



MINNESOTA

Farm and Food in Focus



Implementing Innovation ON MINNESOTA FARMS

AN UPDATE FOR CANDIDATES AND VOTERS REGARDING THE MAJOR IMPACT AND TRANSFORMATION OF MINNESOTA'S FARM/FOOD SECTOR



EMBRACING TECHNOLOGY

60% OF MN FARMS USE COMPUTER TECHNOLOGIES AND AGRICULTURE SOFTWARE, WHICH IS **10% GREATER** THAN THE NATIONAL AVERAGE.

TECH ON THE FARM: Minnesota farm operators are using technology for everything from budgeting and purchasing to crop management, animal health and energy control.

The state ranks well above the national average in number of farm operations that utilize computers, tablets and smartphones to improve productivity and manage resources efficiently. But farmers need more investments in rural broadband for this trend to expand.

Minnesota's agriculture and food sector is deeply invested in advancing technology and innovations that enable farmers and food companies to improve productivity, efficiency and environmental sustainability. But our commitment is more than just cultivating new ideas or cool gadgets. Our goal is to support better living regionally, nationally and globally through investments and policies that leverage Minnesota's standing as one of the largest food and agricultural economies in the U.S.

Innovative Thinking

In Minnesota and across the country, the food and agriculture sector faces significant challenges. There is ever-increasing pressure on operating margins as farmers and food producers try to produce more food in more sustainable and efficient ways. Research and innovation are critically important to helping meet food demand while creating opportunities and efficiencies for farmers. Here are some examples of what that looks like today:

Modern livestock and poultry facilities that scientifically control the environment and reduce disease.

Genetic research is helping breed animals that can produce meat that has less fat and is healthier, meeting the expectations of more health-conscious consumers. It is important to improve crop resilience, boosting plant stress resistance and combat emerging diseases to produce enough nutritious food for a growing population.

New feeding systems are delivering precise amounts of food and vitamin ingredients to improve animal health.

Consumer research offers a wealth of data and insights that is used to develop new food innovations to meet emerging consumer expectations.

Precision Agriculture

Farm operations are relying more on specialized equipment, software and IT services that provide real-time data about crop conditions, soil and air, and animal health, along with other critical information such as hyper-local weather events. Mobile apps, smart sensors, drones and cloud computing make precision agriculture possible for every level of farming including smaller farm operations. Here's what that looks like:

Predictive analytics software uses data to provide farmers with guidance about crop rotation, optimal planting times, harvesting times and soil management.

GPS systems can precisely map the soil characteristics of farm fields so that plant nutrients are only applied where and when needed, saving farmers money and reducing the use of chemicals.

Irrigation software can boost crop yields and save water and energy by connecting to in-field sensors to deliver the correct amount of water to each plant.

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Emerging Ideas and Machines

We welcome next-generation innovators to the heartland. Ag and food tech entrepreneurs are introducing a wide range of new technologies, products and practices. While more research will be needed to determine their ultimate viability, the future of farm and food innovation looks very promising.

Strengthening crops: Emerging technologies are allowing farmers to accelerate a process that we have been doing for centuries -- breeding the best crop plants to improve yield, quality, resistance to extreme climate and requiring less water and other resource.

Robotics: Smart automation is being implemented in livestock and dairy farms and is being developed to help farmers manage crops and soil health.

Soil Health: There continues to be exciting research emerge across the country from universities – financially sponsored by commodity groups – discovering new methods and practices that are enhancing soil health. Farmers have a vested interest in protecting the health of their land and are trying new methods such as reduced tillage, rotational grazing of animals, precision application of fertilizer, cover crops and nitrogen management.

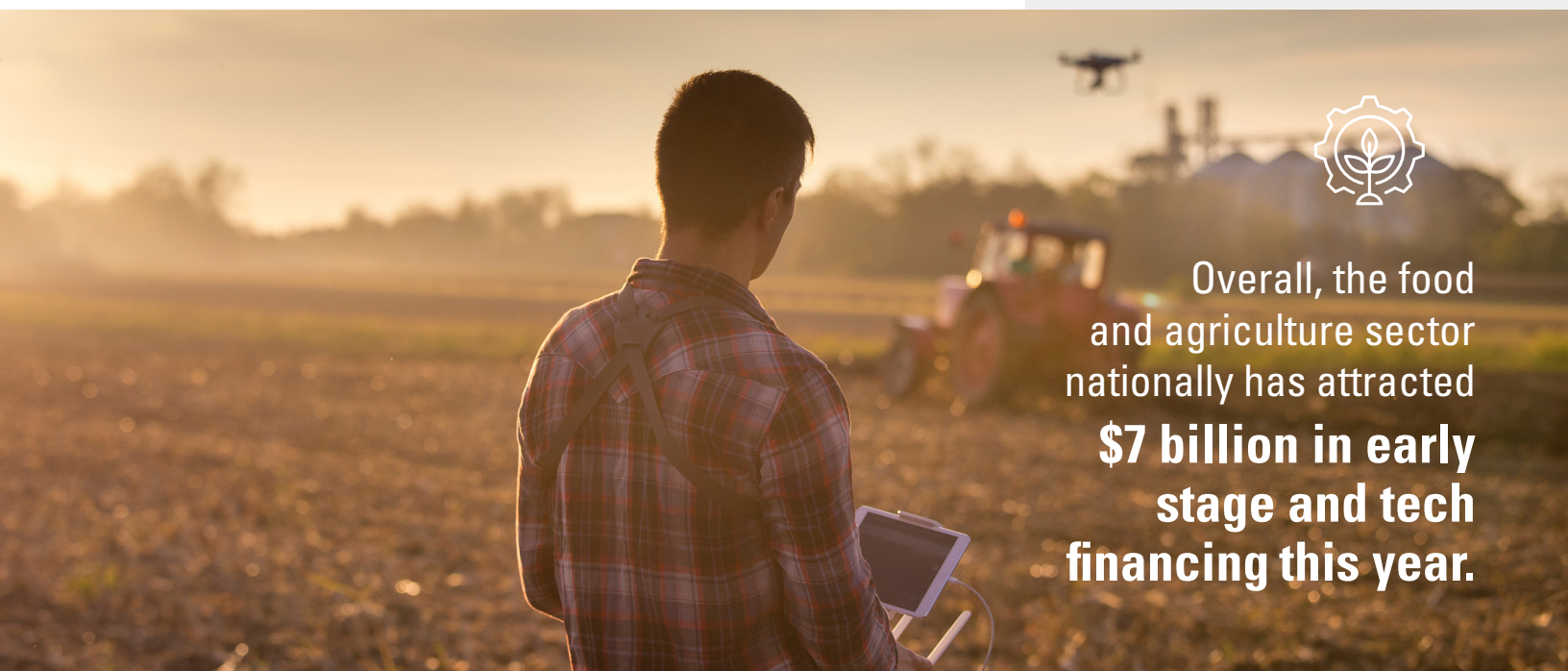
Drones: More farm operations are relying on drones to collect data and images that can be used for improved crop management, terrain assessment and exterior building inspections.

Integrated crop and livestock system: Crops and Livestock are tied together to create a sustainable cycle. Manure from livestock is applied to fields or pastures to build soil health. Manure is a replacement for synthetic fertilizers. Soils that have manure applied to them have more organic matter and beneficial biologic activity.

Research and Education

Minnesota farm commodity groups, financed by farmers through their commodity check-offs, invest millions of dollars each year in university research and best practices innovation programs. Food and agricultural companies are also major sponsors of applied research to create and improve their product offerings.

Minnesota boasts 14 colleges with agriculture programs that are preparing the next generation of innovators, leaders, problem-solvers through dynamic curriculum and hands-on experience. These programs embrace science, business, technology of plant and animal production and natural resources management.



Overall, the food and agriculture sector nationally has attracted **\$7 billion in early stage and tech financing this year.**

Of the \$7 billion in tech investments this year, emerging on-farm technologies have attracted \$2.2 billion in new capital. Due to a vibrant and growing start-up community here, combined with our significant presence in agriculture and food, Minnesota is positioned to become a major hub for Ag-tech.

SOURCES: U.S. Department of Agriculture; USDA-NASS; Pitch Book Data; Star Tribune; The Food Group; food and agriculture industry news reports

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