network will bring new opportunities

to farmers both big and small, and improve the quality, safety, efficiency, and prices of food grown locally. So while there are definitely issues with how fast it will grow, the world wide web will eventually be just that; the world wide web.

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Interview Transcripts Available Upon Request

(They’re separate word documents so I can’t link them here)

Connecting for Crops

By: Rhyleigh Rhoden

.....Loading.....reconnecting.....loading.....no internet access.....internet connection problem.....reconnecting...

Phew! Hopefully we are connected. The lack of high-speed Internet service in rural areas of Florida is inhibiting greater productivity, profitability, and food safety for farmers and ranchers. Without our farmers, Florida and the nation will starve.

Florida is a rapidly growing state, with a population over 21 million, according to the US Census Bureau. That's a lot of people to safely feed. "10 percent of Florida households(mainly rural areas) do not have access to reliable internet service," according to the internet provider database, [BroadbandNow](#). As our growth continues, people in rural areas having adequate internet access should be a priority; which would result in better farming efficiency and food safety.

Advances in technology require advances in connectivity. Farmers with high-speed Internet can easily check prices online , complete government paperwork electronically, ensure healthy crops/animals, communicate with other farmers, and sell to consumers. Farmers can expand their market to a regional, national or even global audience, which will positively impact Florida's agricultural industry and overall economy. Increased connectivity can harness all the benefits of big data collection , including reducing costs through reliable figures. Without broadband, these tasks are less efficient. Advanced GPS technology allows farmers to precisely measure water and fertilizer input. This can save water, reduce pollution by decreasing the need for gas /diesel powered motor vehicles, and increase the quality of our crops by ensuring they're growing healthy. For example,

nutrient deficiencies, pest problems, and even population counts can be detected or diagnosed with a drone more efficiently than motorized vehicles because drones allow one to view the entire area and even zoom in on specific areas of concern. Rural areas need high speed internet so they can take advantage of these advancements. After doing extensive research, it's clear that it's difficult for farmers and ranchers to have an adequate understanding of every acre of their crops without help from technology.

I consulted with several people in farming and agriculture who all agreed that slow or no connectivity negatively affects their production. First, I spoke to my grandfather, Mark Mooneyhan who has been growing palm trees and pecan trees for over 20 years. Living in a rural area, slow connectivity affects his research on bettering his crop about 50 % of the time. With over 400 acres of farmland, he admits it's nearly impossible to survey his land regularly. In turn, this allows pests, poachers, plant diseases, and other unknowns to potentially creep in. Though he realizes advances in technology could vastly help him keep an eye on all his land(cameras, drones), he fears the connectivity in his area wouldn't be strong enough to support such devices. Moreover, his frustrations furthered that he only has ONE internet provider in his county; they need more options.

I also spoke with our 4-H extension agent of the Youth Development Program for Bradford County, Samara Pervis. In her efforts to try to get kids more involved in 4-H, she's realized more than ever that connectivity for our youth is vital. Especially during our Covid-19 pandemic, if a youth didn't have internet access, there was basically no way to stay involved with 4-H. In talking with her, it was obvious she is saddened that our youth miss out on opportunities due to lacking internet connection or availability. She feels high

speed connectivity should be affordable and accessible to every youth in the state of Florida.

Mrs. Johnson, an agriscience teacher at Union County highschool is proud to have been a part of ag-education for over 30 years. Teaching in a rural area, she feels the internet is costly and unreliable. It's difficult to convey to students the need for technology advances when all the student has experienced is limited connectivity. Having formerly taught in Volusia County, she explained that her students who lived in town, internet was never an issue. However, her rural residing students were at a disadvantage. Internet access for students should be non-negotiable; especially in today's virtual times.

My great grandfather, Jack Lakes became a Master Gardener in the late 1990's in St. Johns County Florida. He reminded me that the gardeners that have reliable internet access and take advantage of technology advancement are so much further ahead than farmers with no connectivity. He also solemnly asked about the senior citizen residents in rural areas that were not able to stay in touch with their loved ones during the pandemic due to no connectivity. Technology often bridges the gap for quarantined senior citizens. Today he is 90 years old and still has a small tomato garden at his assisted living facility in Penney Farms, Florida. Penney Farms supports, encourages, and even provides the plot of land if their residents would like to grow and maintain a garden.

In conclusion, agriculture is Florida's second-largest industry, creating millions of jobs for Floridians and providing much economic revenue. But farmers need help to ensure efficiency and food safety. The health of Florida's farms affects us all. Fertile soils, abundant water, ripe growing seasons and skilled farmers combine to make Florida's agriculture industry one of the strongest in the country. Soon technology thanks to high

speed connectivity should be added to the list of contributors to Florida's strong agriculture industry but it should be available and affordable to everyone.

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[Broadband Connectivity Advancements for Rural America](#)

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<https://data.census.gov/cedsci/all?q=florida%20>

Samara Purvis

Bradford county 4-H extension agent

Erin Johnson

Union County High School Agricultural Teacher

Mark Mooneyhan

Raises pecan and palm trees as well as a small business owner

Starke, FL

Jack Lakes

Master gardener, Retired as an active duty Major from the United States Marine Corps,

Retired from Flagler College as Vice President/Head of Business