



How Broadband is Transforming Agriculture

NTIA Webinar Series

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July 19, 2017

Participants

Moderator

- Katherine Bates– Manager of Outreach, Broadband USA, NTIA, U.S. Department of Commerce

Presenters

- Kevin Hensley– Associate Director, Public Policy Division, Tennessee Farm Bureau Federation
- Trish Kelly– Managing Director, Valley Vision (Northern California)
- Ben Craker– Product Manager - Global Fuse: Data, Partnerships & Standards, AGCO

Presentations

- **Kevin Hensley– Associate Director Public Policy Division,
Tennessee Farm Bureau Federation**
- Trish Kelly– Managing Director, Valley Vision (Northern California)
- Ben Craker- Product Manager – Global Fuse: Data, Partnerships & Standards, AGCO

Broadband Needs of Agriculture and Rural People in Tennessee

Kevin Hensley

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Public Policy Division
Tennessee Farm Bureau
Federation

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Quality of Life



- Farm and Home
- Availability
- Social Media
- Streaming Services

Access to Education

- Opportunity
- Distance
- Homework at a fast food place?



Today's Economy



- Today's businesses need access to internet.
- Industry will not go into rural areas without internet access.
- 52% of farms' principle operator has a primary occupation off the farm.

Farm-Business Potential

- Internet can
 - Allow for data collection
 - Increase direct-to-consumer sales
 - Lower costs
 - Save time
 - Increase efficiency
 - Provide access to news, trends, markets



Sweetwater Valley Farm



- Dairy farm
- Farmstead cheese
- Internet sales and advertising
- Social media presence
- In-store credit card purchases

– Check out their website

<http://sweetwatervalley.com/>



Weaver Farms



- Diversified farm
- Direct-to-consumer sales
- Website and social media
- Daily internet use

– Check out their website

<http://www.weaverfarmsmeats.com/contact>



Tennessee Broadband Accessibility Act



link: <https://youtu.be/UI1T5-rZJu4>

Tennessee Broadband Accessibility Act



- Permits TN's Electric Coops to provide retail broadband internet & TV service.
- Education grants for libraries available to improve digital literacy.
- Provides \$45 million over three years in grants and tax credits for service providers building broadband infrastructure.

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How Broadband is Transforming Agriculture: Yolo County Ag Tech Project



Broadband USA



July 19, 2017 – Trish Kelly, Valley Vision



closing the digital divide in rural California

Connected Capital Broadband Consortium

Funded by the CPUC



Collaborates

To identify, plan, and facilitate improved broadband infrastructure across the region's 4 counties.



Connects

With the other consortia in the state; state and federal agencies; and other sectors to address the digital divide.



Advocates

For resources and policy changes to accelerate the deployment, accessibility, and adoption of broadband.



Infrastructure

To improve infrastructure, expand Telehealth, Agtech and increase digital literacy throughout the all areas of the region.

Need for Rural Broadband

- Only 43% of State's rural population (most residing in the Central Valley) has same Internet access as urban areas
- Food and Ag Cluster generates more than \$7.2 billion in direct economic impact, more than 31,000 jobs, more than 30% of exports (SACOG, 2016)
- UC Davis preeminent, generating ag technologies/5 year drought
- Central Valley has federal designation of one of 24 manufacturing regions nationally – poor broadband a major infrastructure challenge





Need for Rural Broadband

- Yolo Broadband Strategic Plan documented gaps in both urban and rural areas
- More than 90,000 persons are unserved or underserved in CCBC region
- Region's rural areas “locked out” of access to critical funding sources; pervasive barriers in filling market gaps

Primary Yolo County Infrastructure Grades (Based on CPUC data, 6 Mb/s down, 1.5 Mb/s up):

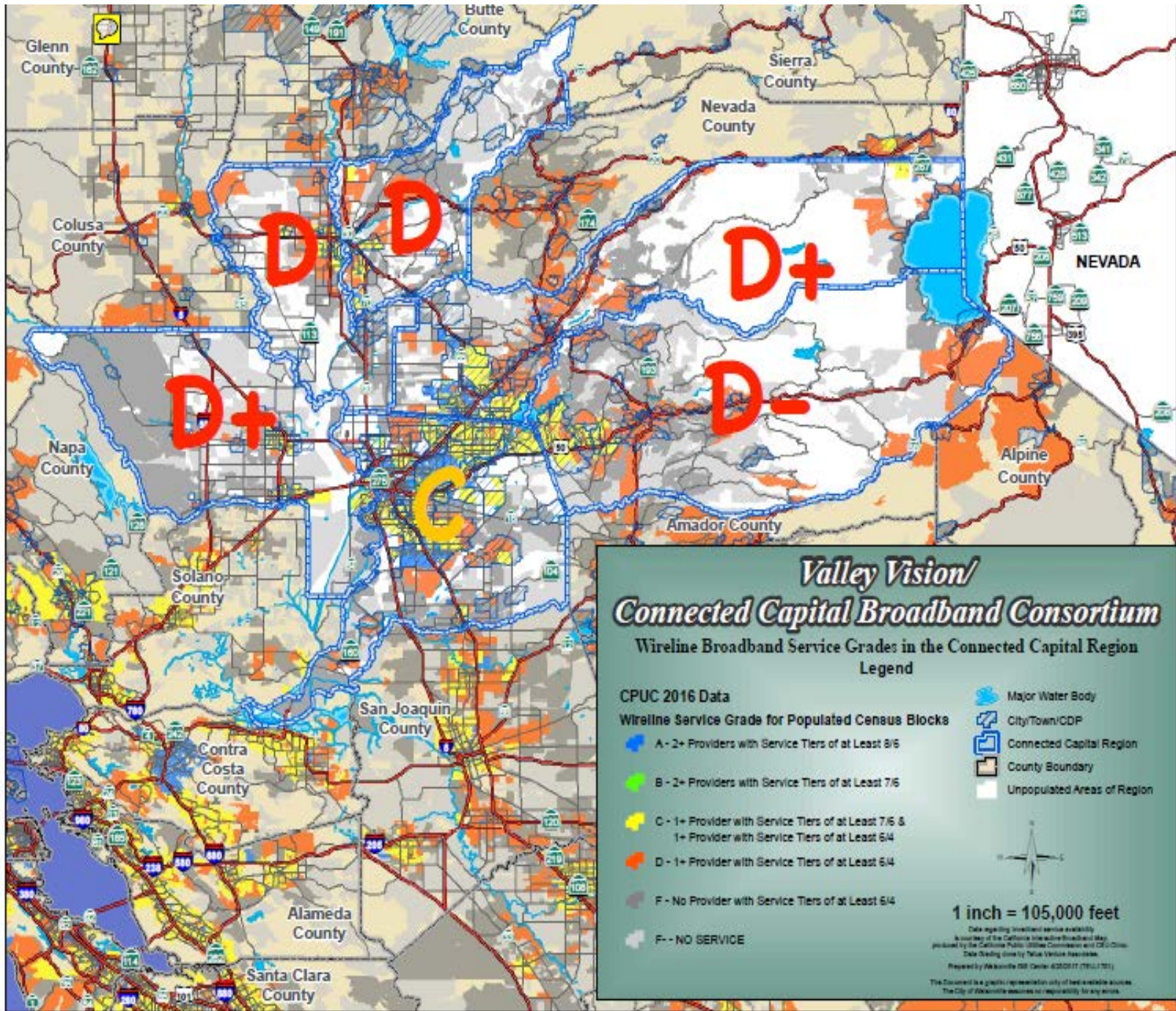
✓Yolo County = D-

✓Davis = D+, UC Davis = F+

✓Woodland = C-

Clarksburg CDP (the Delta) = F

West Sacramento = D+





AgTech Pilot Project

- California Emerging Technology Fund (CETF) funded Valley Vision and Fresno State to conduct an ag tech pilot in Yolo and Fresno counties (\$75,000 each)
- Technology neutral
- Testing three crops: grapes, almonds, tomatoes
- Leveraged funding from Internet Society (ISOC), SF Bay Area Chapter (\$20,000) for Chico State Geographical Information Center
- Advisory Board of education, USDA, private and public leaders

AgTech Pilot Project

Purpose/Goals



Document the need for and benefits of reliable, cost-effective broadband access in rural areas for agriculture



3 Goals

#1 – Demonstrate the value of Ag Tech to increase on-farm productivity; decrease water & energy usage; & reduce pollution through broadband as enabling technology

#2 – Verify claimed provider performance; increase the availability of broadband infrastructure for ag and rural communities

#3 - Introduce Ag Tech capabilities to Yolo and Fresno County farmers/growers



AgTech Pilot Project

Project Activities

PHASE 1 – Literature review on agriculture technology trends. First-ever mobile broadband testing of broadband speeds on 150 farms throughout Yolo County by Chico State University (ongoing)

PHASE 2 – Grower survey with qualitative data on broadband availability on and off farm. Yolo County Ag Commissioner included survey questions in annual letter to all farmers requesting data for annual crop report

PHASE 3 – Field study implementation, working with 3 farmers/2 technologies in Yolo County, 3 farmers/1 technology in Fresno County. Partnering with AgStart incubator to test cutting edge precision technologies and differences. Sensors installed spring on 2017; research and field test results from sensors and other technologies will be analyzed and presented in fall 2017

A man in a dark jacket and light shirt is looking at a tablet in a field. In the background, there are several large metal grain silos, a green tractor, and a red combine harvester. The sky is a mix of blue and orange, suggesting a sunset or sunrise. Overlaid on the scene are several semi-transparent windows showing data, maps, and charts, representing agricultural technology. A network of white lines connects various points across the top of the image, symbolizing connectivity or data flow.

AgTech Pilot Project

Research Findings

- Availability of bb for ag production/operations has serious implications for future of ag
- Deployment shows 20-30% less water usage, increased crop productivity
- Precision ag data is evolving into “big data” – exponential growth, availability and use of information, including analytics
- Precision Ag Market to reach \$7.8b globally by 2022
- Emerging issues – chronic labor shortage, aging of farmers; food safety. Ag technologies needed to help farmers better manage operations

Note: Picture credit, copyrighted image AGCO Corporation

A person in a plaid shirt is seen from behind, holding a laptop, standing in a field at sunset. The background is a warm, golden glow from the setting sun, with silhouettes of farm buildings and a tractor visible on the left.

AgTech Grower Survey Results

Gathered qualitative information on levels of broadband coverage on agricultural lands across the county

- 100 responses (to Yolo County Ag Commissioner's Office)
- 27% of farm report no coverage at all
- 73% of farms report some coverage, some from mobile "hot spots"



AgTech Field Study Process

- Technology's 3 performance criteria: lower resource input; increase crop yield/productivity; increase access to markets/boost bottom line
- Valley Vision coordinated with AgStart agtech incubator to connect ag tech companies with growers
- Companies demonstrated technologies to growers
- Farmers were paid \$1,000 each to beta test technologies

AgTech Field Study Technologies



- Wexus (tomatoes) – monitors pump efficiency and maintenance needs of wells and plugs into energy grid (Polaris monitors/supports hardware device installation; Wexus runs consumer-facing software; tracks energy and water use; provides reporting/alerting to the customer) (Yolo)
- TerAvion (grapes/almonds) – delivers aerial imagery through a platform for the growing season; offers mobile support (Yolo)
- DropControl, by WiseConn (3 crops) - improves automated irrigation systems through an on farm wireless sensor network and UAV image analysis technology (Fresno)

Mobile Broadband Testing

Project Objectives

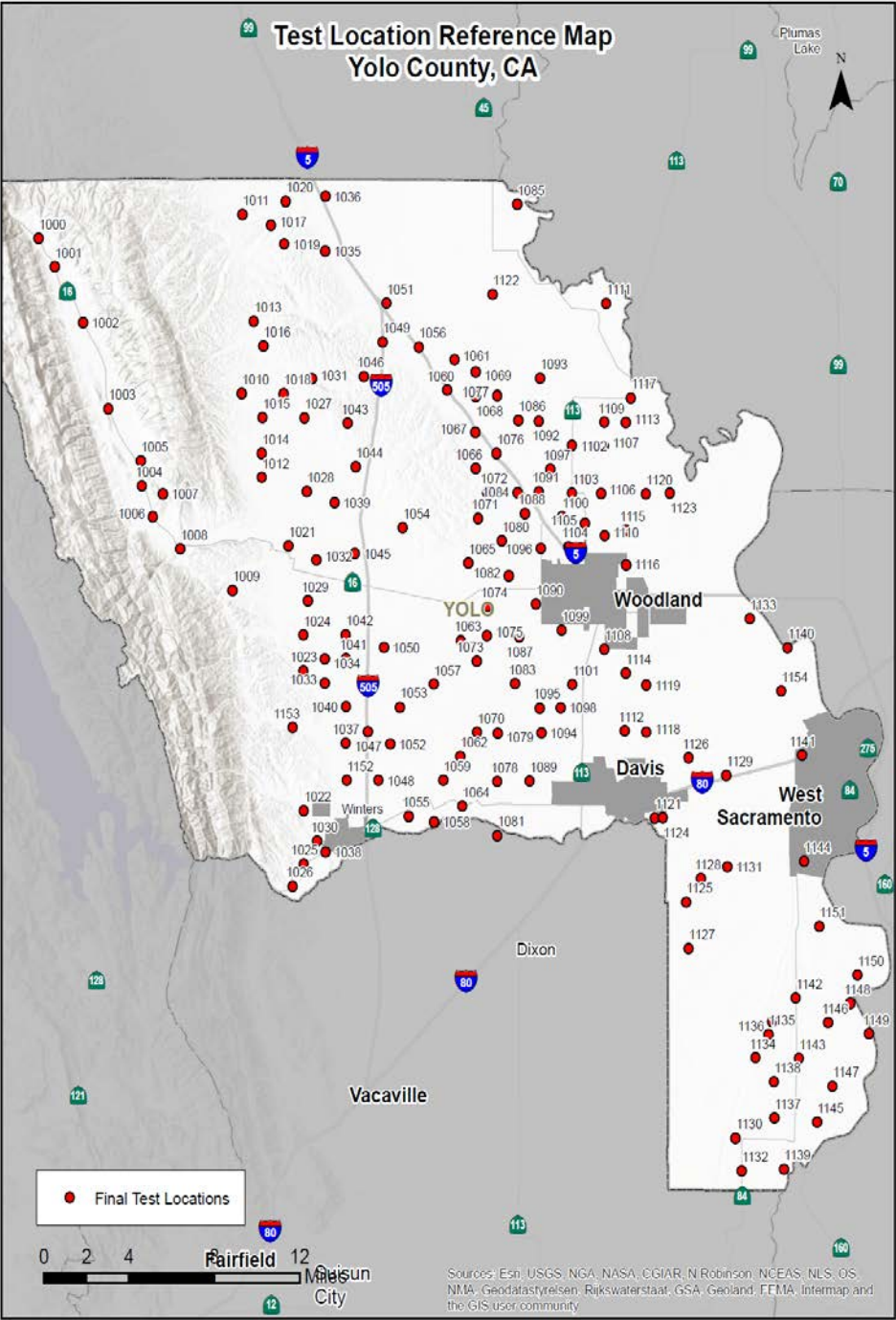
- Measure performance (speed) of mobile broadband in Yolo County ag areas (actual vs. reported), using CalSPEED mobile app, in ag areas covering 150 farms
- Inform Valley Vision's efforts to document the need and market for rural infrastructure investment to enable adoption of precision agriculture technologies





Mobile Broadband Testing Yolo County Outcomes to Date

- Completed Phase I testing from roads in agricultural areas that identified 3 major areas of limited broadband
- Phase II will test in farm fields themselves, 3 in areas of limited broadband and 3 in areas of higher performance to measure variability of farm operations
- The results will be compared to precision ag performance needs
- Data in spreadsheet and in a GIS geodatabase



What's Next

- Project has resulted in new partnerships and project opportunities, raising visibility of issues
- Regional Leadership priority including for Farm Bill discussions
- UC Agriculture and Natural Resources, statewide Apps For Ag Hackathon Competition, 2017 Davis and Sacramento; AgTech Roundtable; CA Broadband Council; USDA
- Fall 2017 – field mapping and pilot final results
- Dissemination – Inform public policy on rural broadband priorities

Presentations

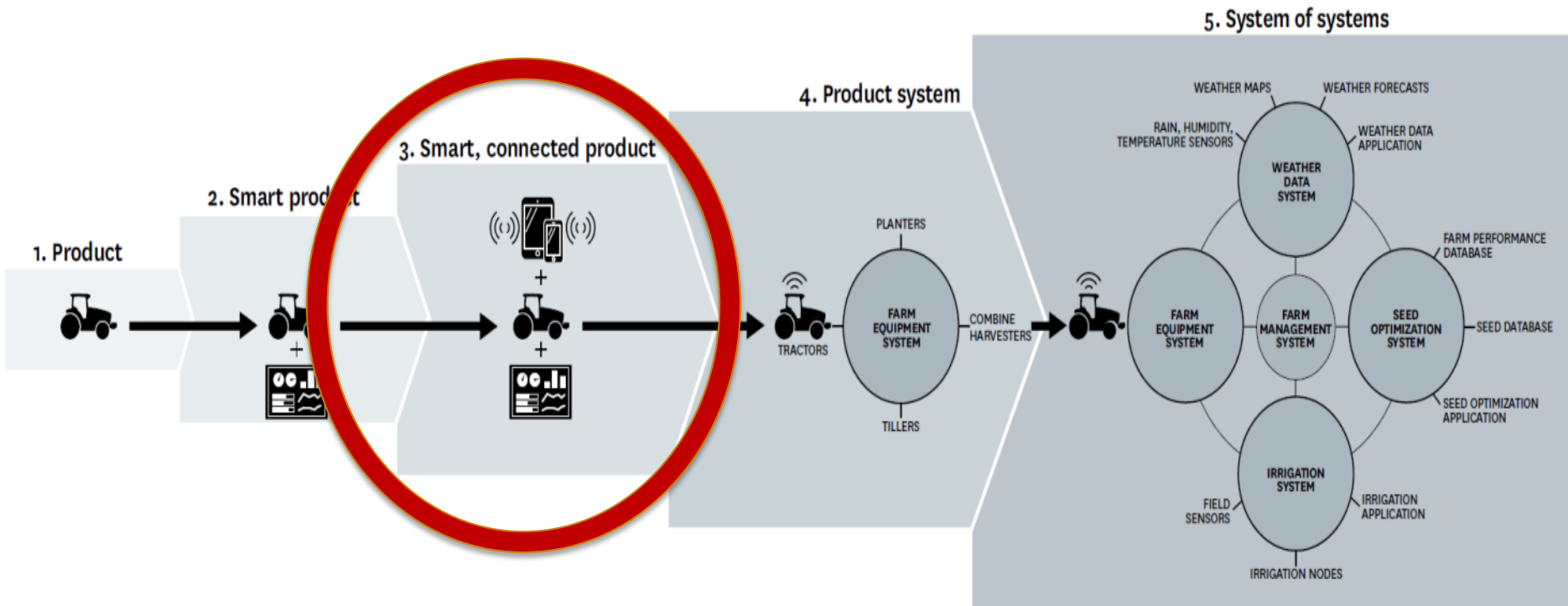
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Connectivity Needs for Modern Agriculture

Technology Progression in Agriculture

Note: Image from November 2014 Harvard Business Review, Porter & Heppelmann





Remote monitoring of grain conditioning and storage equipment

Farm office connection for market information, file transfer, use of cloud based agronomic/ERP platforms, input & logistics management, communication with advisors

Wireless transfer of work orders: variable rate application or seeding files

Remote monitoring of swine & poultry facilities

Supply chain interaction with vendors, inventory, regulatory reporting, imagery and other agronomic tools & services

Wireless transfer of work records: yield files, as applied

Mobile apps & other field scouting tools

Remote monitoring of machines for logistics, machine health, maintenance, software updates, terminal mirroring

Irrigation system monitoring, control and work order/work record transfer

Infield IoT sensors: weather, moisture, soil properties, plant health/growth

Equipment monitoring and other services enabled by connected machines

GNSS correction signals for guidance systems (NTRIP)

Connectivity Needs Summary

- Farm Office, service providers & advisors
 - ERP and operations management tools
 - Agronomic analysis tools
 - Commodity and other market info & trading
 - Communication with advisors
 - Regulatory & sustainability reporting
 - Logistics and fleet management
 - Remote monitoring of stationary assets
 - Communication & coordination with employees and contractors
 - Access to online data: aerial imagery, soil type maps, weather...
- Machinery and other equipment
 - Work order transfer
 - Work record transfer
 - Remote monitoring
 - Logistics
 - Machine health & maintenance
 - Status and location tracking
 - Record keeping & reporting
 - Remote software updates
 - Remote support/terminal mirroring
 - Remote control and monitoring of grain storage & conditioning equipment
 - Remote monitoring of weather & in-field conditions

How Broadband is Transforming Agriculture

Questions and Comments

- Please type your questions in the chat or Q&A box.
- Slides and Transcript will be posted on the BroadbandUSA website within 7 days after the webinar.

<http://www2.ntia.doc.gov/>

Broadband USA

Thank you for attending.

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Digital Training and Workforce Development

September 20, 2017

2:00 pm EST

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