JOHN DEERE

TESTIMONY OF

CORY J. REED
SENIOR VICE PRESIDENT, INTELLIGENT SOLUTIONS,
DEERE & COMPANY

BEFORE THE

COMMITTEE ON
COMMERCE, SCIENCE, AND TRANSPORTATION
UNITED STATES SENATE

"Removing Barriers to Wireless Broadband Deployment"

October 7, 2015

TESTIMONY OF
Senior Vice President, Intelligent Solutions,
Deere & Company

BEFORE THE
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

"Removing Barriers to Wireless Broadband Deployment"

Chairman Thune, Ranking Member Nelson, and members of the Committee, thank you for holding this important hearing and for the opportunity to testify today on behalf of Deere & Company. John Deere is a global leader in the manufacture of agricultural, construction, turf and forestry equipment. Deere provides advanced agricultural and other equipment and services to customers that cultivate, harvest, transform, enrich and build upon the land to meet the world's dramatically increasing need for food, fuel, fiber and infrastructure. Deere has been providing innovative equipment and services to customers since 1837, and today, is pioneering state-of-the-art data and information solutions designed to greatly enhance productivity and sustainability.

This topic is of central importance to the economic vitality of the nation's rural communities, generally, and to the agricultural sector, in particular. Today, access to mobile broadband services is an essential component of a healthy and growing national economy. Rapid developments in broadband technology have not only opened unprecedented opportunities for economic activity, but also for education, health care services and cultural development. Despite the remarkable nationwide growth and innovation in broadband and

advanced technologies, however, too many rural communities in the United States lag significantly behind in access to those technologies and the extraordinary benefits that they can bring.

We at John Deere are acutely aware of this technology gap and the special difficulties it presents for the agricultural sector. The challenging economics of farming and the need to meet long-term demand have transformed agriculture in the U.S. and many other countries into a technology-driven sector increasingly dependent on access to broadband. The "Internet of Things" in rural America includes not only smart meters and smart appliances, but also smart tractors, combines, and production systems. In fact, the rapid adoption of information technologies and services across the agricultural economy today is no less significant than was the introduction of mechanization to farming almost 100 years ago.

Deere greatly appreciates this opportunity to discuss with the Committee the urgent need that we see for actions that will promote rapid deployment of broadband facilities and services in the agricultural sector. I am pleased to share several recommendations for steps that can be taken to bridge the gaps between those that have access to broadband and those that do not.

I. Rural Broadband Programs Must Make Deployment in Agricultural Areas a Priority to Address the Expanding Needs of American Farmers and Rural Communities

Megatrends in the today's global agricultural sector make accelerated deployment of expanded broadband systems and services critical. Farmers are

compelled by long-term demand to sustain unprecedented high levels of productivity by carefully managing costs while increasing yields from a finite amount of land. World population is projected to climb from approximately 7 billion today to more than 9 billion by 2050. This means that every hour, there are an additional 9,000 new mouths to feed globally, which equates to roughly enough new people to fill Washington Nationals Park more than five times each and every day. As incomes around the world rise, animal protein becomes a larger component of average diets. This, in turn, generates greater demand for grains. In most of the world there is a rising trend in farm sizes, scale and specialization as economies develop. Environmental sustainability and compliance is a growing challenge, and the supply of skilled labor for agriculture is not enough to meet the demand.

The stakes for the future of the Ag sector are high. Agriculture and agriculture-related industries contributed $789 billion to the U.S. gross domestic product (GDP) in 2013, a 4.7-percent share.[1] The agricultural economy extends to a wide range of other sectors that contribute added value to the economy. In 2013, 16.9 million full- and part-time jobs were related to agriculture—about 9.2 percent of total U.S. employment. Direct on-farm employment provided over 2.6 million of these jobs. Employment in related industries supported another 14.2 million jobs.[2]

---

[1] *See* USDA, Ag and Food Sectors and the Economy, available at: http://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/ag-and-food-sectors-and-the-economy.aspx.

[2] *See id.*

While the U.S. economy is now in its sixth year of recovery from recession, it remains fragile in some aspects, especially in rural areas. Urban employment now exceeds pre-recession levels but rural employment persists at levels well below its 2007 peak.[3] Rural populations have declined over the last several years, and 779 rural counties continued to lose jobs in 2014.[4] The population, economic and employment pressures in rural America continue to affect the agricultural sector. Between 2007 and 2012, the number of U.S. farms decreased by 4.3%.[5] One important bright spot in today's rural areas is increased productivity, arising from technology innovation and adoption that has fueled growth in U.S. agriculture.[6]

II. Broadband Deployment Policies Must Include Mobile, as Well as Fixed Services

The impacts of these megatrends are an everyday reality for American farmers who face constant pressure to improve efficiency, environmental stewardship, and output. For this purpose, farmers look to advanced smart farming technology solutions, including solutions that take advantage of mobile and fixed broadband access. Today, producers are able to farm to within a few centimeters of accuracy thanks to innovative GPS-enabled positioning systems

---

[3] *See* USDA, Rural America at a Glance, 2014, at 1, available at: http://www.ers.usda.gov/media/1697681/eb26.pdf.

[4] *See id.* at 1.

[5] *See* USDA, Preliminary Report Highlights, U.S. Farms and Farmers (Feb. 2014), available at: http://www.agcensus.usda.gov/Publications/2012/Preliminary_Report/Highlights.pdf.

[6] *See* USDA, Agricultural Productivity, available at: http://www.ers.usda.gov/topics/farm-economy/agricultural-productivity.aspx.

that are now standard on virtually all modern farming equipment, as supplemented with data available from satellite signals. Using these high precision techniques, advanced agricultural equipment and services now include technology that provides real-time agronomic data that can be analyzed to optimize the precise amount of seed, fertilizer and pesticides needed, reduce costs for fuel, labor, water, and identify best practices for fields in a given location. (Deere's Precision Ag Technologies, for instance, gives farmers access to detailed agronomic information in the field essential for improved decision-making with respect to managing costs and recourses.)

Where possible, producers using these precision agriculture techniques communicate via high-speed wireless broadband with customers and vendors, follow commodity markets, obtain real-time information on field conditions, weather and other environmental factors, and manage fleets and regulatory compliance. With access to mobile broadband services, farmers can also employ innovative machine-to-machine ("M2M") operations in the field and machine-to-farm ("M2F") from the field that enable producers to make significant improvements in real-time productivity and cost management.

Today these technologies are making an enormous contribution to improved used of limited resources, regulatory compliance and Ag sustainability. Precision technologies are enabling more efficient, prescriptive use of soils, water, fertilizer, herbicides and fuel by allowing producers to tailor farming practices and applications to the specific conditions of an individual field.

For example, when the farmer leaves his field in the fall, he is able to share harvest yields directly and immediately with trusted agronomist advisors. This helps the advisor to prescribe the appropriate amount of nutrients to be added back to the soil, based only on what the farmer took off at harvest, and ensure those nutrients are added and incorporated before winter. The farmer can also make decisions on which seeds to buy for next year, taking advantage of early order price discounts. By reducing inputs, improving resource management, minimizing land impacts and lowering costs, these technologies are delivering the promise of sustainability on the farm.

The economic impact of these technologies is significant. According to recent reports, data-driven decisions about irrigation, fertilization and harvesting can increase corn farm profitability by $5 to $100 per acre, and a recent 6-month pilot study found precision agriculture improved overall crop productivity by 15%.[7]

We must take steps now to bridge the gap between rural broadband availability and urban and suburban broadband availability. Mobile services, not only wireline fixed services, are essential to broadband deployment in rural and remote areas where infrastructure, land acquisition, and right-of-way costs are higher on a per capita basis than that of urban and suburban areas. To enable real-time sharing of data and communications, including in the context of

[7] *See* Kurt Marko, Forbes, Precision Agriculture Eats Data, CPUC Cycles: It's a Perfect Fit for Cloud Services (Aug. 25, 2015), available at: http://www.forbes.com/sites/kurtmarko/2015/08/25/precision-ag-cloud/.

innovative M2M and M2F interactions, precision agriculture technology requires access to both reliable mobile and wireline broadband services.

However, the harsh reality in the rural U.S. is that there is a significant lack of access to adequate mobile and fixed broadband coverage in the fields where agricultural equipment operates. Today, many John Deere customers are challenged by this lack of adequate mobile coverage. Deere's JDLink™ data service, for example, currently relies on the cellular telephone network to transmit telemetric machine operation data. The lack of coverage needed for these solutions to transmit telemetric data from the machines, already a concern, will only become more problematic as data volumes increase. In rural areas where farm machines operate today, JDLink™ data transmissions have a 70% successful call completion rate. Without significant improvements in cell coverage in agricultural areas, Deere expects that this figure could drop to about 50% in two to three years as agricultural demand for wireless broadband services increases. For these reasons, Deere supports the retention and even expansion of the FCC's Mobility fund and other funding sources as well as infrastructure policies and rules aimed at supporting expansion of rural mobile services.

III. Deployment Policies and Programs Should Assess Broadband Coverage Goals Based on Geographic Area and Functional Use; Croplands Require Coverage and Farms Should be Treated as Anchor Institutions

Deere believes it is time for federal agencies with broadband deployment mandates to view broadband availability through an expanded lens -- one that incorporates a geographic and functional usage metric aimed at advancing broadband deployment to industries and economic activities where access to this key input has fallen behind. Broadband access in active croplands, in particular, should be included as a metric in identifying areas of need and farm operations should be treated as "anchor institutions" for the purposes of existing support programs. While fixed broadband has penetrated the residential and business areas of many rural communities, the cropland areas where farming is done lags far behind in adequate mobile broadband access. Yet agricultural operations are no less important to the economic vitality of these same communities than are those commercial entities served by fixed broadband. By supporting increased wireless broadband deployment in areas where most farming operations occur (*i.e.*, in the fields), rural communities and the U.S. economy will benefit through increased economic growth, improved environmental stewardship, and enhanced food security.

Historically, federal funding programs at the FCC, NTIA and USDA aimed at spurring broadband deployment have focused on enabling last-mile connections to residential consumers and "anchor institutions," defined generally to include healthcare providers, schools, and libraries, as well as middle-mile facilities that enable last-mile connections to these ends. This assessment

framework overlooks significant geographic and functional-use areas of broadband demand and coverage, and the benefits that deployment to such unserved and underserved areas can create. Large swaths of agricultural land in the United States -- where people do not reside, but where they work and contribute to the rural and national economy -- are wholly lacking broadband coverage.

To address this gap, broadband access in active croplands (and farm buildings) should be included as a metric for identifying areas of need. There are a number of ways that "cropland" coverage can be assessed including by using the USDA's GIS data for crop operations or the US geological Survey's (USGS) Land Use classification.

It should be noted that farms represent a significant center of rural commercial activity. Owners, employees, buyers and vendors all conduct business in farm facilities and thus are important locations in rural communities. On that basis, as "anchor" institutions, farm operations should be given priority in implementing rural broadband support programs.[8]

Deere also recommends that government broadband support programs should count machine-to-machine mobile broadband transmissions, by agricultural equipment in the field and associated operators' mobile devices,

[8] Although the USDA reports that sixty-seven percent (67%) of U.S. farms had Internet service (DSL, wireless, cable, and satellite) in 2013, compared with sixty two percent (62%) in 2011 these figures do not reflect connectivity acreage under active crop production and whether the access that is being detected to the farmhouse is in fact sufficient to support today's smart farming operations. *See* USDA, NASS, *Farm Computer Usage and Ownership* (Aug. 2013), available at: http://www.nass.usda.gov/Publications/Methodology_and_Data_Quality/Computer_Usage/08_2013/fmpc0813.pdf.

when assessing the status of mobile broadband deployment. By counting the number of machines with modems working the 300+ million acres of cropland in the United States, program administrators will have better information to more accurately assess the availability and lack of availability of advanced broadband services in rural areas, and can then consider targeted ways to strengthen funding to those rural areas of the country that need it most. Counting only rural populations fails to account for the growth in modems imbedded in agricultural machinery or the economic impacts of the Ag sector.

IV. Funding Programs Need to Be Updated and Expanded

Deere endorses the expansion of the Universal Service Fund (USF) to include backhaul capacity and a variety of middle-mile projects. Effective rural broadband service requires backhaul capacity to keep up with expanding broadband demand. Further, all providers should be eligible to receive support for middle-mile facilities that support wireline backhaul for mobile broadband, not just for middle mile facilities that support wired last mile connections.

We should also allow USF support for standalone broadband services not tied to traditional telephone services. The widespread availability of standalone broadband service will give consumers greater choice in service and providers and will avoid rules that effectively force consumers to purchase services they do not want.

V. Infrastructure Policies Should be Evaluated to Promote Rural and Agricultural Access to Broadband

Finally, Deere supports efforts to promote expansion of the infrastructure necessary to expand wireless broadband deployment in rural and agricultural areas. In particular, we would encourage actions that streamline procedures for siting wireless tower infrastructure and installing conduit. We must ensure that all unnecessary barriers are removed, including delays and expense associated with permitting, federal, state and local siting approvals, and approvals to access highway and other rights of way. "Dig once" policies that avoid repeated excavations and the attendant costs delays, and disruptions, should be encouraged.

Conclusion

The future of our rural communities is closely linked to the strength of American agriculture. Today, the outlook for both is challenging but bright given the resourcefulness of American farmers, the advent of precision agriculture and other innovative farming technologies and the nation's extensive agricultural resources. Whether our rural communities are able to thrive in an increasingly technology-dependent world will be determined by whether we are successful in ensuring that agricultural operations have full access to advanced wireless services and technologies including high-speed broadband.

I appreciate the opportunity to provide the Committee some perspective on this critically important topic. Thank you all for your work and engagement in exploring solutions. I look forward to answering your questions and being an ongoing resource to the Committee. Thank you.