South Central Minnesota Agriculture Resiliency Plan



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About Region Nine Development Commission

Region Nine Development Commission (RNDC) serves nine counties included in Region Nine: Blue Earth, Brown, Faribault, Le Sueur, Martin, Nicollet, Sibley, Waseca, and Watonwan. RNDC takes great pride in working with and on behalf of these counties and their cities, townships, and school districts. Since 1972, being a partner for progress has led to the development of programs in the areas of economic development, business development, healthy communities, transportation, community development, and leveraging regional resources. RNDC is governed by 40 regional leaders. These leaders include elected officials representing nine counties, 72 cities, 147 townships, 32 school districts, the Minnesota Valley Council of Governments, and special interest groups including Health and Human Welfare, Minority Populations, and Youth.

RNDC receives an annual planning grant from the Federal Economic Development Administration (EDA) to conduct economic development planning activities within the district. Activities range from developing and annually updating the Comprehensive Economic Development Strategy (CEDS), leading regional based economic development goals and strategies, facilitating the regional Community and Economic Development Committee, hosting summits, such as broadband, workforce forums, and assisting communities who are interested in seeking Federal EDA funding.

Background

Agriculture is a major economic driver in South Central Minnesota. Any significant disturbance to current agri-businesses would traumatically impact the local economy, affecting thousands of Minnesotans, as well as disrupting the food supply chain that depends on crop production. South Central Minnesota should be prepared for serious challenges, some of which data show might have already started, to increase its adaptability and long-term resiliency. Using RNDC's 2016-2021 Comprehensive Economic Development Strategy, the South Central Minnesota Climate Change Vulnerability Assessment and Adaptation Plan, and in the analysis of this report, RNDC has identified challenges that the Region Nine area will face due to climate change, demographics, and socioeconomic trends, as well as challenges identified by agricultural stakeholders. This report also discusses possible alternatives to adapt to change, as well as some recommendations, strategies, and actions that will better prepare agricultural stakeholders and increase resiliency of agriculture throughout South Central Minnesota.

The South Central Minnesota Agriculture Resiliency Plan is the result of a partnership among RNDC, the Minnesota Department of Agriculture (MDA), South Central College (SCC), Minnesota State University, Mankato (MNSU), and other stakeholders. It is based on regional planning initiatives with the intention of improving the resiliency of agriculturally based communities across South Central Minnesota.

RNDC defines resiliency as the ability to respond to disasters today, as well as the ability to prepare for viable systems that require adequate responses. As a regional government organization, RNDC's mission is the long-term prosperity of the communities living in the Region Nine area. This plan was created as a tool to support the close relationship



between the economic activity of agriculture and the rural and urban communities in Region Nine and throughout South Central Minnesota.

Surveys, face to face interviews, and focus groups were designed so RNDC could learn from stakeholders (e.g., farmers, operators, etc.) about their processes, ideas, fears, and hopes regarding agriculture resiliency. Responses were then used in a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis, which is the first step of the three-part methodology used to formulate this plan. As the key industry players, the farmers and operators who participated offered insights on the state of agricultural economy and the immediate challenges they face that are essential to ensure a solid foundation of economic prosperity in South Central Minnesota.

The second part of the methodology was a comprehensive literature review of community and agriculture best practices. The literature review looked at overlaps between the needs and long-term vision of the agriculture industry as well as best practices recommended through research, implementation organizations, and innovative communities. From the literature review, six key themes (local and global markets, farm succession, health care, new technologies, economics, and climate change) were identified to increase regional agriculture resiliency.

The third part of the methodology used the six themes identified in the SWOT analysis and literature review to hold a series of technical assistance and civic engagement sessions. These sessions were designed with the goal of increasing the resiliency of the agriculture community for future generations and to facilitate targeted dialogues between identified best management professionals, subject matter experts, private agricultural enterprises, farmers, and the public.

This plan is the result of an extensive planning process and lays out the foundation for regional agricultural resiliency by providing a comprehensive view of agriculture, its challenges, and the opportunities defined by stakeholders in the region.

Data Collection and Data Analysis

To learn about stakeholders' processes, ideas, fears, and hopes regarding agriculture in South Central Minnesota, a SWOT analysis was conducted. A survey (See Appendix 1) and face-to-face semi-structured interviews were conducted using a questionnaire as a guide, and focus groups were planned, designed, and hosted following the methodology developed by Mancini.¹ A sample of 99 farmers, producers, and other stakeholders, all of whom operate in South Central Minnesota, was used to complete the SWOT analysis. The sample was broken down into three groups including survey respondents (73 people), interview participants (10 people) and focus groups (16 people).

Face-to-face interviews and focus group sessions were recorded and transcribed. A quality control process of the transcriptions was performed by a third researcher not involved in the interview or transcription processes. Survey responses, face-to-face interviews, and focus group participation were confidential and anonymous, no identifiers or data that could be used or tracked to identify responders or participants was transcribed.

Descriptive statistics were used to analyze the surveys answers, and content analysis was used to analyze the transcriptions of the face-to-face interviews and focus groups. After the textual material was coded and systematically evaluated, relevant themes emerged and were used by researchers from RNDC, SCC, MNSU, and MDA to complete the SWOT analysis.

See Appendix 2 for Agriculture Resiliency Survey Descriptive Statistics. See Appendix 3 for Agriculture Resiliency Stakeholders.

SWOT Analysis

Despite challenges that emerged, South Central Minnesota has many strengths that position it for success. Among these are fertile soil, optimal growing conditions such as plentiful rain and daylight hours, energy to power operations, efficient transportation systems, established networks, education and training opportunities, and processing plants. Producer innovation and value-added processes were stressed as critical elements to agricultural resilience. The region has demonstrated examples of this innovation and ample resources for adding value.

For the purpose of this report, several terms will be used such as farmers, operators, respondents, and participants. Farmers are being referred to as a person who cultivates land or crops or is otherwise raising livestock. The farm operator is the person who runs the farm, making the day-to-day management decisions. The farm operator could be an owner, hired manager, cash tenant, share tenant, and/or a partner. If land is rented or worked on shares, the tenant or renter is the operator.² Respondents are farmers or operators who responded to the survey, while participants are farmers or operators who were interviewed or part of the focus groups.

¹ Billson, J M. The power of focus groups: A training manual for social and policy research. Second Edition, Skywood Press, 2001.
² https://www.ers.usda.gov/topics/farm-economy/farm-household-well-being/glossary.aspx#farmoperator

Agricultural Resiliency Strengths, Weaknesses, Opportunities, and Threats by Theme

Markets

This section discusses market factors such as global markets, local and organic markets, niche markets, consumer expectations and preferences, the need for consumer educations and the impact of taxes, regulations, and tariffs on producers.

Consumer Expectations and Preferences

Participants expressed concern that farmers have a disconnect with the public, which is causing harm to the agricultural community. Frustration was expressed at the lack of ability to successfully farm, tell your story, and educate the entire public all at the same time. Consumer preferences are a threat to agriculture as they change rapidly and are technology driven. Consumers now have access to social media and countless other information outlets, but there is a lack of farmers' presence on these platforms. The potential for misinformation is high, yet these information sources play a large role in shaping consumer preference. Misinformation or lack of information is creating poor consumer and producer relations, as the general public has inaccurate knowledge about how farming works. One participant stated, "They (the public) don't see us working seven days a week 24/7. Instead they see a \$500,000 tractor driving down the road and assume, 'My god, they must really be making money if they can afford that.' " Agricultural stakeholders harbor the perception that people outside the industry lack understanding of current farming processes, pesticides, regulations, economic success, and history of the industry. There is also a lack of knowledge about many other factors such as the size of land necessary to be profitable, economic stressors farmers face, difficulties for new farmers entering the industry, and labor factors.

There is currently a consumer preference for organic, local, and cheap food options. Farmers and operators do not believe that this is feasible despite many mainstream grocery stores now selling organic products. Numerous respondents felt that consumers want to say that they buy organic, but either do not want to or cannot afford to pay for it. Respondents felt that consumers are not willing to pay a fair price for food.

Several respondents mentioned that consumers have a limited diversity in food products due to households cooking less and only purchasing traditional food options. Participants stated that this can lead to copious amounts of food waste, loss of profit, and wasted energy. It is discouraging for many of these farmers who put a large amount of time and effort into their products and the production practices, only to see it go to waste.

Misconceptions about the agribusiness chain exist which causes farmers to devote more time and investment in defending themselves rather than in promoting or educating their customers, neighbors, and the public.

There were also concerns with how the public views treatment and care for the land and livestock due to the public being uninformed about good animal husbandry practices and other best practices when farming. Farmers and operators care about their land and livestock and do not want anyone to write them off simply because they have witnessed unethical practices at unaffiliated locations. The inability to successfully farm, tell your story, and educate the public are seen as major barriers to correcting these misconceptions.

Pests and diseases such as foot and mouth disease, avian bird flu, H1N1, porcine reproductive and respiratory syndrome virus (PRRSV), and others are major concerns in farming operations. Odors, specifically from animal operations can also be an issue for perceptions on farmers. A person driving down the road can easily smell a large hog operation which is displeasing to most people. This fuels some bad opinions and perceptions in the general public about large-scale agricultural practices.

This lack of understanding is not limited to consumers but is common among farmers, operators, and government officials. Government regulation could lead to costly changes in how farmers and operators manage their operation and products. This lack of understanding and knowledge on farming practices and regulations is considered a major threat to agricultural resiliency in South Central Minnesota.

Consumer Education and Public Relations

Participants were hopeful that the future will present more opportunities to focus on education and outreach for consumers as well as education programs for schools to reach younger generations. Participants hope to see more public education about the agribusiness chain and farming practices that supply the head of lettuce consumers pick up at the supermarket. Respondents suggested these types of programs should be more readily available to everyone in the future as it is important to create opportunities for education on all aspects of agriculture and the food supply chain to combat misconceptions surrounding agribusiness.

One challenge to consumer outreach and education is the varying definitions for what is generally considered local, fresh, or rotten. One participant asked, "How do we accurately educate consumers?" The working definitions of these terms not only affects perceptions and understanding but also purchasing habits at all levels of the supply chain.

The idea of producing educational programming that will support opportunities for kids in agriculture and a better understanding of agricultural practices by young students in South Central Minnesota is something most participants supported.

Small and Organic Farms

The organic market is growing but can be difficult penetrate because of an approximately three year transition period. One participant shared a story about another farmer stating, "I look at that [breaking into organics] as a real strength. [One farmer] had to go to hell and back for three years of transition, but he got certified organic."

Farmers recognize the importance of diversification. Some interviewees and focus group participants believe that resiliency comes from diversification in crops because it not only mitigates pests but helps improve yield and, in turn, income. It is a strength for farmers to continue promoting both cover crops and alternative crops to attract pollinators such as butterflies, birds, bees, beetles, and wasps. "We have embraced more organic or more natural methods instead of just spraying. We have a lot of wasps and we have attracted a lot of beneficial insects, so we really don't have a need for spraying," stated one participant. Some farmers noted that once these types of practices are in effect, there may be an opportunity to save money from crop insurance. However, farmers with smaller operations stated that they currently lack access to crop insurance plans which means it is unlikely they would have the same opportunities with crop insurance going forward.

Respondents also felt that it is still unclear how to enter the organic market and how the organic market prices change. One respondent asked, "Why can you go look at the ticket for general prices, but not organic ones?" Transitioning to organic and how neighboring conventional farms might affect organic fields, as over-spray of chemical applications and contaminated water can easily make its way onto organic fields, was a major concern for farmers. Contamination from neighboring farms can occur fairly easily and can result in a huge profit loss to the organic farmer.

The organic market share being corporatized is also a cause for concern. As society attempts to find an equilibrium with local and organic products, participants are concerned about how farmers will survive with consumer trends leaning towards the convenience of one-stop shops provided by big chain grocery stores over traveling to small local markets.

Niche Markets: Local Foods, Community Supported Agriculture (CSA), and New Products

Respondents are very proud of their ability to innovate, diversify, and look outside the normal box with a willingness to try different and unique alternatives. Examples of this in South Central Minnesota include new crops, niche agriculture, precision agriculture, and livestock (e.g., hogs and cattle). Organic agriculture can also be used to access local food markets and farm-totable opportunities within communities. Farmers markets or other local markets should be a strong centerpiece for the communities because they offer a market opportunity for farmers to provide a large variety of high-quality products directly to consumers. Markets like this also bring opportunities to educate communities about agribusiness and farming and build strong connections with consumers.

Several respondents discussed the question of transparency surrounding local foods, and how farmers can get their products into the hands of consumers in a more convenient way while still creating a connection with the consumer. Vegetable production in niche markets is available but lacks an adequate and cost-effective supply chain to take the crop to the consumer in a way that builds a connection leading to concerns among farmers on how this can be done.

Mankato's farmers market is currently held in the Best Buy parking lot which is not the most convenient location if it rains as fewer customers are willing to go out shopping. On rainy days, consumers will just wait until another day or go to an indoor supermarket instead.

This challenge is not unique to Mankato's farmers market but threatens many local markets and their sustainability. Some participants felt the solution to this would be to move it into a permanent or semi-permanent structure in a more centralized location. However, this solution is met with its own set of challenges due to lack of community support, funding, and available space. Trying to find a successful niche market can be difficult as some participants feel that they cannot afford to diversify due to the high risks associated with transitioning and the debt that can occur while doing so.

The lack of funding during transition years along with the unknown of whether or not the venture will be successful or not is a major barrier when branching into niche markets.

Taxes

Increasing capital gains taxes, property taxes, and school district assessments are seen as major concerns to farm operations. Participants noted that several of the states around Minnesota have lower taxes which made leaving and farming somewhere else tempting to many agricultural stakeholders. The higher taxes on the land, specifically when land passes from one generation to another, was also a concern. However, there are remedies such as putting land in a trust, which would avoid a tax burden for everyone involved or converting a farm to a limited liability company (LLC) which would also alleviate liability concerns. More and more farmers have changed their operations in this way to protect their assets and avoid taxes, but a lot of farmers are still owned in a sole proprietorship or joint ownership configuration that would have them paying higher taxes.

A lack of knowledge about the different options and an unwillingness to move in this area has created concerns about succession opportunities and what that would mean for farmers and their ability to retire when they want or need to. Land being taken out of production due to regulations, put into other nonagriculture related use (e.g., wind or solar farms), and being taken out of production because they are too small for farmers to get into with their larger pieces of machinery was a major weakness in the industry. Farmers are still paying taxes on this land based on its sale value regardless of whether it is being used in production or not. Farmers are often large landowners in the community due to the need of massive scale operations that span thousands of acres in order to be successful, so they are greatly affected by property and school taxes. Respondents expressed frustration not only about the extreme cost of these levies, but also the greater disconnect they unintentionally create within the community.

Regulations

Government regulations at the national, state, and local levels can often lead to costly changes in how farmers manage their operations. Participants felt that these types of restrictions hurt both small and large businesses operators in South Central Minnesota. One participant noted there are many hoops and arbitrary rules that come with complex regulations that they must navigate to determine what and to whom they can market their products. These regulations can impact a farmer's ability to be profitable and can discourage new farmers from starting operations. Participants said that it takes a lot more complicated and lengthy paperwork now to maintain a strong and sustainable operation. "More and more government regulations, that [regulations] make the decision to move onto something else easier, rather than battle," shared one participant.

Adding to these concerns, participants mentioned that it was difficult to effectively communicate their experience, opinions, and suggestions with government officials about new regulations. A lack of communication between farmers and those who write regulations for farm operations that affect South Central Minnesota may be contributing to the frustrations around regulations. Participants stated that the lack of communication leads to regulations being ineffective and putting unnecessary constraints on farmers and in turn affects their ability to produce, be profitable, and resilient. Several pointed out that less than two percent of the population is employed as a farmer today.



Therefore, they feel they are not represented in government and in the regulation process. While there are good intentions behind regulations, participants were frustrated at not having enough impact on what is directly impacting their livelihood.

Respondents used the buffer strip regulation as an example, noting that the majority of those that needed them already were prior to the regulation. The regulation was written and implemented fully without farmer input which participants felt was an ineffective regulation. Participants pointed out that having an arbitrary buffer size is not the most effective from an environmental and farming process but instead an opportunity to cut costs. One participant shared, "If the government is not going to force me to have buffer strips, I am going to wait as long as I can because that's an extra \$600, I can keep in my pocket." Some counties in the South Central Minnesota have elected to control or police their own buffers, versus the state which some felt was a strength their area. One participant stated, "We want buffers that are actually going to be in there and have a benefit. Sometimes you need a large buffer, sometimes you don't need one at all."

Participants noted that when filing paperwork with the Farm Service Agency (FSA) or Natural Resources Conservation Service (NRCS), it is unclear how many agencies will get involved. Several noted frustrations with societal trends such as making the local rivers (e.g., Blue Earth, Minnesota, or Mississippi) clear and free of sediment load when these rivers have never been clear, even before industrial agriculture.

Participants also noted the lack of effective communication and understanding between farmers and operators and government agencies on the federal level which creates difficult situations. One respondent asked, "Should you go to a local person (for information on regulations) or the Minnesota Department of Ag? I have had to call or email 8-to-10 people so far, and I am getting closer and closer to someone who actually knows what the set of regulations I would fall under [in order to sell to consumers]." The time-consuming process to navigate through statutes and regulations to find ones that apply to a farmer's operation can create frustration. Participants recognized that they can contact their elected officials, but felt that it is not worth their time, that the success of farming and food regulation is not a top priority and therefore nothing will be done.

One respondent who had worked as an assistant in Washington D.C., noted that the lack of time is also an issue policymakers face. Policymakers are responsible for many issues and rely on others to explain complicated bills and issues, allowing for opportunities in communication breakdown. There is a lack of information and demographic research that has been done about the industry which contributes this problem. For example, if you were looking for information about how many people were working on dairy farms both the Department of Agriculture and Census Business Bureau would not have that information.

The Clean Water Act, buffer zone, and other regulations have been implemented without a lot of farmer participation who may have been able to provide better information to create more effective regulations. Participants pointed out that in manure management there are multiple government agencies to comply with and there is a lack of consistency in the decisions, interpretation of the decisions, and enforcement. However, this situation is not unique to manure management but is a common issue with regulations. "There are so many rules on us as small producers that it seems like they don't want to see us succeed," shared one participant.

2018 Tariffs

In 2018, the Trump administration set tariffs on steel and other foreign commodities which prompted China to impose tariffs on American crops. Participants mentioned that these tariffs are a serious threat to South Central Minnesota and the United States as a whole. Many respondents mentioned preparing for harvest: they were unsure whether they would be able to recoup the expenses of the 2018 season in addition to the leftover stock they already had due to the weaker market.

2018, was particularly difficult for the farmers' finances due to many who saved corn and soybean in silos from previous years waiting for better prices. Now, they are creating an economic storm due to livestock prices also being below the cost of production.

Several participants noted that in the last 30 years, crop land has largely become monoculture, growing only corn or soy, leaving farmers more susceptible to tariffs and low market prices.

When the current economic situation was compared to the crisis in the 1980s and 1990s, some participants felt that today they have more tools to face challenges within the financial sector. There is more access to financial capital and new regulations that protect land owners as well as a better environment for their operations. One participant shared, "You know, 30 years ago when I started farming this was a different conversation, you didn't have scholarships, you didn't have the Rural Finance Authority for beginning farmers, you didn't have the Farm Service Agency having first time interest loans for going out and buying real-estate for the young producers, it just wasn't there."



Farm Succession

This section looks at family farms, farm succession and transition, labor issues, offthe-farm work, available networks and training, and ties with rural communities.

Family Farms

There are a large range of family farm sizes represented by participants and respondents from small to large farming operations. While participants and respondents felt that having a smaller operation was harmful to their profits as well as their chances of expansion or succession, others felt that their smaller operations were a strength in the agricultural community.

Participants acknowledged the possibility that farmers do not want their children to stay on the farm knowing that they would have to struggle with money for the foreseeable future and preventing succession.

Divorce can also be a barrier due to the financial difficulties with a farm needing to provide for two households rather than one. Conflicting opinions about how to run farm operations in households can also create barriers when discussing farm succession.

Children are no longer as involved due to the mechanization of farming operations, resulting in the need for fewer people. Several respondents recognized that if a family has 3,000-5,000 acres, one family member cannot take the whole farm over and keep it running. This dilemma ultimately leads to more corporate farm structures happening as farmers retire.

Off-Farm Work

Farmers are often forced to have jobs off the farm to cover additional living costs as well as have access to health insurance.

Part-time farmers, where both spouses work off the farm, and have income streams that are unrelated to agricultural markets, are becoming more prevalent due to greater access to affordable healthcare benefits. Participants stated profit margins for agriculture are insufficient to pay for health insurance and therefore creates a need for healthcare access from another source. This is a contributing reason to farmers not having a successor within their family.

Family Land Succession and Transition

There is a long tradition of family farms in South Central Minnesota, and some families have been farming the same land for more than six generations. However, continuing this pattern of family transition is a major concern for a variety of reasons. Operators described how this concern arises the instant they acquire a new section of arable land. "Even when they buy a piece of land, they put it into a will to keep the land in the family," shared one operator.

Respondents noted the significant tax cost of transferring land to the next generation as a barrier to farms succession. Farmers who create succession plans spend a substantial amount of money on lawyers in order to complete the transfer in the most economical way. One respondent shared stories of succession being unsuccessful due to new approaches to farming by the next generation, and that concerns arose about whether or not adequate knowledge is being passed to the next generation in order to succeed.

Several of the long-time farmers interviewed felt that it is almost impossible for young farmers to start a new operation unless they are gifted the land. One respondent gave an example of a farmer who had completed a career outside of farming by the time he took over the family farm and that this put him at a disadvantage, not only because of his age, but also the prolonged disconnect from the land. Another respondent commented on how the timing of when you start farming is critical for success, and that farms that start during difficult years often struggle more.

Respondents also discussed disappointment or concern for how the next generation of aspiring farmers view the industry. Several participants stated their children had no interest in taking over the farm. In some ways, they were happy that their children were moving on to an easier life where having money in the bank is more of a guarantee, yet at the same time sad to see an era end. Lack of interest in younger generations may be due to the extreme "bust" years the industry has been experiencing. Participants stated that in their opinion it is more stressful to be a working kid on the farm today than it used to be. Family members of these farmers, who are now college-aged, have experienced both "boom" and "bust" over the last 10-15 years, and have seen what the industry has done to their family. Many family farms have only been losing money which contributes to many younger generations no longer seeing the value in continuing to farm.

Several respondents also noted the decrease in family size. Most of the participants did not have four or more children, which reduces the chance that one would want to take over the operation. For some respondents however, family transition is a very challenging issue that might include skipping one generation, hoping to have better circumstances to facilitate the transition of the land and business to their grandchildren.

Labor

Rural areas are witnessing a decline in population due to an increase in younger generations attending universities and moving to urban areas for work. Participants expressed concern over rural emigration into urban areas as a source of diminishing labor for their farm operations. The labor pool that is needed for the seasonal work required by farming operations is no longer available.

With this workforce shortage comes issues with finding quality employees. Due to high demand, labor expenses continue to increase. Financial margins are tight, thus making it difficult to provide enough income for quality farm labor. For this reason, many of the larger farms, especially dairies, have brought in contracted labor from other countries. However, the requirements to work legally are increasing for immigrants making it more difficult to bring in contracted employees from other countries. These factors result in hiring from a small pool of the workforce such as hiring high-schoolers or part-time workers. However, this comes with disadvantages. Hiring high-schoolers and part-time works means working around their already set schedules and not being able to have them work full time.

Retirement

Participants stated that, for the most part, the land is their retirement plan. One participant shared, "The history has been that the older farmer invested in their land as a retirement system for themselves so that when they got old enough, they would turn around and sell it to their children or their grandchildren." However, selling, whether to family or otherwise, has tax implications that could affect farmers. One participant stated, "If they sell it there are tax implications, there are retirement implications." Another participant planned to source their retirement through leasing their land but stated, "Farmers after retirement won't be able to rent out their land for decent enough price."

Healthcare is also a concern of many farmers and operators when discussing retirement. Healthcare coverage and costs are rising resulting in farmers and operators having limited options that are affordable and available in their area.

Social Security was another concern for many participants due to the unknown of whether or not it will be able to provide for them during retirement. This makes it very difficult for farmers and operators to plan for retirement. One participant shared, "I don't know what's going to happen. I don't know if I will be able to retire."

Family Business, Rural Communities

Farmers in South Central Minnesota have the experience and knowledge about the land and farming operations in this area.

A strength in South Central Minnesota is the presence of multi-generational sustainable farm operations. Farmers define themselves as resilient, hard-working people who produce high-value crops, livestock, and other agricultural products. They consider human capital as one of the most important strengths farmers have. Operators in South Central Minnesota also credit their economic and personal resiliency for maintaining their capacity to live and continue farming through downturns. Family values and work ethics are core to their value system.

Farmers and operators have a rich heritage of cooperation and innovation. Additionally, many take great pride in their communities and offer solutions to help their communities thrive. Participants emphasized that there is a greater understanding of farming in small, rural communities throughout South Central Minnesota. Farmers and operators love to farm alongside Minnesota's natural resources, and knowledge about farming has been passed from one generation to the next. Farmers and operators consider themselves life-long learners as well as tolerant to unstable weather conditions.



Strong family support in the farming community is essential to success. The ability to work as a family unit provides an exceptional advantage to farm operations as multiple family members are engaged and supporting each other. One participant shared their opinion of what resiliency really means stating, "I think resiliency is just maintaining that family legacy, I guess, and passing down the farm and continued growth and development within it." For instance, family support allows new generations to attend college and be trained in farm business management, genetics, soil, and other agriculture sciences or technical areas that facilitate innovation and diversification. Farmers and operators in South Central Minnesota feel that strong graduate and undergraduate programs help maintain and foster interest in the agricultural community.

In addition, having a family farm unit helps lower overhead and the costs of production. Farmers are proud of their financial and management skills. Many respondents stated they enjoy a relatively decent financial position due to lack of debt and good working capital which accounts for their long-term sustainability. Diversifying their operations both in agriculture and outside of agriculture is another way of creating long-term resiliency.

Economic, environmental, and social sustainability are seen as strengths for farmers, especially on multi-generational farms where many enjoy marginal debt and strong financial position. Farmers and operators view South Central Minnesota as the most fertile land in the world, with ample daylight, precipitation, and fresh water sources (e.g., creeks, rivers, and lakes). One participant shared, "My grandfather used to tell me this, and I never forgot it, invest in the land because they don't make more." Participants stated that maintaining farming traditions is important because farming is an integral part of rural communities and their sustainability.

Respondents mentioned concerns over businesses related to agriculture doing badly or consolidating and the negative chain reaction that it has on the farming sector and local communities. The companies that supply for farm inputs (i.e., fuel, herbicides, pesticides, seeds, and spraying services) will still be providing their services regardless of the demand. However, when consolidation happens, it can force people to leave rural areas which directly affects other local businesses and can lead to them closing their doors. The consolidation of co-ops is already occurring in South Central Minnesota and could lead to dwindling interest in co-ops in general. Some respondents stated that more support from co-ops on education and being a government liaison for farmers could create greater interest and make co-ops more relevant their communities.

Networks and Training

Locally available training in technology, finances, and farm management in South Central Minnesota, especially for young farmers, is one of the strengths highlighted by focus group and interview participants. Local banks provide classes to young borrowers where financial advisors educate farmers about risk and insurance, worst case scenarios, probabilities, and estimatecosts so farmers are able to make educated decisions in terms of the best insurance each season.

Local colleges and universities offer technical assistance, including the Farm Business Management Program, which instructs farmers about technology, finances, and farm economics. Programs like this encourage young farmers and allow them to research new ideas, methods, and technologies in farming that will increase productivity and reduce hired labor.

Other Land Transitions

Some participants mentioned the Transition Incentive Program (TIP)³ as an alternative to family transition when family members are unable or unwilling to take over farming operations. One participant shared, "I am leasing, renting a big chunk of my farm to a new farmer who gets a break from the government because of TIP. It's a program that gives rent reduction to beginning farmers, it's a five-year contract and the government subsidizes me and allows him to financially get on his feet better." This creates an opportunity to establish new farmers by renting land from established and aging farmers. This program is beneficial to the established farmers by generating revenue streams and cutting down on labor while allowing new farmers to get started



by lowering initial start-up costs. One participant stated, "They are out renting land by a 10 percent tax credit to the landlord, and this is all relatively new, but it's catching on." However, some participants highlighted that this applies only to non-lineal descendants. Many of the participants felt that smaller farms run by younger farmers need the most help making the transition into agriculture. This also posed the question of how the industry can do a better job of matching farmers with those wanting to enter the industry.

Several respondents commented on the need to shrink the education gap in South Central Minnesota as well as across the state, on farming and farming practices, as a way to create more opportunities for individuals to enter the industry. With fewer children in farm families, several respondents stated there is a need to teach the next generation how to use the equipment that they grew up learning to use. While there are still some in younger generations who grew up farming and know how the operations and equipment are run, there are many who did not but who want to learn.

Current and future opportunities should focus on the initial move of younger people into agribusiness. One participant stated, "It just depends on people being able to get a foot hold and get established." Some participants mentioned the need for programs that would allow established farmers to mentor new farmers giving the next generation a foothold and proper knowledge about agribusiness.

³(https://www.fsa.usda.gov/programs-and-services/conservation-programs/transition-incentives/index)

These opportunities need to be directed towards supporting strong education, financial planning, and apprenticeship programs that will help people make educated choices when moving into agribusiness. In the long run, this will help new farmers become more stable, successful, and profitable. One participant summed it up simply as, "Education always allows a person to better understand what it is that they are dealing with."

In general, farmers and operators in South Central Minnesota feel it is very important to create and manage opportunities that promote new and existing family farm prosperity. One participant mentioned that family is an important factor during the sale of the operation, regardless of where that family is from. He stated, "I am always looking for someone to take over for us, I want a family there."

Healthcare

This section focuses on health care issues in rural areas including cost, insurance, access, provider issues, mental health, and the impact of insurance on retirement. Many farmers say they are paying more for health insurance than most, and at the same time are experiencing compromised care creating growing concern within the agricultural community.

Cost

The rising cost of healthcare has become a major concern in the agricultural community. Not only are the rising costs a concern now, but also a factor on whether or not retirement is an option. Access to more information on regulations and health insurance premiums are needed due to a large portion of out-of-the-pocket expenditures farmers incur. This information would give farmers and operators the knowledge to make the best and most affordable option.

Health Insurance

A high cost of health insurance and limited access to care provoke serious concerns among rural residents. Many respondents stated that they or a spouse must have an off-the-farm job in order to receive affordable healthcare. Part-time farmers, where both spouses work off the farm and have income streams that are insulated from agricultural markets have a better chance of having access to affordable insurance and health care benefits. In most cases, the need for these jobs is due to the profit margins of agriculture not supporting the cost health insurance. Participants shared that many buy health insurance as a capital expense in order to reduce tax liability.

While there was initial excitement within the industry for the Affordable Care Act (ACA), a loss of choices, options, and affordability occurred when it was implemented, causing many in the agricultural community to view the mandate as a barrier instead. The ACA mandate created difficulties when hiring employees due to the high-priced insurance costs. Since the start of the ACA, premiums have increased about 20 percent every year. Participants mentioned that they cannot pay health insurance coverage for themselves, let alone other employees. "Health insurance is a joke. You cannot afford to farm and pay anybody health insurance", shared one participant.

Provider Access

In rural areas competition among health insurance companies is very low and, in some cases, nonexistent. In 2018 there were more insurance options, yet in certain areas only one provider is available within the insurance network. One farmer shared that in the last three years she has had to change healthcare providers each year due to issues with access to providers.

Prevention and Healthy Lifestyles

Participants felt that an increased emphasis on healthy lifestyles should be used in order to reduce longterm health care expenses. Many farmers make their health a priority since they must run the farm on a daily basis in order to support themselves and their families.

One participant shared their feelings of helplessness towards improving accessibility to healthcare stating, "I really feel that we do not have a huge impact on health insurance." Yet some farmers commented on how they are very independent and do not want the government handling their health insurance. "I don't want the government to handle my healthcare. I really don't. I want to do it myself," shared another participant.

Health Care Facilities and Access

"As long as you are not bleeding, they will put you off as long as they can to not cover you," shared one respondent. Many respondents mentioned concerns and issues of finding medical providers and facilities available in their area that are covered by their insurance. Many expressed frustrations with having to wait months to see one of the few pre-approved physicians or facilities after jumping through hoops with constant referrals just to see one specialist. Some respondents shared that this gave them the sense that the healthcare community simply doesn't value you them.

Mental Health

While there is a shortage of healthcare providers in rural areas, the presence of mental healthcare providers is lacking even more. Mental health issues were mentioned as a major concern in the agricultural community. Some respondents shared a sense of despair about the financial position of farming and being powerless to change it. Others reported feeling both isolated. One participant referred to the isolation by stating, "It's like living in a fish bowl or an echo chamber of bad attitudes."

"We can get so isolated and become our own worst enemy because we only talk to ourselves," shared one respondent. Farmers see themselves as very independent which creates what respondents saw as a negative disconnect, not only between other farmers but the community as well. Government efforts regarding mental health were also seen as inadequate to many farmers.

New Technologies and Research

New technologies offer a positive outlook in the agricultural community as they offer new opportunities and ways to add value to farm products. Topics discussed in this section include technology, agribusiness, access to global markets, land stewardship, and research.

Despite many challenges, farmers continue to adapt to new problems and create sound solutions based on research. Respondents stated farmers in the region are very transparent and think outside the box for solutions. Many have successfully adopted new ways to do business by developing and applying new technologies to their farming operations. As some farmers shared that they often feel that they are in part leading the world in this area. Participants see access to new equipment and technology as a major strength throughout South Central Minnesota. One participant said, "When the prices are good, people will trade off equipment sooner or lease it. They are leasing it because that's a fixed cost. They know the input cost of leasing you don't have a lot of maintenance of a lease because it goes back after so many hours."

Some participants believed that technological advances, paired with existing education and experience among agribusiness farmers and operators, will promote greater interest and opportunities to integrate new technologies (e.g., precision agriculture) in South Central Minnesota. This technology provides opportunities for agronomic (e.g., horticulture, staple crops) businesses to sell more products and access advising services.

As previously stated, there is a rich history of farming practices and business innovation throughout South Central Minnesota. One participant referred to farmers and operators in South Central Minnesota as, "We have the knowledge, the people, and the willingness to innovate and adapt to new technology and new practices."

However, the advances of technology are expensive and can difficult to implement without proper training and expertise. Respondents felt that access to new technology, paired with specialization and expansion in these markets, will create more demand for agricultural products as well as the potential for more opportunities to expand into alternative niche markets (e.g., organic).

While big data and new technologies have increased yields and reduced input costs, they do so at a high implementation cost, with new equipment being very expensive and technically challenging to leverage. Participants stated that many farmers work with agronomists to take full advantage of these new applications due to the software being very expensive. Respondents also stated that current genetics and breeding practices are very important because it helps to improve livestock and crop production.

One barrier many respondents spoke of was the industry's focus mainly being on the research and development towards monoculture, rather than increased efficiency due to the ability to harvest multiple crops at once with the same machine. Many participants and respondents favored diversifying or expanding the crop rotation options, although many advised being conservative and carefully about changes before implementing them.

One major barrier that technology and innovation in South Central Minnesota face is the current age of the farmers and operators and how long it takes to see a return on investment (ROI) from new technology. One participant described it as, "I am not willing to invest anymore in equipment at my age. I am 60 years old. I cannot diversify and go into debt for another 10 to 15 years." Adapting new technology can be difficult and more importantly operators mentioned concerns over integrating new technology or improving infrastructure and how it can cause stress or worse, bankruptcy if done improperly. However, overall many participants felt that, when done properly, adoption of modern technology can lead to a better bottom line at the end of the year and better overall land stewardship.

Biotechnology

Some operators in South Central Minnesota felt that agricultural biotechnology companies are continuing to change and adapt as the needs of the region change. Companies like Dupont-Pioneer, Bayer-Monsanto, and Syngenta will continue to strengthen and refine the products they offer in the future which participants viewed as a benefit farmers and operators. One operator stated, "I just think there is a lot of possibilities with biotechnology, whether that be on the crop end or the livestock end, I think there are possibilities out there we are not thinking of." Participants mentioned that technology will continue to grow and change going into the future.

Precision Agriculture

Being able to take advantage of every small increase in yield is important to increasing overall profits. Many farmers are incorporating the use of drones to oversee fields which allows a more precise application of fertilizer, pesticides, and herbicides. The new precision agriculture technologies with Variable Rate Application (VRA) and complicated yield monitoring programs make contemporary farming very computer based.

Many of the participants had either heard of or already implemented some type of precision agriculture into their operation and felt that more widespread adoption of these services is potential strength for farmers and operators in South Central Minnesota. One participant specifically commented on remote sensing with drones stating, "I think a lot of farmers could benefit from using sophisticated drones and technology." However, participants felt that rapidly changing technology is also intimidating and thus can be very hard to adapt to.

Access to Broadband and High-speed Internet

Access to broadband and high-speed internet is critical for farmers and operators in South Central Minnesota. New opportunities, whether in new technologies, education, or otherwise, will likely be linked to access to high-speed internet. High-speed internet lets farmers access new markets and educate consumers as well as allow farmers to access technical assistance and nonlocal resources. However, not all farmers in South Central Minnesota have access to high-speed internet.

Not only is the coverage area a concern but participants were also concerned about the speed offered in rural areas. This is especially important in precision agriculture due to the technology utilizing equipment and data interpretation at near real-time speeds.⁴

New Land Uses

Participants are looking for opportunities to cut overhead costs and create reliable profit streams. As a strategy for this, some participants highlighted that farmers are looking for alternative land uses such as alternative energy production technologies. This may include renting a portion of their land to install wind mills and solar farms as a way to have a source of fixed, stable income. One participant noticed this opportunity was recently gaining more in interest within his own community stating, "I see a lot of wind farms, I see a lot of solar going up in areas."

Some respondents were open to having large investors from outside the state come in but would like to have it controlled locally. One respondent stated, "I think there are reasons to have infusions of capital. I think that having it controlled locally is a very positive thing for us."

⁴ O'Grady, M. J., & O'Hare, G. M. P. (2017). Modelling the smart farm. Information Processing in Agriculture, 4(3), 179-187.

Agribusiness: Value-added Products

Participants stated that farmers and operators in South Central Minnesota are proud of the quality of their products as well as the quality of their operations. Many agreed that they are very fortunate due to availability and access to the labor force, energy to power their operations, fertile soil, transportation systems, and processing plants. Ethanol was also mentioned as critical to agribusiness, with plants located across South Central Minnesota.

Respondents stated that the large amount of current agribusiness infrastructure (e.g., education, facilities, processing plants, etc.) present in South Central Minnesota is a major strength to farmers and operators. "[Processing plants] are employing many people, adding an extreme amount of value to the components that we have here in this area. So, anybody in this area is very lucky and fortunate to have processing," shared one respondent. "We are not just a place of processing our own crops, we are bringing other crops in here."

Participants described the importance of diversifying and exporting higher value products in order to prevent their business from losing value due to continuous export of the lower value products. "When you are talking about diversity, I think that's one thing our area has some incredible strength," one participant said. "We have got a market and we are not dependent on the river or exports, as much."

There are both organic and non-organic specialized feed mills, crops, livestock, processing facilities, and ethanol plants throughout South Central Minnesota. These processing facilities convert the plant's proteins, fiber, and energy into oil. An example of this is the Agricultural Utilization Research Institute (AURI)⁵ which investigates innovative alternatives that can add value to Minnesota's agricultural products. One participant mentioned, "We are lucky, very few places have these size of plants, very few places have the ethanol refinery to the extent that they do today." Respondents are very proud of the processing infrastructure in South Central Minnesota, as it brings some certainty to the marketplace. One respondent shared, "All of the jobs, the value add is coming out. When we sell to 15 different people, at very high value, all of that value is staying here and so we are lucky there, the ethanol plant is doing the same thing."

One of the processors interviewed pointed out that many people, both in agriculture and not, do not recognize the amount of advantages in South Central Minnesota. Most consumers don't know that when they drink a Pepsi, they are drinking a "local Pepsi" because the corn syrup was most likely produced from corn fields in South Central Minnesota. Additionally, a dairy operator with excess milk production began a local cheese making business to add value and create new farm-to-table products. Some respondents mentioned that South Central Minnesota has meat storage and processing plants around but that this was an area for growth.



Many participants felt that there will be a lot of opportunities to integrate old-farm attitudes with new technology of the future. Family agribusiness operators want to pass on a business that is sustainable and relatively low risk. Many operators in South Central Minnesota believe that this an area of strength and opportunity. As stated by one participant, "Technology is going to continue to grow and develop and do a lot for the industry." However, this does not come without concerns. "We take advantage of these technologies and cause our farmers to overproduce both grain and livestock, which results in more downward pressure on prices," shared one participant.

Participants were conflicted on the advantages and disadvantages of new technologies, and that the opportunities for Minnesotans should be created by adopting more traditional and organic practices to help to diversify into in niche markets and boost small-farm resiliency. One operator stated, "We have embraced more organic or more natural methods instead of just spraying." The reasoning behind this push against conventional agriculture technology and towards more sustainable and traditional practices is fueled by the sentiment of strong personal responsibility as caretakers of the land. As described by one farmer, "I think that environmental stewardship is probably the most important." The technology surrounding mono-cropping and the reliance on that technology can lead to less sustainable practices. One operator stated, "The challenges have been for greater productivity, and that has pushed the use of herbicides, pesticides, fertilizers, and huge farm machinery. I do not know if that is going to be sustainable for very long." Farmers and operators alike are interested in the health of Minnesota's natural resources, and both participants and respondents expressed interest in new technology and practices that are sustainable, productive, and boost the resilience of their operations.

However, many respondents noted that this does not necessarily mean going full organic, which has roughly a three-year transition period, but instead expressed the interest and need to take steps away from traditional mono-cropping and conventional technology due to its potential impact on the land. Respondents who utilize organic-style conservation practices have identified that making that transition from conventional style can be the hardest part, and current technology and historical use of land does not make that any easier. As one respondent shared, "One of the challenges is a lot of us are farming on land that used to be commodity crop land. In many cases it is some ways degraded from farming only corn and soybeans."

Regardless of their view on technology, one major barrier participants and respondents mentioned was the lack of access to information for not only themselves but also consumers and how the lack of education can affect a farmers resiliency. One operator mentioned the need for education by stating, "The biggest drivers are disease, marketing, and labor. To be resilient to that you have to be aware of it."

Global Markets

Participants mentioned that international relationships could be an opportunity for the agricultural community in South Central Minnesota. One participant stated, "The Ag. industry makes seven trips yearly to different countries to promote, sell what they got. So, I think relationships, I think avenues are out there we just got to find them."

Stewardship and Diversification

Long-term stability and future opportunities in South Central Minnesota will be due to the strong sense of land stewardship as already stated by many farmers and operators as they pride themselves on maintaining strong operations. Opportunities to improve the water and soil quality are also areas that many participants mentioned were an interest to them, with that comes concerns of how it can negatively impact input costs.

Participants also mentioned the opportunity in South Central Minnesota to help native pollinators which in turn can help them diversify their operations for specific purposes. Examples include the products they grow to diversify the species utilized in buffers, conservation areas, and field margins. This opportunity would favor soybean operations or alternative crops that do not utilize wind pollination, like corn. While this is linked to crop diversification, the focus is on ecosystem health versus vegetable or organic market opportunity driven diversification. Some participants are already promoting strong native pollinator health on their land and mentioned that they are able to spray less after proper varieties were established and stabilized. One participant stated, "I think in a couple grow seasons we started to notice that being successful."

Many farmers and operators mentioned the importance proper use and care when dealing with pesticides and fertilizers as chemicals can have a large impact on water quality, both locally and nationally, such as the creation of the dead zone in the Gulf of Mexico.

Many respondents mentioned frustration towards large corporate farmers who they feel do not care for the land or consider the impacts of climate change and regulations. The focus of the absentee landowners is perceived by many to be on profits instead of sustainability, which is leading to harsh regulations for the majority of medium-to-small farmers who consider themselves good stewards of the land.

However, farmers and operators are only able to make informed decisions on potential opportunities if they are readily accessible and affordable. This is a potential barrier to farmer and operators across South Central Minnesota, as not all opportunities are available to everyone.



Economics

Participants identified a wide array of economic factors that impact operations including trade policy, the impact of corporate farms, debt, prices versus cost, urban sprawl, environmental concerns, and subsidies.

Free Market, Trade Policy, and Foreign Trade

Regarding the free market system, some participants believed the free market does not account for some of the costs. One participant shared, "We have tried to adapt to the negatives to some degree, and I think that we have done pretty well because I do believe that our system is set up to provide the lowest cost, most nutritious, most available [agricultural products]."

Agricultural markets and trade policies were also mentioned as a barrier throughout South Central Minnesota, especially with foreign trade due to the large number of commodities they export. Many participants noted that the United States exports a lot of soybeans to countries like China and the potential for trade wars and volatile markets. This is becoming a growing concern for farmers and operators making forecasting profits and weighing potential option very difficult.

External factors can cause tariffs, market prices, and cash flow to be unsteady and unpredictable. Respondents expressed concerns that there is rarely a year where their incomes are large, due to high input costs as well as external supply and demand factors. Nearly every participant commented on the inability to recoup costs due to high input costs and low commodity prices. Respondents stated that a large reason for this is the lack of local demand for mono-commodities. One participant shared, "We can't consume what we produce, [there is] far too much of it." Participant shared experiences where dairy farmers were unable to sell their product due to the low prices and were forced to dump milk.

Often when crop prices were low, livestock prices were high. However this has not been the case recently. For farmers and operators who are looking to diversify in order to combat this, many respondents mention that the current infrastructure in South Central Minnesota is not currently set-up to support that, making the process more difficult. However, diversification cannot completely combat this problem. When tariffs are enacted in the middle of the season, farmers do not have a lot of options. One participant share, "You cannot instantly go from one thing [commodity] to another." Respondents mentioned concerns with the foreign trade markets being extremely unstable and the United States being very dependent on exports, thus making difficult to predict profits or losses.

Several respondents brought attention to the disconnect between the overproduction and low prices that are occurring in the United States, as there are still millions of people starving in the United States and globally.

Impact of Corporate Farms Versus Family Farms

Some participants felt that large farming operations could afford more inputs for their operation, which allows them to get massive yields, thus having a negative effect on smaller operations as this drives the market price down when large volumes are brought into the market.

There also is a disconnect between smaller family farms and large corporations. Many of the participants felt that large corporate farms receive more financial backing from investors and other sources, which allows them to hold their product for longer periods of time and therefore sell when market profits are high. On the other hand, family farms do not have as much free capital to hold out long enough for higher market prices and instead must sell when prices are low forfeiting some profits or being forced to sell assets.

Participants also mentioned the effect larger corporate farms have not only on the markets but also rural communities. Many participants felt that large corporate farms cause populations in communities and school districts to decrease. This, in part, can be due to more people looking for off-the-farm jobs. Large corporate farms also pose a threat to local businesses due to the strong influence they have over prices due to purchasing power.

Debt

Large debt is an issue many farmers and respondents face. Respondents mentioned that interest and insurance rates are too high, making it very difficult not to go into debt. Others mentioned that lack of working capital made it equally difficult to stay out of debt.

A common theme throughout the interviews was a concern over the ability of new farmers to acquire the capital they need to enter the industry and become profitable. One respondent stated, "[new farmers enter the industry] so far in the hole before they can really ever see the daylight that all it takes is a couple of hiccups [natural disaster or poor production years] and they will be bankrupt." At the same time, some farmers are feeling the loss of optimism as they prepare to consider selling the farm. As one respondent stated, "There is a certain amount of pressure when you start getting into those 4, 5, or, 7-plus generations. I don't want to be the generation that screws it up." Many farmers and operators expressed concerns over their loans and that they could be called in suddenly, leaving them in a very difficult position. This also creates a problem in that many lack available capital to use if loans are called in because their investments are in land and equipment.

Bad ROIs and poor profit margins were also major concerns for farmers and operators in South Central Minnesota. Many participants were frustrated with the bleak financial performance, and its perceived impact on farm operations and community strength.

Unlike the 1980s farm crisis, this debt is not held on land, but instead on unsecured credit. Concerns regarding these factors center around access to capital, both for new farmers attempting to enter the industry as well as existing farmers, as they try to keep up with growing technological and production demands. For new farmers, they are not only expected to buy the top-of-the-line products, but they also need to have the capital for land and other entrance costs. Some of the participants voiced concerns for new farmers who have had to borrow large sums of money to enter the industry in recent years and have been hit hard by growing interest rates. Experienced farmers also addressed the fact that they are at a point, not only economically, but in their careers where it is easier to just fix and maintain equipment versus buy more or newer units.

Respondents addressed the issue of minimal liquid savings due to tax regulations. Numerous participants discussed the need for operating loans and stressed how they try avoid using the money from these loans due to the likeliness of needing them in the future. Respondents and participants mentioned land value and lack of land access as major barriers to their farming operations. Participants noted that land prices have increased greatly since the mid-to-late 1990s and that buying more land is almost impossible for new farmers or those who want to expand their operation due to the debt load.

Transportation

Participants recognize that South Central Minnesota has access to a reliable transportation network including highways, railroads, and airports, that allows their products to reach local, regional, national, and international markets. One participant mentioned, "We are able to move products globally, so that has been an asset."

Rental and Other Land Use

Rented land, which is not farmed by the owner, could be a hindrance to the agricultural community in South Central Minnesota. Participants suggested that renters do not have the same motivation that owners do to keep the land productive and healthy. Bad tenants who do not take care of the land can make the farmers around them look bad by association. For farmers who consider renting their land when they retire, this can be a deterrent.

Urban Sprawl

Many farmers feel limited by either physical restrictions to more land or economic restrictions. Several expressed concerns around urban sprawl including increased land prices and therefore decreased access to quality land. Many participants mentioned wanting to see cities grow up and not out, stopping urban sprawl, and saving very high yielding productive farm land. Some respondents see an end to their family farm legacy and consider urban sprawl as a potential opportunity for them to exit the industry and sell their land to developers. However, that does not mean many farmers are taking advantage of that opportunity. One respondent said, "You are just not to see a lot of people jumping for those opportunities at this time, no matter what the price. I don't think that [the] trends [are] going to change anytime soon."

Environmental Concerns

Many respondents had concerns about environmental issues surrounding farming. Erosion, fall plowing, soil health, and lack of education about sustainable practices was perceived as major barriers to agriculture in Minnesota. Some participants stated that many farmers in South Central Minnesota understand erosion concerns and are actively trying to mitigate soil erosion through use of cover crops and altered tillage practices, but others are not convinced. One of the participants said, "I think the environmental sustainability, fall plowing. I think is catastrophic, and I see fall plowing all over up here, and down in Iowa I don't see it." Also mentioned by participants was nutrient leaching and sediment run off which is closely tied to land erosion concerns and may be affecting water quality. Some participants mentioned concerns about spreading too much manure on fields and that the nitrogen waste from animals is adding to the damage. Participants were worried that farmers, government, and society in general are not proactive enough on this issue and that we are allocating resources in the wrong areas. There was a lot of concerns surrounding increasing population and the effect it will have on the environment as well as the increased pressure on farmers to keep improving the yield each season.

Livestock Prices

Livestock farmers discussed a multitude of issues, ranging from diseases to transportation costs to lack of non-traditional opportunities. Several pointed out the fact that, unlike crops, livestock operators do not have the luxury of being able to hold onto product until prices increase. One livestock operator stated, "When [they] are ready to go to market, they go to market no matter the price." Another key weakness in livestock production is that of expansion. Several farmers pointed out that costs do not stop at purchasing more land but also the cost of new highly technological barns and permits to build. "Three or four years ago we were thinking about expanding, or doing robots, or a parlor or free stay barn [for our dairy] but right now, you got to have your head down and try to make it through," shared one participant.

Some participants have concerns about contamination and diseases wiping out a livestock farmer's entire population and that it could be such an economical loss that they may be forced to liquidate their business.



Climate Change

Climate change is grabbing the attention of many farmers and operators and can include extreme weather events as well as new crop opportunities. Climate change and environmental issues were described by respondents and participants in a variety of ways. Some saw opportunities to take advantage of and potential benefits while others saw it as a threat to their operations.

Extended Growing Season

In some instances, climate change can be seen as an opportunity because it creates an extended growing season which bring the potential for new crops and products. Many respondents mentioned concerns over conventional monoculture farming and the ability maintain elevated levels of production as climate change continues. One respondent noted, "I have been told by environmentalists that Illinois, Iowa [and] Nebraska [are] getting too hot for them to raise corn."

Stable Food Supply

Climate change, specifically with warmer seasons and changing precipitation patterns, were referred to as a concern, even with modern crop advancements due to the effect it can have on food stability. One participant shared, "We all want a stable food source. We want to be able to support our families. We want to be able to have a good clean Earth for our future and the current, I guess. So, there is no reason we shouldn't all be on the same side."

Precipitation Change

Participants described the 2018 growing and harvesting season in South Central Minnesota as climatically rough. Large amounts of rain, during what is supposed to be the dry growing season of the summer, was experienced over the past year. These unseasonable rains caused farmers to lose large amounts of crops largely due to the inability to get onto the land to harvest until very late in the season. Many participants attributed the changes in precipitation patterns to climate change, recognizing that they will need to adapt to it in the future. Just in the last three years respondents shared that there has been a shift in heavy rainfall events from May to the harvest months of late August and September. This not only affects accessibility to crops, but also the quality of them. The yield loss from this past season due to excessive rain not only made it harder for farmers to harvest but also made it harder for them to secure loans from banks for the upcoming seasons.

Additionally, participants stated the watershed has become hyper-efficient due to a multitude of factors including increased tiling, run off creating lost fertile topsoil, and low-lying land to floods. One farmer shared that is likely that 20-40% of production abilities will be lost to flooding in the coming years. Heavy rain events have put increased pressure on tiling systems, causing many farmers and operators to have to replace them sooner than expected. Another respondent pointed out that, unlike other agricultural industries in the United States, the industry and set up in South Central Minnesota does not allow producers to control the quantity and time of water that their crops receive. There is little irrigation in South Central Minnesota, leaving the nutrient rich soil exposed and susceptible to run off. This is costly to not only the farmer but the environment, as well.

With more extreme weather events, some farmers may have to give up farming because they will not be able to get operating loans with low ROIs. Unpredictable weather events can continue to impact future seasons yields and profit margins which can be detrimental to farmers and operators in South Central Minnesota.

Nearly all participants and respondents mentioned that their operation has been impacted by climate change in one way or another. The industry is constantly trying to keep pace with changes in the growing season and creating new agriculture products (e.g., hybrid seeds and chemicals) to help mitigate potential problems due to these changes.

Summary

Farmers in the South Central Minnesota are deeply committed to their work, families, communities, and land. They clearly understand the risks present in agriculture and have proven to be resilient as well as optimistic about the opportunities new technology, new markets, education, adding value, and the internet bring to the agricultural community. Assets throughout South Central Minnesota, including the land, transportation system, processing plants, higher education, networks, and training and technical assistance, are shown to be a great strength to not only the farmers but also consumers.

It is very easy to think of contemporary events as unique and isolated. This is why many economists talk about the market crisis as unique to the United States, or unique and isolated in space and time. That kind of framing triggers questions like "What did we do wrong?" and "Who is to blame?" rather than raising questions about the internal relations in the prevailing modes of agricultural production. We live "in history" and what we have witnessed in the global economy, and specifically in agricultural production, over the last decade represents major historic transitions. How we think about today's challenges impacts how we respond, so it is critical to consider the events in a historical context.

The below arguments are from a purely economic standpoint. Much has been written about economic determinism, that policies and institutions are driven by changes in the economy, and these arguments could be construed to fall into this category. That said, there is no argument that the neoliberal political agenda that took place in the early 1970s have impacted economic performance and structures as well. The Chicago School of Economics rise to prominence in the late 1960s, combined with the first trade deficits for the U.S. in the late 1960s and the profit squeeze that took place certainly led to a new form of political agenda that impacted manufacturing and agriculture alike. The possible economic explanations used in this chapter are not to downplay the role of changing policies, and it is important to understand that economic changes do not take place in a vacuum. These three economic arguments are used to highlight possible economic explanations of a changing world economy starting in the early 1970s.⁶

Mainstream Explanations

Mainstream explanations regarding the crises that many farmers experience within Region Nine appear to fall into three broad categories. The first category of arguments describes the crisis as a unique agricultural incident, triggered by increased global competition. The second set of arguments suggests that the crisis was caused by the volatility of the markets. The third category represents a middle-of-theroad set of arguments, which suggest the crises are rectifiable through different governmental policies or support.

First Mainstream Explanation: Increased Global Competition

USDA data suggest that the United States accounts for roughly 40 percent of the world's total soy exports in 2018-2019, and that Brazil, the U.S., and Argentina will make up 87 percent of the total world trade of soybeans over the next decade. Brazil's agricultural export value now exceeds \$81 billion, and the country is expected to take over as the world's foremost agricultural exporter in the next 10 years.

Of Brazil's current gross domestic product (GDP), 20 percent is accounted for by commodities like soy, corn, cotton, and meat. Altogether, agricultural products account for 46 percent of their export merchandise. The USDA predicts that by 2027, Brazil will raise output of agricultural products by 55 percent, and exported crops are expected to reach 341 million tons by that time. Brazil, the second largest beef producer, has already increased poultry exports five-fold to overtake United States as the largest broiler exporter.⁷

⁶ See Sasha Lilley's Catastrophism (2011), PM Press, Oakland, CA for various perspectives on the role of political changes in the neoliberal era.

⁷USDA Agricultural Projections to 2027. (2018, February). Retrieved November 2018, from https://www.usda.gov/oce/commodity/projections/USDA_Agricultural_Projections_to_2027.pdf

In plain language, these arguments assume that diminishing market shares for United States farmers and low-cost production globally causes the crisis. As a result, these arguments hinge on the idea that United States farmers lose their competitiveness and that deficits are accumulated, which have to be financed through loans, resulting in a widening of debt, and eventually deteriorating conditions for farming at home.

Second Mainstream Explanation: Agriculture is a Volatile Business

The second mainstream explanation is that agricultural market prosperity tends to be cyclical, which often contributes to price volatility for agricultural goods. Market demand and production of agricultural products are likely to increase over the next decade to meet growing population demands. However, USDA commodity price data, summarized in Figure 1, suggest that prices of agricultural goods have been trending downwards, as global production capacities increase. Some operators in the region have already considered diversifying their production capacities to account for falling prices.



Figure 1: United States Grain Commodity Prices⁸

Third Mainstream Explanation: A Combination Problem

These arguments rest on two underlying assumptions: 1) There are geopolitical issues that will lead to increased competition between global producers and the United States. 2) Agricultural prices are expected to continue to trend downwards as the United States loses market share. This explanation recognizes a rather weak structural cause. It is mainly concerned with market shares, or how prices are related to diverse national economies and does not consider the sphere of production.

Problems with the Mainstream Explanations

There are several problems with these arguments. First, United States production costs have been suggested as the factor triggering both the fiscal and the current account deficits. This argument rests upon the assumption that the United States nominal unit labor costs (ULC)—a measure of labor costs relative to labor productivity—increased faster than those of other countries. This is difficult to accept for a number of reasons.

(1) Nominal ULC is not a convincing measure of competitiveness, as it is only to a very limited extent dependent on income levels.

(2) The economic Kaldor paradox argues that competitiveness depends not only on low wages and costs competitiveness, but also on qualitative factors (e.g., structural competitiveness).

(3) Average farm income has been constantly lagging behind productivity in the United States. Thus, real ULC (i.e. income) has been falling continuously for several decades. See Figure 2 for farm income in Region Nine compared to Minnesota and the United States.

(4) A decrease in farm income to restore competitiveness presupposes that rival economies will maintain their farm incomes stable or, at least, will reduce them less.



Figure 2: Farm Earnings as a Percent of Total Earnings, 2016

Critical Explanations

The more critical explanations typically emphasize two inter-related elements: (1) They emphasize the crisis-prone nature of agriculture, thus focusing on its world structure and the aftermath of the 2007-2008 financial crises. (2) They criticize United States agricultural policies and argue either for its dissolution or for its radical overhauling. In short, these explanations recognize in a rather implicit or disguised manner the general deficiencies of the United States agricultural system. However, they do not appear to suggest that the immediate problem is found in market capitalism, but rather its forms of management or "financialization" of capitalism.⁹

The "financialization" theory argues the assumption of a return to the pre-capitalist modes of operation. Banking in feudalism was based on unequal exchanges, in which monopoly formations and lending practices have to be re-evaluated. Hence, these types of theories argue that we are witnessing a crisis of financialized capitalism.

The global markets, bringing together countries with very different rates of growth and profitability, give rise to high levels of debt for United States farmers because debt finance yields higher profit rates through tax incentives.

Problems with Critical Explanations

These types of explanations appear to suffer from the general weaknesses of the "financialization" thesis. There is no reference to the production structure in the United States and other agricultural economies. It also ignores the existence of relations of economic exploitation among the three or four largest producers. The arguments uncritically accept the mainstream arguments of relatively high incomes in the United States being the cause of its deteriorating competitiveness.

A Structural Explanation: Falling Rates of Profits

A third explanation would attribute the crisis to the fundamental elements in the sphere of production, or more specifically, a strong structural component where there are internal elements that contribute to crisis formation, such as the tendency of the profit rate to fall over time as capacities increase. Specifically, competition among producers of agricultural products encourages investments (e.g., machinery and land) in order to enhance labor productivity.

Competition among producers, therefore, forces farmers to accumulate capital (e.g., machines, tools). At times, the accumulation of capital becomes too rapid, and production increases faster than demand. When the overall rate of profit is low, smaller farmers are especially vulnerable to business crises and with heavy indebtedness they get taken over by larger farmers or agricultural firms, which concentrates power in the hands of fewer and fewer producers.

This can best be described by using the political economy conceptualization of profits as a function of surplus values (s; i.e., the value generated by each farmer beyond their labor input) relative to the combined use of constant capital (c; i.e., fixed inputs) and variable capital (v; i.e., labor), with the rate of productivity (s/v) in the numerator and the organic composition of capital (c/v; i.e., the use of capital relative to labor) in the denominator. An interesting dilemma emerges. Profits will increase faster when the rate of productivity grows faster than the organic composition of capital. However, in order for productivity to continue to grow, an investment in constant capital has to be made. Hence, capital accumulation grows faster.

Profits = s / (c + v) = (s/v) / (1 + c/v)

With that in mind, the "financialization" is actually a consequence and not a cause, as the critical perspectives on the crisis suggest.¹⁰

Hence, if one were to believe the structural arguments, a possible solution to low agricultural resiliency, is rooted in aggregate farm planning and consolidation of farm operations. This may not be what individual farmers want to hear, but data indicates that there are falling rates of profit at play and that investments in constant capital has undermined the sustainability of farm operations in a constant quest for higher capacities.

¹⁰ Kristian Braekkan & James Ramsburg (2017). "Policy Failures, General Deficiencies, or Structural Constraints?" Vol 2, Issue 1.

Farm Succession

Many respondents remarked about their concern with farm succession. The important things to ask about farm succession are: how many people can one farm support? Does the next generation really want to farm? Do the economics of farming make it feasible? Early farm succession planning is needed to determine whether succession is in fact feasible. There are two things to consider, estate planning and succession planning. Conversation around either of these topics can be difficult for families, but it is one of the most important conversations to have.

Farm succession is the passing on of a legal farm business entity from one generation to the next. The financial burdens of trying to do this are complicated and dependent on how and when a farmer would like to retire. There are many factors to consider, such as if there will or will not be overlap between the current and future operator. Because most farms and agriculture business entities are set up as sole proprietorships, they are not required to do mandatory reporting. It is for this reason that there has been little data collected regarding retirement and succession. Below is information from the book "Talking the Talk: Revolution in Agriculture Communication," which is based on a survey and interview study that was done by the Iowa State University. The authors address many questions about farm succession and process. The figure below shows a sample of where succession planning stands within the industry. The data suggest there are many farmers who have not made any plans for succession.

Figure 3: Farm Succession within U.S. Families¹¹



It is interesting to note that family members were the ones more consulted about succession decisions. Interestingly, more than 50 percent of the respondents had not spoken to anyone about succession planning of their farming operations.

¹¹ Lamberti, A. P., Talking the Talk: Revolution in Agricultural Communication, Iowa State University. Nova Publishers, 2007.

Retirement Plan Discussion¹²

Equitable distribution of inheritance for spouses, children, and among siblings can be cause for emotional turmoil within families. Furthermore, are the concerns of tax implications due to land transfers and equipment giving. In attempt to be proactive and prevent such issues from arising, it is important for conversations to be had about succession. Gifting farm equipment, equity or land can be done gradually in an attempt to lessen tax implications. Operators may also choose to rent out their equipment to their successors as an attempt to provide a steady income for the retiring farmer. Another option to lessen the financial burden of succession is for the next generation of farmers to slowly buy the business from parents, again providing a small income for retirement for the generation leaving the business.¹³



Figure 4: Those With Whom Farmers Have Discussed Their Retirement Plans¹⁴



For the agriculture sector to be more resilient, there are several steps an operator can take today that would allow this process to flow smoother. The first of which is to look at how a farming business is currently structured.

Figure 5: Ownership Structure of Minnesota Farms (%)¹⁵



The fact that the majority of farm business structures in Minnesota are sole proprietorships is significant. This is likely due to the fact that it is the simplest form of business structure. This is the default that the government will use for any liability and tax purposes.¹⁶ It only allows for one person to be liable for all debts and liabilities, but also all of the profit. As a sole proprietorship, all profits will be taxed as personal income and be reported on an Internal Revenue Service (IRS) tax reporting forms Schedule C or Schedule F of Form 1040. Therefore, if this operator has a bad accident that happened to adversely affect a neighbor's farm operation or someone on their farm is injured, all of the farm and personal property would be within reach of the courts in litigation.

Among other forms of business entities are General Partnerships, Limited Partnerships, and Limited Liability Company (LLC). Each of these have their own advantages and disadvantages. For instance, with a Limited Partnership, the children of a retiring farmer could both inherit the farm from their parents, but only one might be interested in farming. In that case, one person would be management and the other would be a silent partner and be shielded from liability beyond their interest in the business but also share in a reasonable amount of profits for use of their part of the farm interest.

An LLC is a distinct entity that is a hybrid of a partnership and a corporation. It protects the owner or owners from liability beyond the business, and it also allows a pass-through income to be seen as personal income only. There are also Family Limited Partnerships (FLP) which have many of the same characteristics as LLCs.¹⁷

¹⁵ Adapted from USDA (2016) United S ?ID=17854#P05456a328a464ca8ac06c7 Department of Agriculture, Economic Research Service, Home/Data Products/State Fact Sheets/State Data. Retrieved from https://data.ers.usda.gov/reports.aspx See543f_5_428iT15C0x0 Agriculture and agribusiness law: An introduction for non-lawyers. (pp. 166-176) New York, NY Routledge Taylor and Francis Group. Corporations usually are classified as S-Corp or C-Corp. There are some very sound reasons why a family or group of families would want to structure their business like this, liability protection being one of the most important, but they could end up potentially paying the most tax this way as well. It is something that should discussed with a legal professional.¹⁸

To better understand the options, see Table 1 for how a business can be structured and what the tax implications are for income and liability. This table is presented as informational only and should not be construed to constitute legal or financial advice. Specific questions unique to an individual's situation should be discussed with an appropriate financial or legal professional.

Type of Ownership	Number of Owners Allowed	Liability Protection for Owner	Tax Implications
Sole Proprietorship	1	None	Individual level taxation
General Partnership	2	None/double	Individual level taxation
Limited Partnership	2 or more	Yes/No	Individual level taxation
Limited Liability Company	1 to Infinity	Yes	Individual level taxation
S – Corporation	1 to 100	Yes	Individual level taxation
C - Corporation	1 to Infinity	Yes	Taxed twice. Once as the owner of the corporation and then again with individual income tax.
Trust or Blind trust	1 to Infinity	Yes	Trust is taxable, and that money comes out of what the trust beneficiaries would receive.

Table 1: Farm Business Structures

Estate Planning

Estate planning, which is slightly different from succession planning, is simply ensuring the property goes to the people you want it to go to when you pass away. Land and buildings that are attached to land are what the courts will consider to be real property. Everything else normally will be considered personal property. The distinction is important because of land sale and rental situations. Often when farmers choose to retire, they may want to rent out their land if they have no successor, so if the tenant attaches something to the land or buildings it could become part of the land. There is a slight rise in the percentage of tenancy, with 33 percent in 2012 renting a portion land for their farming operation, while the percentage of operations with an operator owning all the land, they farm dropping 3.9 percent from 2002 to 2012. With land values continuing to increase, this trend of diminishing numbers of owner-operators is likely to continue.





¹⁸ Feitshans, T. A. (2016) Business entities, Agriculture and agribusiness law: An introduction for non-lawyers. (pp. 166-176) New York, NY Routledge Taylor and Francis Group

^{35 &}lt;sup>19</sup>Adapted from USDA (2016) United States Department of Agriculture, Economic Research Service, Home/Data Products/State Fact Sheets/State Data. Retrieved from https://data.ers.usda.gov/reports.aspx-?ID=17854#P05456a328a464ca8ac06c76228ee543f_5_428iT15C0x0

Some authors describe obligation, business growth, and specialized positions as the main traps a farmer may face: Many family business owners make their children or other family members feel obligated to continue in the family business. Having an honest talk with a potential successor could avert a huge mistake and possible loss of the family business. In addition, many farms cannot support as many generations that are living. Most farm businesses can only support one or possibly two generations. Many farmers must have an off-the-farm job to survive. Frequently, family members remain in specialized positions and fail to cross train. This can cause complications, such as inadequate training on how to manage business record keeping and finances.²⁰



Figure 7: Percent of Farmers with off-the-farm Employment as Primary Source of Income²¹

With the understanding that almost 50 percent of farm operators rely on an off-the-farm job, more rural residents are completing college.

Figure 8: Rural Minnesota, Percentage of Persons Completing College²²



²⁰ Stalk G., Foley H. (January and February 2012) Avoid the traps that can destroy family businesses. Retrieved from https://hbr.org/2012/01/avoid-the-traps-that-can-destroy-family-businesses ^{22, 23} Adapted from USDA (2016) United States Department of Agriculture, Economic Research Service, Home/Data Products/State Fact Sheets/State Data. Retrieved from https://data.ers.usda.gov/reports.aspx-?ID=17854#P05456a328a464ca8ac06c76228ee543f_5_428iT15C0x0



Additionally, the size of Minnesota farms has increased by nine acres per farm (or approximately 2.5 percent) from 2002 to 2012. This suggests an incremental trend toward farm consolidation and away from family succession.



Figure 9: Average Minnesota Farm Size in Acres, 2002-2012

According to USDA data, commercial farms are performing significantly better than resident or intermediate farms whose operators are working off-the-farm jobs as their primary source of income.

ltem	Residence Farms	Intermediate Farms	Commercial Farms	All
Number of Farms	1,049,995	761,925	184,332	1,996,252
		Income, Median Do	llars per Household	
Farm Income	-2,356	175	137,479	-800
Off-farm Income	82,945	48,452	39,750	67,500
Earned Income	65,000	19,190	22,123	41,933
Unearned Income	12,500	25,219	6,250	18,796
Total Household Income	82,471	59,511	195,526	75,994
		Income, Average Do	llars per Household	
Farm Income	-91	7,665	225,264	23,678
Off-farm Income	107,693	68,197	77,355	89,817
Earned Income	81,463	35,143	56,279	61,458
Unearned Income	26,230	33,054	21,075	28,359
Total Household Income	107,602	75,862	302,619	113,495

Table 2: Principal Farm Operator Finances, by Economic Research Service Farm Typology, 2017²⁴

Table 3: Age of Principal Farm Operator in United States, 2017²⁵

	Major Occup	pation of Principal Operator	
Item	Farm or Ranch Work	Work Other Than Farming or Ranching	All
Average age of Principal Operator (Years)	62	57	60
Younger Than 35 Years (Percent Distribution)	4	4	4
35 to 44 Years (Percent Distribution)	6	12	9
45 to 54 Years (Percent Distribution)	10	22	16
55 to 64 Years (Percent Distribution)	35	34	34
65 Years or Older (Percent Distribution)	45	27	37

As the previous charts and tables illustrate, the size of a farms has increased, but low profit margin in crop production and livestock is what is driving the concerns regarding succession as one generation goes off to college and works elsewhere, leaving the previous generation wondering who will take over the farm.

This may also be contributing to the growing trend of a "skip generation." This means that one generation leaves the farm business because it cannot sustain two families, but by the time the older generation wants to retire, the grandchildren are old enough and will be inheriting the farm operations and business.

²⁴ USDA, Economic Research Service and National Agricultural Statistics Service, 2017 Agricultural Resource Management Survey. Data as of November 30, 2018. *For details on the farm types, see the ERS report, Updating the ERS Farm Typology (EIB-110), April 2013. Changes in questionnaire design between the 2016 and 2017 Agricultural Resource Management Surveys contributed to a change in the share of farming operations classified as "retirement farms."

^{*} Adapted from USDA (2016) United States Department of Agriculture, Economic Research Service, Home/Data Products/State Fact Sheets/State Data. Retrieved from https://www.ers.usda.gov/data-products/farm-household-income-and-characteristics/farm-household-income-and-characteristics/#Farm%20Household%20Characteristics

Health Care

The health care system in the United States is a dynamic and complex multi-system network that changes frequently, depending on federal and state regulations and the income, age, location, employment, and status of the person. In 2017, the uninsured rate amongst people of all ages in the United States was 8.8 percent (10.2 percent of the population younger than 65 years, approximately 28.1 million people).²⁶ The main reasons for being uninsured among adults younger than 65 years in 2017 were high cost of insurance (45 percent), loss of job or change of employer (22 percent), loss of Medicaid coverage (11 percent), and change in status (11 percent).²⁷

Insurance

The private and public health insurance options have multiple alternatives to choose from depending on the type of coverage, location, available network services, age, socioeconomic status, and other variables. In addition, each year a person or employer has the option to change the type of insurance and coverage during the open enrollment period or when the status of the person changes, which could affect the type of insurance the person and his or her family can get.

Private coverage accounted for 67.5 percent of the insured population in the country during 2016. During the same year, the percentages of the population covered for some or all of the calendar year by type of coverage were employer-based health insurance (55.7 percent), followed by Medicaid (19.4 percent), Medicare (16.7 percent), direct-purchase (16.2 percent), and military coverage (4.6 percent).^{28, 29}

The nation's expenditures in health care reached \$3.5 trillion in 2017. The following graphic shows the share by payer (health insurance company) responsible for 75 percent of the total (41 percent public payers, in addition of the three percent paid by the government for public health activities; and 34 percent private payers).³⁰



Figure 10: The Nation's Health Dollar (\$3.5 Trillion) Where it Comes From, 2017

PieChartSourcesExpenditures.pdf

^{26, 29} https://www.census.gov/library/publications/2017/demo/p60-260.html

²⁷ https://www.kff.org/uninsured/fact-sheet/key-facts-about-the-uninsured-population/#footnote-384995-11

³⁹ ²⁸ The total percentage is greater than 100 percent because some people were covered by more than one insurance during the year due to change in their status ^o Centers for Medicare and Medicaid Services. (n.d.) Retrieved January 11, 2019 from https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/

These \$3.5 trillion were expended to pay for hospital care (33 percent), physicians and clinical services (20 percent), prescription drugs (10 percent), government administration and net cost of health insurance (eight percent), and other services (14 percent).³¹





Insurance in Minnesota

In 2017, about 349,000 Minnesotans did not have health insurance, 6.3 percent of the population, a lower rate than the nation, but a two percent increase from the previous year.

Figure 12: Minnesota's Uninsured Rates, 2001-2017³²



The uninsured rates are higher among populations 18 to 34 years old, those who did not graduate from high school, the self-employed, employees of businesses with fewer than 50 employees, and persons of color.

Y	ear	2004	2009	2011	2013	2015	2017	
State	wide %	7.7	9^	9	8.2	4.3	6.3*	
Age	0 to 17	5.4^	6.3^	5.4^	6.2^	3.4	3.8^	
	18 to 34	15.9^	18^	17.5^	15.6^	7.3^	10.9*^	
	35 to 64	6.6^	7.8^	9.3	7.9	4.4	7.4*	
	65+	.3^	1.6^	.7^	.5^	0.4	.2^	
Region	Northwest	8.8	10	9.9	6.4	4.1	11.8	
	Headwaters	11.4	24.7^	14	12.4	3.2	10.2^	
	Arrowhead	8.5	9.4	12.5	8.2	3.2	5.2	
	West Central	10.2	12.2	6	5.2^	2.2^	7.2*	
	North Central	11.6	13.2	12.5	7.2	10	8.1	
	Mid- Minnesota	7	8.3	6.9	6.7	3.9	7.5	
	Upper MN Valley	10.2	10.8	6.6	6.8	5.6	14.8^	
	East Central	10.8	15.5	8.3	9	1.9^	7.9	
	Central	5.2^	8.9	5.6^	7.4	4	4.9	
	Southwest	8.4	6.1	9.5	13.6	6	5.7	
	South Central	4.8^	9.1	10.7	12.1	5.5	4.4	
	Southeast	5.5^	9.1*	6.5^	5.7	2.6^	3.1^	
	Twin Cities	7.8	7.6^	9.5	8.4	4.5	6.4*	
	*Indicates a statistically significant difference from previous year shown at the 95% level.							
	^Indi	cates a statisti	cally significant	difference from	n statewide rate	e within year at	the 95% level.	
Source: MDH Health Economics Program and University of Minnesota School of Public Health, Minnesota Health Access Surveys.								

Table 3: Minnesota's Uninsured Rate per Age and Region, 2004-2017³³

Figure 13: Employer Size of All Minnesotans vs. Uninsured Minnesotans³⁴



The sources of health insurance for Minnesotans in 2017 were: Employer, self-insured (33 %), followed by employer, fully insured (18 percent), Medicare (17 percent), medical assistance, MinnCare (16 percent), small group (five percent) and individual (five percent).³⁵

Figure 14: Minnesota Health Insurance Sources, 2017³⁶



■ Individual ■ Medical assistance/MN Care ■ Employer, fully insured ■ Uninsured ■ Small group ■ Medicare ■ Employer, self-insured

The major health insurance companies that offer health insurance in the region are: Blue Cross Blue Shield of MN, HealthPartners, Medica, Prefferred One, Ucare, Humana, Cigna, United Health Care, and SilverScript.³⁷ SilverScript is a prescription insurance company.³⁸ A comprehensive list of healthcare companies that offer healthcare insurance in Minnesota is posted at the Minnesota Department of Health website.³⁹

The majority of Minnesotans (57.3 percent) obtained their health insurance from private sources (group or individual), while public sources cover 36.5 percent. Similarly, in South Central Minnesota, 58 percent of the population had private health insurance coverage, and 37.6 percent were covered by public health insurance. The uninsured rate in the region was lower (4.4 percent) compared to the state (6.3 percent) in 2017.⁴⁰

Table 4: Minnesota Sources of Insurance, Percentages⁴¹

	2009	2011	2013	2015	2017
Group	57.6	56.6	55.2	55.9	52.9
Individual	5.1	5.2	5.4	6.2	4.4
Public	28.3	29.2	31.1	33.6	36.5
Uninsured	9	9	8.2	4.3	6.3
Total 100 100 100 100 100					
https://mnha.web.health.state.mn.us/PublicQuery.action					

Table 5: South	Central	Minnesota	Sources	of Insuranc	e,
Percentages ⁴²				-	

	2009	2011	2013	2015	2017
Group	49.6	51.3	47	53.5	53.2
Individual	5.6	7	5	3.8	4.8
Public	35.7	31	35.9	37.5	37.6
Uninsured 9.1 10.7 12.1 5.2 4.4					
Total 100 100 100 100 100					
https://mnha.web.health.state.mn.us/PublicQuery.action					

³⁸ MNSure Website (n.d.) Retrieved January 10, 2019 from https://www.mnsure.org/new-customers/who-can-enroll/requirements.jsp
³⁹ Minnesota Department of Health. (February 2018) Administrative costs at Minnesota health plans in 2016. Retrieved January 12, 2019 from http://www.health.state.mn.us/divs/hpsc/hep/publications/costs/2016admincosts.pdf 40, 41, 42 https://mnha.web.health.state.mn.us/PublicQuery.action

^{35, 36} https://mn.gov/commerce-stat/pdfs/rate-release-packet-2017.pdf

³⁷ Minnesota Health Insurance Nework (n.d.) Health insurance companies page. Retrieved on January 11, 2019 from https://www.mnhealthnetwork.com/companies.htm

Expenditures in Minnesota

The distribution of health care expenditures paid by public and private sources in Minnesota in 2014 is also complex. Hospital care was the most expensive expenditure, accounting for 38 percent of the total, followed by physician and other professional services (23 percent), and prescription drugs and other medical non-durables (11 percent).⁴³

Figure 15: Minnesota Health Spending, by Expense, 2014



In 2014 in Minnesota, 52 percent of the total amount of money spent in health was paid by private sources, including private health insurance (38 percent), out of pocket (12 percent), and other private payments (two percent); public sources spent (48 percent), including Medicaid (23 percent), Medicare (19 percent), and other public sources (six percent).⁴⁴

Figure 16: Minnesota Health Spending, by Source of Funds, 2014⁴⁵



^{4.4} https://www.kff.org/other/state-indicator/distribution-of-health-care-expenditures-by-service-by-state-of-residence-in-millions/?currentTimeframe=0&selectedRows=%7B%22states%22:%7B%22minnesota%22.%7B%7D%7D%7D%5ortModel=%7B%22calld%22.%22location%22.%22sort%22.%23sort%22.%20sort

Health Care in Region Nine

In the South Central Minnesota, the majority of the population obtains the insurance coverage from group or public health insurance plans, which could be applied for through MNSure⁴⁶, a gateway to apply for health insurance, including public health programs managed by the Minnesota Department of Human Services (DHS) and private health insurance options managed by individual insurance companies. MNsure determines the applicant qualifications for subsidies, Medical Assistance, or Minnesota Care.⁴⁷ The system also allows comparisons between plans, coverages and costs. Plan features may change from year to year, like network, deductibles, and co-pays.⁴⁸

The Minnesota Hospital Association reports 137 healthcare clinics and 10 hospitals in the region in 2017.⁴⁹ Compared to the state of Minnesota, the patients-physician-dentist-mental health provider ratios tends to be higher in Region Nine, except for the ratios of Blue Earth County and Brown County; Blue Earth County and Nicollet County; and Blue Earth County respectively.

Data From County Health Rankings, 2017*	Primary Care Physician	Dentist	Mental Health Provider
Blue Earth	1,020	1,150	450
Brown	870	1,950	520
Faribault	2,030	2,810	2,810
Le Sueur	13,890	3,460	3,950
Martin	1,120	1,670	1,110
Nicollet	1,140	1,450	620
Sibley	3,730	2,980	3,720
Waseca	2,110	2,370	9,490
Watonwan	2,770	2,740	2190
Minnesota	1,100	1,480	510

Table 6: Region Nine counties Compared to Minnesota by Primary Care Provider Ratio⁵⁰

*Number of people to one provider

Additionally, rural areas are more likely to have physician assistants and nurse practitioners working with patients, rather than a primary care physician, which can lead to an increased number of referrals outside South Central Minnesota, especially to the metropolitan areas of Rochester and the Twin Cities.⁵¹

Figure 17: Availability of Primary Care Physicians & Percentage of Primary Care Physicians Working with Physician Assistants or Nurse Practitioners⁵²



48, 49, 50 https://www.mnsure.org/

³² County health rankings and roadmaps. (n.d.) retrieved on January 10, 2019 from http://www.countyhealthrankings.org/app/minnesota/2017/rankings/nicollet/county/factors/4/snapshot

⁵¹ Minnesota Hospital Association. (n.d.) Retrieved from https://www.mnhospitals.org/mn-hospitals/find-a-hospital

With the passing of Minnesota legislation SF1 Section 10, on January 30, 2017, there is a new option to get healthcare insurance through cooperatives. Currently there are two cooperatives that meet the requirements of the ACA, Land O'Lakes Inc. and 40 Square Cooperative Solutions, which are offering group buying power to provide coverage to over 1,700 people as of 2018.⁵³ Land O'Lakes has created its own insurance company, BuyPoint Insurance Solutions, while 40 Square Insurance is partnering with PeferredOne Insurance to provide coverage to its members.

Technology in Heath Care

In recent years the healthcare sector has sought new technologies for patients and physicians. Telehealth provides mobile health communication (mHealth), remote patient monitoring (RPM), and capacity to store and forward transmission of medical information.⁵⁴ It has potential to be used in rural areas where some patients might lack transportation or time to reach health care providers outside their areas, improving timeliness, monitoring, and communication.⁵⁵ The system also can be used for learning and sharing information on how to care for patients with long-term chronic illnesses.⁵⁶

In order to have telemedicine in place and obtain better results, it is necessary to have reliable infrastructure, including fiberoptic networks, broadband service and high-speed internet access.⁵⁷ Telehealth would also require more computers and programs to be fully implemented.⁵⁸ Medicare reimbursement, licensure, security, and training may also be road blocks for its implementation.⁵⁹

New Technologies

New technologies, information, and innovation have fueled the change to meet the needs of operators across Minnesota. Recent USDA data⁶⁰ show that since 2008 in Minnesota, the total amount of land planted has increased by only a few thousand acres while the production volume from that land has gone up by millions of bushels. This suggests that Minnesota farmers have been continually increasing production without the need for developing more agricultural land, which also supports the idea that biotechnology and farming efficiencies are continually improving.⁶¹ The increased production volume cannot be credited purely to the seed companies alone. The performance and production of any crop can be impacted by weather patterns, pests and disease outbreaks, chemical applications, soil health, seed coat treatments, and available precision agriculture technologies.⁶²

A study from Purdue in 2017, which surveyed agricultural supply retailers and supporting business, found that only 52 percent of the retailers they looked at were offering remote sensing from aerial imagery.⁶³ Precision agriculture uses real-time data monitoring and remote sensing to manage spatial and temporal variation on the farm, and it creates incredibly detailed amounts of data that help provide insights and improve the efficiency of an operation.⁶⁴ The flow information through a precision agriculture service like this generally requires wireless data transfer from the operation to a server for analysis.⁶⁵ Some types of precision agricultural services have been available for almost a decade, but only a portion of those available have been readily adapted.^{66, 67}

bune, Farmer health plans expect growth. Retrieved from http://www.startribune.com/farmer-health-plans-expect-growth/499714481/ nformation Hub. Telehealth use in rural healthcare. Retrieved on January 11, 2019 from https://www.ruralhealthinfo.org/topics/telehealth#challenges Project Echo Q-A fact sheet. Retrieved on January 12, 2019 from https://echo.unm.edu/wp-content/uploads/2016/10/Project-ECHO-Q-A-Fact-Sheet-for-Providers-Health-Cent

t of Agriculture National Agricultural Statistics Service Minnesota Ag News Crop Production 2018 ons to 2027. (2018, February). Retrieved November 2018, from https://www.usda.gov/oce/commodity/projections/USDA_Agricultural_Projections_to_2027.pdf DeBoer, J., & Bradford, J. (2017, December). 2017 PRECISION AGRICULTURE DEALERSHIP SURVEY. Retrieved from http://agribusiness.purdue.edu/files/file/croplife-purdue-2017-preci-

rnhammer, H. (2009). Mobile farm equipment as a data source in an agricultural service architecture. Computers and Electronics in Agriculture, 65(2), 238-246.

The services can be sold in bundles or as individual parts based on customer needs.^{68,69} Many of the services on the market are already being offered through co-ops and retailers that farmers in South Central Minnesota are familiar with.⁷⁰ The same study from Purdue found that only five percent of retailers did not have some form of precision agriculture service available to producers, and that the most utilized technologies have been Global Positioning System (GPS) guidance or auto steer and auto sprayer boom section or nozzle control with 78 percent and 73 percent adoption rates respectively.⁷¹ It is up to farmers from the South Central Minnesota to have conversations with local retailers to find out what services they can currently offer each year. The retailers from that same study predict that field mapping with Geographic Information Systems (GIS) and soil sampling will become the second and third-most adopted technology packages by operators in 2020.⁷²

Rural areas of Minnesota seem to have limited access to information and services.⁷³ Information access for rural operators in the South Central Minnesota is likely to be linked to Minnesota's broadband coverage, which is lacking greatly in rural parts of the state.⁷⁴ The type of internet connections most Minnesota farms have is through a Digital Subscriber Line (DSL) connection. However in 2017, 38 percent of farms were relying on satellite or mobile internet connections, suggesting they do not have access to traditional internet provider services.⁷⁵

Figure 18: Minnesota Broadband Service Map, 2018⁷⁶



USDA data also found that in 2017, 78 percent of Minnesota farms had a computer but only 53 percent of them use it for the business.⁷⁷ High-speed broadband coverage in rural Minnesota is not reaching all the households, which is likely impacting agriculture business operators and limiting their ability to make fully informed decisions, as well as limiting access to other technological services.⁷⁸ New technologies generate large pools of data that are shared wirelessly to the farmer and precision agriculture web-based interfaces.^{79,80}

13.74.76 Kelliher, M. A. et., al, (2018, October). October 2018 Annual report, governor's task force on broadband. Retrieved from https://mn.gov/deed/assets/2018-bbtf-report_tcm1045-354312.pdf

⁷⁹ O'Grady, M. J., & O'Hare, G. M. P. (2017). Modelling the smart farm. Information Processing in Agriculture, 4(3), 179-187.

80 Steinberger, G., Rothmund, M., & Auernhammer, H. (2009). Mobile farm equipment as a data source in an agricultural service architecture. Computers and Electronics in Agriculture, 65(2), 238-246

^{48.70,71.72} Erickson, B., Owenberg-DeBoer, J., & Bradford, J. (2017, December). 2017 PRECISION AGRICULTURE DEALERSHIP SURVEY. Retrieved from http://agribusiness.purdue.edu/files/file/croplife-purdue-2017-precision-dealer-survey-report.pdf

⁴⁹ Sharma, R., Kamble, S. S., & Gunasekaran, A. (2018). Big GIS analytics framework for agriculture supply chains: A literature review identifying the current trends and future perspectives. Computers and Electronics in Agriculture, 155, 103-120.

^{73.77.78} U. (2018, August 18). Minnesota Ag News - Farm Computer Use. Retrieved November 18, 2018, from https://www.nass.usda.gov/Statistics_by_State/Minnesota/Publications/Other_Press_Releases/MN_Farm_Computer_2017.pdf

The speed at which Information moves is a threat specifically towards adoption of precision agriculture services because the real-time farm level information gathering is used as a guide for the most efficient use and management of resources like pesticide or fertilizer applications, seed planting, and harvest yield monitoring.81

A 2018 Minnesota governor's task force found that 21 percent of rural households in Minnesota are unserved, meaning that they lack access to 25 Megabits per second (Mbps) download and three Mbps upload speed. Furthermore, 41 percent of rural households are underserved, meaning they lack access to 100 Mbps download and 20 Mbps upload speeds.⁸² The average internet speed of Minnesota compared to other states is relatively slow because of the large portion of the state's rural areas that are poorly serviced.⁸³ Minnesota is ranked 27th in terms of speed compared to other states.⁸⁴ This issue is not only a county and state-wide issue but has been identified as an issue on a national scale.⁸⁵ Figure 18: Primary Type of Internet Connection on Farms, 2018⁸⁶



Climate Change

The climate of South Central Minnesota has been getting warmer and wetter. Like much of the United States between 1920 and 2016, yearly precipitation in the region grew from 25.98 inches to 38.69 inches, an increase of 38 percent.87

During this same period, the average temperature in South Central Minnesota increased by 4.08°F.88 Such an increase on temperature can have a positive impact on the growing season by lengthening it, but also could be detrimental to the crops by putting an increase pressure on their lifecycle.

In the months of August, September, and October, crop farmers expect the land to be dry in order to harvest their commodities. These three months have been experiencing more extreme wet events in the last 20 years than previously recorded.⁸⁹ Not only are they more frequent, but they are becoming more severe than previously recorded.⁹⁰

In addition to the issues of weather pattern changes, the region has been experiencing more dramatic shifts in growing degree-days. According to the Lamberton, Minnesota weather and research station (located in a county west of Region Nine), the last 30 years have encompassed both the longest (2,971) and shortest (2,146) growing degree-days.⁹¹ Notably, the most recent five years have recorded a growing shift above the historical average. 92

⁸¹ O'Grady, M. J., & O'Hare, G. M. P. (2017). Modelling the smart farm. Information Processing in Agriculture, 4(3), 179-187. ^{82,83} Kelliher, M. A. et., al, (2018, October). October 2018 Annual report, governor's task force on broadband. Retrieved from https://mn.gov/deed/assets/2018-bbtf-report_tcm1045-354312.pdf ⁸⁴ (2018, October 01). Report: US States with the Worst and Best Internet Coverage 2018. Retrieved from https://broadbandnow.com/report/us-states-internet-coverage-speed-2018

⁴⁵ International Broadband Data Report (Sixth). (2018, February 02). Retrieved from https://www.fcc.gov/reports-research/reports/international-broadband-data-reports/international-broadband-d



Diseases, Pests, Chemicals, and Pollinators

The impact that climate change plays in each pest, vector, and transmission is complex, and there are many unanswered questions regarding measurement of its impact on different species.^{93, 94, 95, 96} As outlined in RNDC's *South Central Minnesota Climate Change Vulnerability Assessment and Adaptation Plan*, warm winters can contribute to spread of infectious disease because a milder climate and longer growing seasons can open the window for carrying vectors, like insects.

Also mentioned in the RNDC plan was how this has led to increased time of standing water, which in turn boosts the risk of water contamination and water-borne illnesses spreading into waterways. The report identified standing water, flood prevalence, and warmer weather as factors that could compound the already high levels of nitrogen, phosphorus, and suspended solids found in southern Minnesota waterways. The Minnesota Pollution Control Agency reported that in 2018 only 16 percent of streams in southern Minnesota watersheds meet quality standards for aquatic life. Specifically, high levels of nitrogen are likely a result of the conversion of prairies into crop land with artificial (tile) drainage systems.⁹⁷

Crop pests were also mentioned by many of the participants. On a global scale, some estimates put 30 percent of food production as being reliant on pollinators for success.⁹⁸ The issues here are that not all insects are pollinators, and many participants had concerns about disease-carrying or pest species of insects. Since 2004, aphid populations found in soybean fields across Minnesota have increased, and so has the use of insecticides to control them. Over the last couple of years, ongoing attempts to combat these insects have led to chemical resistance among some aphids, which then require heavier applications of insecticides. The result is greater impact on secondary species.⁹⁹

⁹⁹ Alkhamis, M. A., Arruda, A. G., Vilalta, C., Morrison, R. B., & Perez, A. M. (2018). Surveillance of porcine reproductive and respiratory syndrome virus in the United States using risk mapping and species distribution modeling. Preventive Veterinary Medicine, 150, 135-142. doi:10.1016/j.prevetmed.2017.11.01

^{94.97}M. (2018, November 20). The state of rivers and streams. Retrieved November 2018, from https://www.pca.state.mn.us/water/state-rivers-and-streams

⁹⁵ Nathues, H., Nathues, C., Alarcon, P., Rushton, J., Jolie, R., Fiebig, K., . . . Geurts, V. (2017). Cost of porcine reproductive and respiratory syndrome virus at individual farm level – an economic disease model. Preventive Veterinary Medicine, 142, 16-29. doi:10.1016/j.prevetmed.2017.04.006

^{98.98.99} M. (2016, August). Review of Neonicotinoid Use, Registration, and Insect Pollinator Impacts in Minnesota. Retrieved November, 2018, from https://www.leg.state.mn.us/docs/2016/other/160802.pdf

Impacts on Hog Industry

For participants involved in the hog industry, porcine reproductive and respiratory syndrome (PRRS) was a common concern. This disease comes in multiple strains that affect sows and growing pigs and causes significant financial losses in North American swine industry. In 2005 it was estimated that in the United States PRRS-related losses are around \$560 million per year.¹⁰⁰ This disease has been characterized as going through seasonal increases in outbreaks, but unfortunately the risks associated with climate and herd density are not fully understood.¹⁰¹

A study from the University of Minnesota looked at the geographic location of outbreaks of PRRS on sow farms between 2009-2016 and found that a majority occurred in north central lowa and in South Central Minnesota. The study also created a model with climate components, like temperature and precipitation, to predict probable locations of outbreaks. Findings suggest that a large portion of southern Minnesota may be as risk for PRRS outbreaks.¹⁰² It would suggest that the South Central Minnesota's large hog density, coupled with current climate patterns, may put the pork industry at greater risk for disease, like PRRS.

Chemicals & Seed Technologies

One common technology paired with hybrid crops to mitigate pests are seed-coat treatments and pesticide applications that contain biological and chemical ingredients to suppress, control, or repel plant pests, pathogens, and insects that attack seeds, seedlings, or full-grown plants.¹⁰³ Neonicotinoids are currently among the most common broad-spectrum insecticides in the world. In 2015, Minnesota had 510 registered neonicotinoid based products that target floral, root, and stalk-boring insects.¹⁰⁴ Neonicotinoids are a class of chemical that has been an ongoing area of concern over the last decade. In 2013, the Minnesota Department of Agriculture started to investigate this issue further at the request of the legislature. The final reports of those agencies are expected sometime in 2019.¹⁰⁵

Agricultural pesticide chemicals can be used as sprays, but they can also applied as a coating that is that rolled onto the seeds.^{106, 107} These insecticides are widely used because they are very effective at low concentrations, but they can also be damaging to native insects and mammals who are exposed to them unintentionally.¹⁰⁸ A large number of pathways can lead to damage, including direct exposure to the chemical, or exposure to treated pollen, plant tissues, or nectar.¹⁰⁹

Minnesota's avian and mammalian wildlife species could be at risk to increased exposure from use of these of chemicals, which accompany increased pest prevalence in warmer weather.¹¹⁰ Chemically treated seeds are brightly colored to indicate that they should not be not be fed to livestock, but this may be leading to unintended exposure for other animals when spills are left unnoticed by the farmer and left out in the field where they are easily visible to migratory birds.¹¹¹

Figure 19: Species at Risk of Consuming Treated Seeds

BIRDS THAT MAY EAT TREATED SEEDS

- + Canada Geese
- + American Crows
- + Mourning Doves
- + Sparrows
- Blackbirds
- + Wild Turkeys + Ring-Neck Pheasants
- + Blue Jay
- + Brown Thrasher
- And more...



Photos are courtesy of Minnesota Department of Natural Resources

¹⁰⁰ Nathues, H., Nathues, C., Alarcon, P., Rushton, J., Jolie, R., Fiebig, K., . . . Geurts, V. (2017). Cost of porcine reproductive and respiratory syndrome virus at individual farm level – an economic disease model. Preventive Veterinary Medicine, 142, 16-29. doi:10.1016/j.prevetmed.2017.04.006 ^{101.102} Alkhamis, M. A., Arruda, A. G., Vilalta, C., Morrison, R. B., & Perez, A. M. (2018). Surveillance of porcine reproductive and respiratory syndrome virus in the United States using risk mapping and species distribution modeling. Preventive Veterinary Medicine, 150, 135-142. doi:10.1016/j.prevetmed.2017.11.011 ^{102.103.105.105.106} M. (2016, August). Review of Neonicotinoid Use, Registration, and Insect Pollinator Impacts in Minnesota. Retrieved November, 2018, from https://www.leg.state.mn.us/docs/2016/other/160802.pdf ^{107.100.101.106.101} Roy, C., Chen, D., Ponder, J., & Jankowski, M. (2016). Neonicotinoids on the Landscape: Evaluating Avian Exposure to Treated Seeds in Agricultural Landscapes. Retrieved November, 2018, from https://files.dnr.state.

mn.us/wildlife/research/summaries/forest/2016_neonictoids.pdf (#8.199 M. (2016, August). Review of Neonicotinoid Use, Registration, and Insect Pollinator Impacts in Minnesota. Retrieved November, 2018, from https://www.leg.state.mn.us/docs/2016/other/160802.pdf

Neonicotinoids are one of the most widely used pesticides and can be found in many of these seed coat packages that are offered on corn, soy, wheat, and sunflower products to help protect the seedlings from abiotic and biotic stress early in life.¹¹² Farmers pay a premium for seed coated packages which help protect crops from seasonal stresses, and so they have a financial incentive to not spill seeds as it will increase input costs.¹¹³ Growing evidence from the Minnesota Department of Natural Resources suggests these seeds are dangerous to birds and native ecosystems of Minnesota.¹¹⁴

As mentioned, farmers do not want to waste seeds, as it increases their input. It is likely that the spills are occurring in planting during turns or in areas that are not near the road. Recent studies have shown seed spills on the surface of 25 percent of fields in Minnesota.¹¹⁵ They also estimate that around 15,000 seed spills may be occurring every year in Minnesota.¹¹⁶ This issue has recently led to changes on product warning labels and education movements promoting treated seeds. This shows a strong initiative in the region to promote awareness when rapidly adopting technologies for one problem and creating another. It also has helped identify the fact that a large variety of impacted bird species are eating these seeds.^{117,118}



 ^{12.113,114,115.116} Roy, C., Chen, D., Ponder, J., & Jankowski, M. (2016). NEONICOTINOIDS ON THE LANDSCAPE: EVALUATING AVIAN EXPOSURE TO TREATED SEEDS IN AGRICULTURAL LANDSCAPES. Retrieved November, 2018, from https://files.dnr.state.mn.us/wildlife/research/summaries/forest/2016_neonictoids.pdf
 ¹⁷ Treated Seed Stewardship for Handling Spills. (2018, March). Retrieved November, 2018, from https://seed-treatment-guide.com/wp-content/uploads/2018/03/Treated-Seed-Stewardship-for-Handling-Spills.pdf
 ¹⁸ Alkhamis, M. A., Arruda, A. G., Vilalta, C., Morrison, R. B., & Perez, A. M. (2018). Surveillance of porcine reproductive and respiratory syndrome virus in the United States using risk mapping and species distribution mode reventive Veterinary Medicine, 150, 135-142. doi:10.1016/j.prevetmed.2017.11.011

Recommendations

From the SWOT analysis of the surveys, face-to-face interviews and focus groups, the main topics farmers were referring to as strengths, weaknesses, opportunities, or threats were:

- Market, both global and local, the impact of regulations like taxes and tariffs, and opportunities for organic products and niche markets.
- Farm succession to the next generations, children or grandchildren, and new farmers; its dynamics and the need for education and technical assistance to learn about best alternatives for each family.
- Access to health insurance, health care services and health promotion and prevention services in the region, especially mental health services, increasing cost of premiums, out-of-the pocket payments, deductibles, and prescription drugs.
- New technologies, including precision agriculture, broadband and high-speed internet, new genetics technology, accessibility, applications, and cost.
- Economics, particularly value-added products and processes, like ethanol and soybean processing plants, innovation, and diversification of land use.
- Climate change, especially extreme weather events, like flooding and drought, that may affect the quality of the soil, the presence of new diseases and pests as well as opportunities for new crops.

These relevant issues should be addressed to improve resiliency of farmers in the region; therefore, it is recommended to:

1. Develop a vision for a resilient agriculture by engaging all the stakeholders and components of the supply chain system including large operators, small growers, cooperatives, large agrobusinesses, transporters, universities and colleges, investors, entrepreneurs, innovators, consumers, and the public to work together pursuing a resilient agriculture.

2. Provide opportunities for civic engagement. These sessions allow farmers to have a strong voice to explain how they feel, their concerns, and share new opportunities for more resilient agriculture.

3. Consolidate safety networks to protect farmers from current and new market externalities and threats.

4. Diversification and readiness to adapt is recommended for farm operations, which will help farmers to be better prepared to face the uncertainty of markets and climate change. Producers should: evaluate the viability of new value-added products, take advantage of the longer agricultural seasons to plant new crops, and be aware and ready to fight new pests and diseases that may affect agriculture, including human beings, livestock, and plants.

5. Adopt a curriculum developed by farmers and educators to educate urban and rural populations, including students from K to 12. This curriculum must reflect real life farming in the region, the local production of food and its deep interactions with the local, regional, and global economies as well as opportunities for local, niche, and organic markets. Presentations like the *Small-Town Economics* developed by the University of Minnesota Extension Services should be available for all farmers and operators.

6. Include farmers in the conversation about new and current controversial regulations to generate an environment of mutual understanding about the needs for and consequences of regulations in the region.

7. Continue educating all farmers and their families about farm succession, farm transition, estate planning, and retirement. Coordinating efforts should continue with state, regional, and local stakeholders including the University of Minnesota Extension Services, Minnesota State colleges and Universities, and the MDA, to continue developing farm transition curriculum. Examples include *Farm Transition and Estate Planning: Create Your Farm Legacy*, developed by the University of Minnesota Extension Services.

8. Offer technical assistance and legal advice to all farmers in the region, including telephone help services, webinars, online trainings, and podcasts.

9. Educate prospective new farmers about the opportunities and challenges to start new farm operations such as the costs, regulations, and alernative farming practices.

10. Implement a comprehensive, affordable, reliable, and accessible health care that responds to farmers, their families, and employee health needs.

11. Explore, develop, and implement new health insurance alternatives and health plan options for farmers, their families, and employees such as cooperatives.

12. Educate farmers and the public in about alternatives they may have for health insurance, health promotion and prevention services, health care costs, variability, and projections to be aware of their implications and learn about accessible alternatives to mitigate these costs.

13. Be aware of the many resources that are available for farmers and agriculture workers in Minnesota including the following:

- Minnesotafarmstress.com, which is a dedicated helpline for farmers to call or to find information on their website.
- Farmer lender mediation program through the University of Minnesota.
- Farm Advocate Program, this partners retired farmers with current farmers to help with many different things such as finding a lawyer, going through a balance sheet, or even going along to a difficult doctor's appointment.
- Farmtownstrong.org, a collaboration between the National Farmers Union and the American Farm Bureau Federation to combat the opioid crisis.
- Dr. Amit Sood, MD, from the Mayo Clinic in Rochester, MN, that has written books about personal resiliency. His website is https://www.resilientoption.com/.

14. Adopt the recommendations and strategies to face the expected increase in nitrogen levels in ground water, phosphate levels in surface water, pathogens in water, protozoa micro-organisms, and algae.

15. Increase awareness of farmers about new technologies, expand current educational programs, and create new ones that allow farmers to learn about new technologies including precision agriculture, broadband and high-speed internet, new genetics technology, new seeds, accessibility

as well as their challenges, applications, and costs.

16. Expand projects designed to bring into the market new domesticated grain crops, promote continuous living cover crops, and relay cropping like the Green Lands Blue Waters Minnesota Institute for Sustainable Agriculture (GLBW) and the Genomic Environmental Management Socioeconomic Data (GEMS) at the University of Minnesota to increase their impact creating innovative crop alternatives.

17. Educate farmers about sustainable practices and principles that increases biodiversity, enriches soils, improves watersheds, and enhances ecosystem services.

19. New technologies should be developed and implemented by innovation programs at colleges, universities, entrepreneurs, and investors.

20. Leverage USDA funds focused on broadband development with local Internet Service Providers (ISPs) to drive the next generation of digital agriculture.

21. Promote farmer's access to the Minnesota Agriculture Water Quality Certification Program (MAWGCP). The program offers several features that could be of great benefit for an individual farm and for the region's environmental health as well.

22. Explore the feasibility of new value-added processing plants as an alternative for innovation and diversification. Examples include the hemp industry, which could be an opportunity to learn how new value-added products could be exported to regional and global markets.

23. Expand the reach of research institutions, like the AURI and the University of Minnesota Agriculture Experiment Stations, to educate and raise awareness among farmers about new and value-added products and their impact the local agribusiness industry.

24. Build awareness of climate change, especially extreme weather events like flooding and drought, which may affect the quality of the soil, the presence of new diseases and pests, as well as opportunities for new crops to develop climate readiness.

25. Adopt and adapt the strategies proposed in the *South Central Minnesota Climate Change Vulnerability Assessment & Adaptation Plan* to mitigate the effects of climate change to maximize soil and water conservation, expand alternative genetics and crop choices, improve infrastructure management, increase adaptive capacity for livestock and human health, expand risk management and management planning across planning platforms, and strengthen local food production.

Conclusions

The South Central Minnesota Agriculture Resiliency Plan reflects the challenges expressed by agriculture stakeholders in South Central Minnesota and offers opportunities to overcome them. This was an important opportunity to learn from local farmers and operators on how they visualize agriculture in the future as well as their concerns.

Farmers and operators are resilient. They share a rich history that spans generations of overcoming adverse weather events, economic crises, barriers to healthcare services, changing technologies, and evolving communities. This spirit will help the new generations and new farmers to succeed in South Central Minnesota.

Adaptation, diversification, and innovation are characteristics farmers share. These traits will facilitate successful farming and production of the food that will be necessary to feed people and livestock for generations to come.

This plan intends to create a more resilient agriculture community by promoting meaningful conversations and partnerships between the state and federal governments; universities and colleges; farmers, operators, producers, and transporters; health care insurers, providers, and patients; policymakers; and the general public. Increasing awareness and providing alternatives for farmers to become more resilient and better prepare for the complex challenges South Central Minnesota is beginning to face is essential for the future success of agriculture.

Appendix

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Appendix 1 Agriculture Resiliency Survey

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Appendix 2 Agriculture Resiliency Survey Descriptive Statistics

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Appendix 3 South Central Minnesota Agriculture Resiliency Plan Stakeholders



Appendix I: Agriculture Resiliency Survey

- 1. What do you think your operation's strengths are?
- 2. What do you think your operation's weaknesses are?
- 3. What opportunities do you see for your operation in the future?
- 4. What threats does your operation face in the future?

5. Resiliency is South Central Minnesota's ability to respond to disasters today as well as prepare systems that require limited responses to such disasters in the future. With this in mind, what does resiliency look like for your farm?

- 6. Please mark any options below that you currently raise as part of your farm business: Crops: corn, soybean, wheat, dry edible beans, sugar beet, barley, hay, oats, peas, other Livestock: dairy cows, beef cattle, hogs, goats-dairy, goats-meat, sheep, turkeys, chickens-broilers, chickens-layers, ducks, other
- 7. How long have you been working in your current farming operation in Minnesota?
- 8. Are you the primary operator of your farm?
- 9. How many employees work at your farm?
- 10. What county is the farm located in?
- 11. What is your gender?
- 12. What race or ethnicity do you identify as?
- 13. What is your primary language?
- 14. What is your age?
- 15. Comments



Appendix II: Agriculture Resiliency Survey Descriptive Statistics

A total of 73 surveys were collected with the average age of the respondents being 51 years, with a median of 55 years. Of the respondents, 75 percent were male, and 95 percent identified themselves as White or Caucasian. English was the primary language of all the respondents, and 91 percent of respondents described themselves as operators or farmers located in Region Nine (88 percent were primary operators or farmers).

Survey Responders by County	
County	Percent
Blue Earth	20.37
Brown	7.41
Faribault	11.11
Le Sueur	9.26
Martin	7.41
Nicollet	11.11
Sibley	5.56
Waseca	11.11
Watonwan	5.56
Other (County Outside Region Nine)	11.11

Most respondents grow more than one crop with most respondents growing corn (77 percent), soybean (74 percent), hay (33 percent), and raising hogs (33 percent). Of respondents, 37 percent grow other products including vegetables, honey bees, fruits, hazelnuts, herbs, rye, and other produce.

Сгор	Percent
Corn	76.74
Soybean	74.42
Oats	11.63
Peas	11.63
Wheat	9.30
Нау	32.56
Hogs	32.56
Chickens (Eggs)	20.93
Chickens (Broilers)	6.98
Beef Cattle	18.60
Dairy Cows	4.65
Goats (Meat)	6.98
Goats (Dairy)	4.65
Sheep	4.65
Turkey	2.33
Other	37.21

Of respondents, 43 percent have been working on their current farm operations for an average of 36 years and average employing one full-time employee and 2 part-time employees.



Appendix III: South Central Minnesota Agriculture Resiliency Plan Stakeholders

- Agriculture Department, South Central
 College
- American Legion, Madelia
- Cedar Crate Farm
- Center for Excellence in Scholarship and Research, MNSU, Mankato
- Dept. of Landscape Architecture, University of Minnesota
- East Henderson Farms
- Feast! Smart Start participants
- G.E.M.S., International Agroinformatics Alliance
- Great River Greening
- Green Lands Blue Waters Minnesota Institute for Sustainable Agriculture, University of Minnesota
- GreenSeam
- Institute for Ag and Trade Policy
- Jer-Lindy Farms
- Little Big Sky Farms
- Mankato Clinic
- Mankato Maker Space
- Mayo Clinic Health System
- Midwest Dairy
- Minnesota Agricultural Education
 Leadership Council
- Minnesota Farmers Union
- Minnesota Milk Producers Association
- Minnesota Soybean Growers Association
- Multicultural Network Group
- Redhead Creamery

- Roots Shoots and Boots Coalition
- SCORE
- Small Growers Network
- South Central Minnesota Business Development
 Network
- South Central Minnesota Small Business
 Development Center
- South Central Service Cooperative
- Southern Minnesota Center of Agriculture
- St. Peter Co Op
- University of Minnesota Extension Services
- USDA FSA Regional Office



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