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Perspectives from the Field: The State of Rural Broadband in America

At Terranova Ranch, we farm a diverse crop mix of over twenty specialty crops in the San Joaquin Valley of California, about 30 miles southwest of Fresno and within 100 miles of Silicon Valley the technology capital of the USA. At Terranova Ranch, we are well known for being innovative, cutting edge with technology, automation and usually are the first to try and advance new concepts for agriculture in California.

I want to give you a flavor for our struggles with obtaining high-speed, dependable broadband service in our rural location. Five years ago, ATT approached us about providing a fiber connection and their equipment for service on our farm. They first quoted approximately \$875,000 and then about 6 months later, requoted \$1.5 million dollars. to put in fiber cable to the farm with speeds of 20 megabits up and 20 down. Their service fee was over \$500 per month. Needless to say, we declined their offer. I had the opportunity to give testimony to congresswoman Spanberger at a similar hearing several years ago at the Capitol and referenced the ATT situation. Over the years, we have had to endure low internet speeds of 5 megabytes down and 5 up to run our phones at a cost of \$130 per month and had to have a second service just to access the internet for online meetings and general access, paying \$228 per month for 21 mbps down and 5.2 up. At my home on the farm I only had 7 mbs down and 3 mbs up-I couldn't even watch a movie without watching the spinning dial trying to keep pace-price was \$80 per month We do have a fiber line running less than a mile from our headquarters, but it is a "long haul fiber" and no one is able to tap into it. Definitely frustrating.

Two years ago, we were able to obtain Starlink internet service which brought our broadband speeds up to 45/15 megabits per second, which was a real improvement. The initial cost per service for equipment was over \$550 for equipment along with monthly subscription rates.

One year ago, due to our reputation for wanting to be on the cutting edge with technology, we were given the opportunity to receive broadband service from a California company, Cal.net at competitive pricing and with speeds of 100/100 mbs. After becoming connected, and with Cal.net's expertise, we began to do something I had only dreamed about on the farm, automating our irrigation system in row crops using broadband. Crops that may only be in the ground for 150 days or less, primarily processing tomatoes. We were able to do this by installing automatic controls on our wells to turn them on and off along with portable, solar powered valves in our fields, that control our subsurface drip irrigation systems. Our pumps and valves are all connected to the cloud via LoRaWAN and on to our dashboard on either phone, tablet or laptop that controls the systems. In 2023 we began automating one tomato field (80 acres) as an experiment. This year, we now have over 7 fields (420 acres) connected by LoRaWAN to our pumps and the valves in the fields and controlled by a dashboard and fully automated thanks to high speed broadband service. We also have connected soil moisture meters, pressure sensors, flow meters to measure the water

were using, and sensors that measure the level of our underground aquifers. In the future, will have more devices connected throughout the farm. All the information is gathered together on one dashboard, making it easy to automate and control our fields' irrigation needs.

In 2023, we hosted a demonstration event on our farm that attracted about 35 other farmers and interested agencies from around our region that wanted to see the new system we were using on farm.

What does this mean for our farm? We now have precise control of our irrigation water that is applied to our crops so that we only put on the water necessary for the crops. And, rather than having to have someone open and close valves in the fields manually at all hours of the day and night trying to apply the correct amount of water for the crop, we can program each field to provide exactly the right amount of water and fertilizer needed on a daily basis. This is just the beginning of our on-farm technology program and the IoT on-farm. We can also program our pumps to shut off during electric peak pricing periods, keeping our costs down and providing electricity for others during high demand periods.

We also need high speed internet to be able to access other data for growing our crops. We subscribe to aerial photos that measure moisture stress and plant health of our fields on a weekly basis. Our foreman can access this on their tablets to find problem areas that need attention. Another service we use collects data from all of our wells via our power companies' smart meters and displays data along with predictive irrigation needs by crop along with weather information from our on-farm weather stations is provided via broadband. None of this would be possible without dependable, high-speed internet. We are currently starting to have our employees use electronic timecards for their work hours. They will simply input their daily time on their phone and then upload the information via internet to be processed for payment.

Unfortunately, other farms in the area are not as lucky as we have been with accessing high speed internet on their farms. Their internet access continues to be slow, expensive, and unreliable.

And this isn't just about on farm technology for irrigation. With high-speed internet, we are now able to have security cameras to help prevent farm theft. My mechanics can order parts for tractors online and are able to watch YouTube videos on how to make critical repairs that they are not familiar with.

Covid put the spotlight on the limited access to broadband in the San Joaquin Valley rural areas. Our farmworkers' children tried to connect their tablets to a single cell phone to download their schoolwork and continue their education. They didn't succeed. Those that were able had a parent drive them to local libraries, parked outside to connect and obtain access to their child's schoolwork. Telemedicine was and continues to be critical for many isolated, rural communities where health care is also limited. We may be rural, not the high-density targets for internet companies, but our requirements are no less important or needed. It always makes me fume when I see advertisements in large California cities advertising "one gigabyte" speeds to customers for ridiculously low pricing. Why them and not us? We have been left out. Please help us join the rest of the country with dependable, high-speed connectivity.

Thank you,

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