

**Testimony to the
Committee on Appropriations Subcommittee on Agriculture, Rural Development, Food and Drug
Administration, and Related Agencies
Thursday, April 29, 2021
Diversifying On-Farm Income: Opportunities to Strengthen Rural America**

Madam Chairwoman Baldwin, Ranking Member Hoeven and distinguished Senators, thank you for the opportunity to testify before this hearing of the Committee on Appropriations Subcommittee on Agriculture, Rural Development, Food and Drug Administration, and Related Agencies about 'Diversifying On-Farm Income: Opportunities to Strengthen Rural America.'

My name is Brian Carroll, and I am director of the Grand Farm Education and Research Initiative located near Fargo, North Dakota. It is an honor to be with you today.

The Red River valley has a long history of agricultural innovation with locally grown companies like Titan Machinery, Bobcat, and Steiger Tractor Company. Building on that history of innovation, the Grand Farm accelerates the research and innovation to develop technologies of the farm of the future by producing solutions for the big challenges facing the agriculture industry. Essentially, we provide a neutral platform for projects and demonstrations that energizes collaboration among businesses, organizations, and researchers.

History of the Grand Farm

In March of 2017 at 1 Million Cups Fargo, Barry Batcheller, a local entrepreneur and founder of Phoenix International, issued a challenge to our community. Batcheller challenged us to define a "major" — a specialty that attracts new businesses and innovation to their area. In the days following farm, business and civic leaders came together and discussed how our region's major could center around advanced technology in agriculture.

Emerging Prairie, a local nonprofit with a mission to energize communities, took the lead in bringing the major for the region to life. Emerging Prairie worked with local, state, and national leaders to define five strategic pillars:

- developing an advanced agriculture technology ecosystem
- creating a coding and robotics school
- establishing autonomous friendly policy
- bringing a world-class venture capital organization to the region, and
- developing the Grand Farm Innovation Site.

Immediately following the definition of these priorities, a local farmer donated 40-acres of farmland 6-miles south of Fargo, to help launch the Grand Farm test site. A steering committee formed to guide the initiative:



- Lauris Molbert, Venture Partner, Arthur Ventures - Steering Committee Chair
- Christi Offutt, Chair of RD Offutt Co.
- Barry Batcheller, Chair of Appareo
- Tammy Miller, CEO of Border States Electric
- Jake Joraanstad, Cofounder of Bushel
- Eric Hardmeyer, CEO Bank of North Dakota
- Kevin Biffert, Founder of Fargo Automation
- Mike Derheim, Cofounder of The Nerderly & Prime Digital Academy
- Michelle Kommer, Commissioner of ND Department of Commerce
- Greg Tehven, Cofounder of Emerging Prairie

The momentum around the initiative built through the following year. In July 2018, at TEDxFargo Barry Batchellor presented a vision for creating “Robosention Valley” throughout the Red River Valley to focus on the mechanization and automation of production agriculture through the intersection of technology, innovation and research. At the same event, Brad Smith, president of Microsoft, discussed the rural-digital divide, highlighting the disparity of opportunity based on geographic location and accessibility to stable, reliable, and fast internet connectivity.

By the spring of 2019, we were positioned with land, partners and projects and Emerging Prairie welcomed Secretary of Agriculture, Sonny Perdue to Fargo, ND, to break ground on the Grand Farm Test Site. This brought national attention to the Grand Farm with several key stakeholders coming forth and the subsequent launch of several of the five strategic pillars within the next year.

Building off the growing national attention, in late 2019 Microsoft came in with a big bet by investing \$1.5 million over 3 years into the development and establishment of the Grand Farm. During the announcement Mr. Smith commented,

“Our ambition is to partner Microsoft technology, technologists, and data scientists with North Dakota farmers and entrepreneurs to build a world-class leading ag innovation center that showcases the “farm of the future.”

The partnership between Microsoft and the Grand Farm is founded on a joint focus on increasing collaboration in agriculture technology. We agree that it takes an entire ecosystem to initiate change, and that includes private companies, government agencies, and a network of startups and entrepreneurs, all with a common goal and desire to find solutions for the world’s largest problems, including food insecurity.

With this funding secured, Emerging Priairie established a separate 501(c)(3) non-profit in 2020 and named it the Grand Farm Research and Education Initiative, Inc. Grand Farm’s Board of Directors are:

- Mike Derheim, Board Chair, Co-Founder of Prime Digital Academy
- Taya Spelhaug, Board Member, TechSpark Manager at Microsoft
- Jay Schuler, Board Member, Regional Ag Entrepreneur
- Cynthia Schreiber-Beck, Board Member, North Dakota State Representative
- Mark Watne, Board Member, President of the North Dakota Farmers Union

Following nine months of active recruitment, in March 2020, Plug-and-Play announced the launch of Plug-and-Play North Dakota. Plug-and-Play, in partnership with Bremer Bank, Microsoft Corporation,

OCP Group, and CHS, expands the innovation platform and entrepreneurial ecosystem in Fargo. Plug-and-Play North Dakota engages start ups through six-month cohorts. Since its launch, 42 start-ups are engaged in the ag tech ecosystem from around the world.

April 2020, we launched the Emerging Digital Academy to address the challenge in the region of the lack of a technology workforce. The 20-week coding and software development bootcamp was launched with the support of 11 industry partners and 13 students in the first cohort. Since this launch, 31 learners have graduated the program (92% graduation rate), and seven learners are currently in the program's fourth cohort.

Last summer the Grand Farm Innovation Test Site continued to build momentum. Working with North Dakota State University, CHS, and USDA's Agricultural Research Service we identified several core projects for the test site and planted it to soybeans, corn, sugarbeets, sunflowers and wheat. This led to over 40 innovative, agriculture technology projects through last summer with nine different organizations and companies. Additionally, we held 22 outdoor events through the summer. The energy around the Test Site culminated in an autonomous truck demonstration in October with North Dakota Department of Transportation which brought more than 30 state legislators together to discuss autonomous technologies and future policies that may be needed.

The Grand Farm of Today

As the growing season begins this year, Grand Farm will deploy over 200 projects on the Test Site with over 130 acres planted to soybeans, corn, rye, sugarbeets, wheat, and sunflowers. We are currently working with over 30 participating partners, which are listed in the attached slide, many of which are private companies collaborating with public and private entities to innovate together and demonstrate new ag technologies. Our projects this summer include technologies in precision agriculture, robotics, autonomous systems, biologics, big data, satellites, internet-of-things, and connectivity solutions. Additionally, with the reopening of our region, we have 66 outdoor events planned through the summer, many of which will be streamed, to engage farmers, entrepreneurs, startup, and students of all ages.

Since the launch of the Grand Farm initiative, and with the expansion of virtual meetings through the COVID pandemic, the team has been able to meet with hundreds of organizations from around the world. We've connected with industry, higher education, research organizations, grower organizations, and government agencies. We've discovered that the Grand Farm is uniquely positioned as a neutral platform for all, providing a place for agriculture technology innovators from all types of organizations to dream of the future. As a neutral platform, Grand Farm facilitates conversations – and those conversations lead to projects and collaborations and amplification. The Grand Farm provides the agricultural technology industry connection, facilitation, and amplification.

United States Department of Agriculture Programs

Several programs administered through United States Department of Agriculture are of particular interest to the Grand Farm.

The Rural Innovation Stronger Economy (RISE) grant program is in strong alignment with our five strategic pillars in its goal to provide innovation centers which improve economic resiliency. We intend to apply for this opportunity when the program is announced in the coming months.

As the Grand Farm recruits and engages the agriculture technology industry from around the world, we do so to develop technology and commercialize products in our region with the goal of producing high paying jobs and accelerating the formation of new businesses. Additionally, our Emerging Digital Academy upskills our region's workforce by providing a low-cost educational program in coding and software development. These learners graduate with the skills necessary to fill entry-level software development positions.

We are planning for a grant application to this program this summer to accelerate the private investments of our corporate partners and begin building a long-term campus for the Grand Farm. It is our vision to have an innovation center surrounded by demonstration fields, research plots and creative spaces for startups and entrepreneurs to identify challenges and work collaboratively to find solutions.

Another program of interest is the Agricultural Innovation Center Program, which we envision would provide support for amplifying the applied research at the Grand Farm. We're designing our application specifically to fund projects for value-added agriculture in our region, such as hemp, and to support the growth and commercialization of those products in our region.

In 2020, our parent organization, Emerging Prairie, was awarded a \$50,000 Rural Business Enterprise Grant from USDA Rural Development. This grant provided the funding for Emerging Prairie to establish the formal entity of the Grand Farm, to develop and execute our initial business strategy. The foundational investment from Microsoft provided the matching funds needed for this helpful grant program.

One offering to our ecosystem that the Grand Farm is developing is a potential Start-Up Grant Support Program. This would provide support for start-ups and small businesses with applications to Small Business Innovation and Research, Small Business Technology Transfer, and the Agriculture Food and Research Initiative grant programs. These USDA programs are annually awarded and provide support to many start-ups and small businesses. Through this service, Grand Farm would provide start-ups and small businesses with a faculty member or graduate student, industry mentor, and grant training. We are currently looking at a Small Business Administration grant opportunity to provide capital to start offering this service to start-ups and small businesses.

Additionally, although not a formal USDA program, the Grand Farm is actively involved with the Federal Communications Commission Task Force for Reviewing the Connectivity and Technology Needs of Precision Agriculture in the United States. The Secretary of Agriculture sits on the Task Force and USDA staff provide support and expertise to the Task Force. On multiple occasions our staff has reported to the task force about the future of agricultural technology and the connectivity needs of autonomous technology for the farm of the future. Many of the connectivity projects on the Grand Farm are based on challenges and interest areas those task force members identified.

Regional Collaborations

The Grand Farm initiative would not be what it is today without several key supporters and regional collaborators.

The State of North Dakota

Multiple agencies within the state of North Dakota have provided significant support to the Grand Farm, including the North Dakota Department of Commerce, North Dakota Department of Transportation, and North Dakota Department of Information Technology. Grand Farm continues to coordinate with these agencies to develop programs that support the goals of the state of North Dakota. Leaders from the State government sit on many Grand Farm task forces providing thought leadership and expertise to the initiative.

North Dakota State University (NDSU)

Following the launch of the Grand Farm, North Dakota State University quickly became a key partner providing thought leadership on the steering committee and the Emerging Prairie board of directors. Even as our first growing season at the Grand Farm began during the pandemic, it was a tremendous success due in part to our collaboration with NDSU. Several key projects at the Grand Farm were conducted by NDSU students, staff, and faculty members, and were amplified through industry connections, social media, articles and speaking opportunities. Key personnel currently involved are from the North Dakota Agricultural Experiment Station and the Office of Research and Creative Activities, but interest is growing to include NDSU Extension and others across the university.

University of North Dakota

At Grand Farm's inception, the University of North Dakota invited the Grand Farm team to the Big Data, Big Ideas conference. The conversations at that conference led to the development of Project X, a project focused on traceability in agriculture. Since then, Grand Farm has collaborated with UND's Research Institute for Autonomous Systems, Center for Innovation, and the Computational Research Center. These partnerships have led to several collaborative grant proposals focused on innovations in the autonomous industry and economic development. One such proposed collaborative program is the North Dakota Autonomous Technology Corridor. We have a grant application under development for the Economic Development Administration's Build-to-Scale grant program that would establish a regional ecosystem in autonomous technologies between Fargo, North Dakota and Grand Forks, North Dakota.

Greater Fargo-Moorhead Economic Development Corporation

Grand Farm and the Greater Fargo-Moorhead Economic Development Corporation work closely together to identify opportunities to increase economic development opportunities, bring collaboration with local companies and attract companies to the Fargo-Moorhead region. Through regular collaboration and close communication, Grand Farm and the GFMEDC are closely aligned on our goals to bring more energy to the region.

University of Minnesota Crookston

The Veden Center of Rural Economic Development and Grand Farm worked with rural communities throughout Minnesota and North Dakota on several grant programs to support rural communities and military veterans in the agriculture industry. This partnership helped Grand Farm form early connections with rural stakeholders and provided a foundation in thought leadership about how Grand Farm could serve rural America.

Grow North

Grow North is an organization based in Minnesota focused on creating an interconnected, sophisticated, invested, and accessible ecosystem for Minnesota's entrepreneurs and innovators across food and agriculture. There were many synergies identified with their work and Grand Farm and work has begun on working together on growing the ecosystem and introducing companies to new work.

BioKansas

Through conversations with Biokansas, a nonprofit focused on the life science ecosystem in Kansas, it was recognized that there were opportunities to amplify the work being done in both ecosystems. Just yesterday we co-hosted a virtual event that featured the Lieutenant Governor of Kansas and the Commissioner of the North Dakota Department of Commerce discussing work being done in each state. It showcased four startups and four established companies, highlighting the innovative work they're doing in ag tech and life sciences. By jointly amplifying the innovative work in both states we hope to build continued connection, identify and build on synergies in the two ecosystems and continue to highlight the innovation happening across the Great Plains.

Midwest AgTech Innovation Corridor

At the heart of Grand Farm is the idea of innovation through collaboration and the importance of promoting innovation in our ecosystem and across our region. Grand Farm is in preliminary talks with other Midwest innovation catalyzers about building a Midwest AgTech Innovation Corridor to facilitate communication and dialogue to work together across the region. We have initial interest from BioKansas, MBOLD, Grow North, Wabash Heartland Innovation Network, AgriNovus, AgLaunch, Agriculture Utilization Research Initiative, and the Midwest Row Crop Collaborative. And we offer the invitation to other Midwest innovation catalyzers to reach out to us if they would like to learn more.

Success Stories

In the few years since Barry Batcheller's challenge to the Fargo region, the Grand Farm initiative is grateful to report several key success stories.

Emerging Digital Academy

Since launching in April 2020, Emerging Digital Academy (EDA) has graduated 31 learners over three cohorts and has had a graduation rate of 92%. Before entering the program, these learners had an average salary of \$24,460 -- upon placement into jobs, these learners have an average salary of \$52,000. All learners from the first two cohorts who actively sought jobs found employment. This transformation is life changing, as highlighted by this learner from the first cohort:

"Receiving a scholarship to EDA was a turning point in my life. Had I not received the scholarship, I would not have been able to afford the academy. EDA took me from my lowest point of my life nine months ago, to the peak I'm at now. I have secured a reputable position with a company I previously would've only dreamed of working for. My perspective on life has changed and I'm excited to see where my new career path leads me."

Emerging Digital Academy has been supported by the private sector, with seven Founding "Forever" Partners (Microsoft, Scheels, Bushel, OnSharp, Fueling Our Future, Sycorr, and CoSchedule) and four Academy Supporters (Codelation, Stoneridge Software, AT&T, and Network Center). This support has extended beyond launch, with many of these partners hiring learners who have graduated from the program. The steering committee supporting the development and launch of Emerging Digital Academy included:

- Byron Snider, Board Chair, SIS-Leader, Scheels
- Nathan Joraanstad, Director of Engineering, Bushel
- Taya Spelhaug, TechSpark Manager, Microsoft
- Kelly Dawson, Senior VP - Human Resources, Border States Electric
- Katie Bjornson, Technology Solutions Provider, Sanford Health
- Darin King, Vice Chancellor of IT, North Dakota University System
- Kirk Anton, Senior Sales Manager, Heat Transfer Warehouse
- Gary Inman, IT Manager, Bell Bank
- Staci Holzheimer, University & Student Development Coordinator, Bank of ND

North Dakota Department of Transportation Autonomous Truck Launch

On October 6, 2020, Grand Farm hosted the launch of an autonomous truck developed through a collaboration between Kratos Defense and North Dakota Department of Transportation (NDDOT) to increase safety for NDDOT employees. The development of this autonomous truck technology was achieved through a grant provided by the Federal Highway Administration's Accelerated Innovation Deployment (AID) program.

Following this launch, Grand Farm worked within the AgTech ecosystem to identify agricultural challenges where this autonomous technology could be adapted for immediate impact. These stakeholder conversations identified substantial workforce shortages in the sugarbeet industry. This identified challenge led to facilitated conversations between Kratos Defense, American Crystal Sugar, Transystems, and CHS. Just this week, executives visited Fargo to continue planning for a pilot of an autonomous truck during the Fall 2021 sugarbeet harvest.

Traceability in Agriculture

Following the Big Data, Big Ideas conference with the University of North Dakota in September 2019, Grand Farm began engaging stakeholders such as Microsoft and USDA's ARS in discussions to understand traceability and blockchain in agriculture. These conversations identified gaps in the pre-competitive space around blockchain and traceability. On February 26, 2021, Grand Farm held a virtual Blockchain in Agriculture event. This event gained global attention, with over 550 attendees registering from 20 countries. From the energy created from the Blockchain in Agriculture event, a steering committee was formed which further identified how Grand Farm could provide the most value and build on this momentum around this identified challenge.

Grower Pain Point Report

At Grand Farm's Grower Roundtable in 2020, a collection of growers and industry professionals gathered at the Grand Farm Test Site to discuss pain points facing growers. From crop and soil management to data visualization to autonomous systems and the farm of the future design, 23 pain points were identified and outlined in a report that published in the Future Farmer magazine. In 2021, there are plans to continue this investigative work with growers.

Economic Development

Grand Farm has worked closely with Greater Fargo-Moorhead Economic Development Corporation and North Dakota Department of Commerce to bring innovation to North Dakota. Grand Farm meetings regularly with these organizations to discuss and compare organizations being engaged. This has resulted in joint announcements as companies come to North Dakota or release products. On

September 30, 2020, Trilogy Networks made their announcement that they would be engaging with North Dakota to research, test, and implement their cloud network platform:

“We're excited to partner with Grand Farm, the Greater Fargo-Moorhead Economic Development Corporation, and the North Dakota Agricultural Experiment Station to add the critical connectivity element to their amazing ecosystem. We're already seeing the value of edge computing capabilities at our Farm of the Future series pilot project. Bringing this technology to Grand Farm will allow us to support and scale precision agriculture applications to advance the autonomous farm. Collaborations with ecosystem partners like Grand Farm will allow us all to deliver on the promise of precision agriculture. - George Woodward, Chief Executive Officer, Trilogy Networks.”

Global Recognition

Partnerships with industry and higher education often lead to unique opportunities to engage a global audience. One such partnership was with Agronomeye, an augmented reality company from South Australia. The large-scale project completed at the Grand Farm led to a joint presentation between Agronomeye and Grand Farm, with Stu Adams, Co-Founder of Agronomeye, and Dr. William Aderholdt, Director of the Grand Farm Program Management Office. This presentation was viewed by a global audience, drawing tens of thousands of impressions in the first month -- most of these impressions were from outside the United States.

Engaging K-20

One of the exciting roles Grand Farm has had is engaging K-20 students in thinking about the future of agriculture technology. Since launch, Grand Farm has hosted club events, tours, and facilitated projects with industry. Liberty Middle School's science fair team, Team CO2, expressed interest in tile drainage systems, Grand Farm was able to connect the team directly with Ellingson Companies, one of the largest tile drainage companies in the United States, and the largest in the Red River Valley. Liberty Middle School was the 1st Place Winner for North Dakota of the U.S. Army Educational Outreach Program's STEM-In-Action Grant, providing them funding to create a “iron-enabled biochar design was created to be attached to a drain tile pipe and filter phosphorus from the runoff water passing through.”

The Future of the Grand Farm

Through our collaborative work with private companies, start-ups and entrepreneurs, we continue to focus on how we can provide the most value to the agriculture technology industry and farmers. We are discovering that our highest value is providing a neutral platform focused on facilitating collaboration between private industry, higher education, and government, with few to no barriers of entry to the conversation.

Over the past couple of months, Grand Farm has found a unique opportunity to energize conversations around hot topics in agriculture, such as traceability and blockchain, and now under development, a virtual event focused on carbon. Our facilitation brings together both the ecosystem building efforts and innovative projects of the Grand Farm, resulting in a prime environment for catalyzing solutions.

In the coming months, Grand Farm will be selecting a long-term site for our future campus that will provide expanded space for projects and demonstrations, connection to thought leaders in agriculture technology, and amplification through speaking opportunities and networking events.

Conclusion

In conclusion, we want to emphasize today for the subcommittee that the entrepreneurial spirit is alive and well in rural America and that programs like the soon to be announced RISE program will strengthen entrepreneurs across the nation, and hopefully in the Fargo region.

I'd like to thank the distinguished members of this subcommittee for your continued support of entrepreneurs, including farmers and ranchers, as you consider ways to promote the diversification of on-farm income. I would be happy to answer any questions at the appropriate time.