



Agriculture and Global Supply Chain: Space Weather Planning and Preparedness

Dr. Kathryn Draeger, University of Minnesota Dept. of Agronomy and Plant Genetics
and Extension Regional Sustainable Development Partnerships



Overview

- Background
- Space Weather Impacts on Agriculture
- Lessons from past disruptions
- Planning for resilient food supply



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Space Weather Impacts on Agriculture and Food Supply Chains





“I have first-hand experience when magnetic storms screw with my autosteer and auto-trip when seeding trials... very annoying indeed.”

~MN ag researcher and educator, June 2023



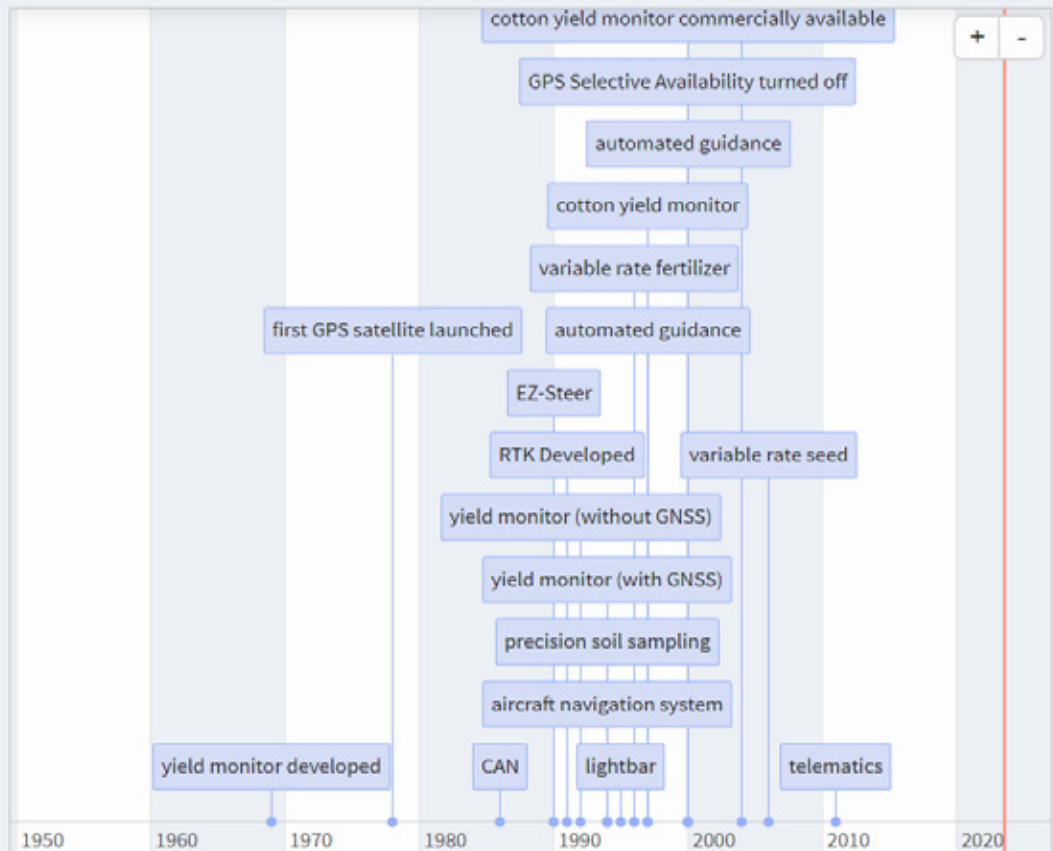
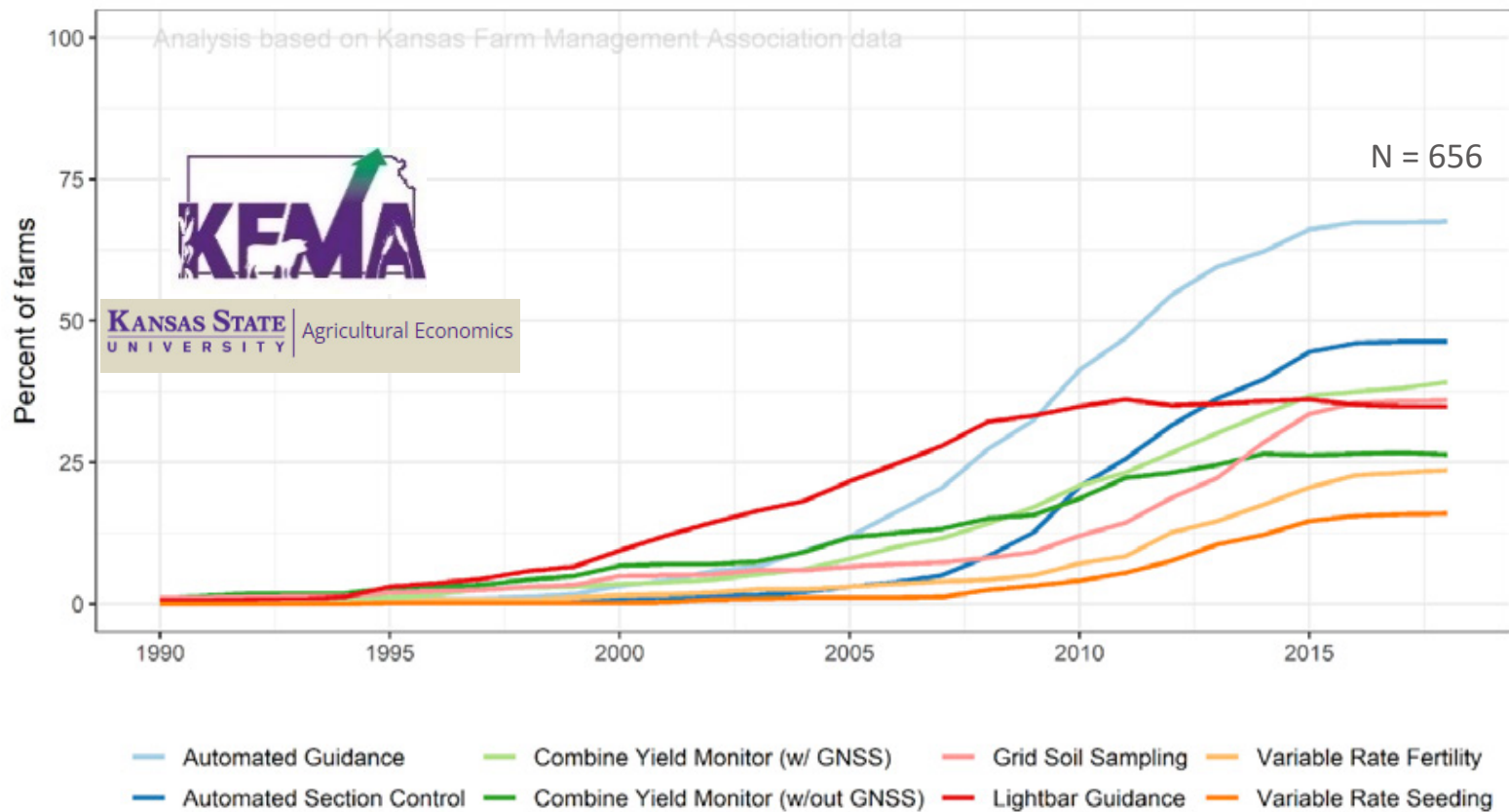


Figure 1. Date of Commercial Availability of GNSS services for Precision Agriculture

Dr. Terry Griffin, Kansas State University, 2021

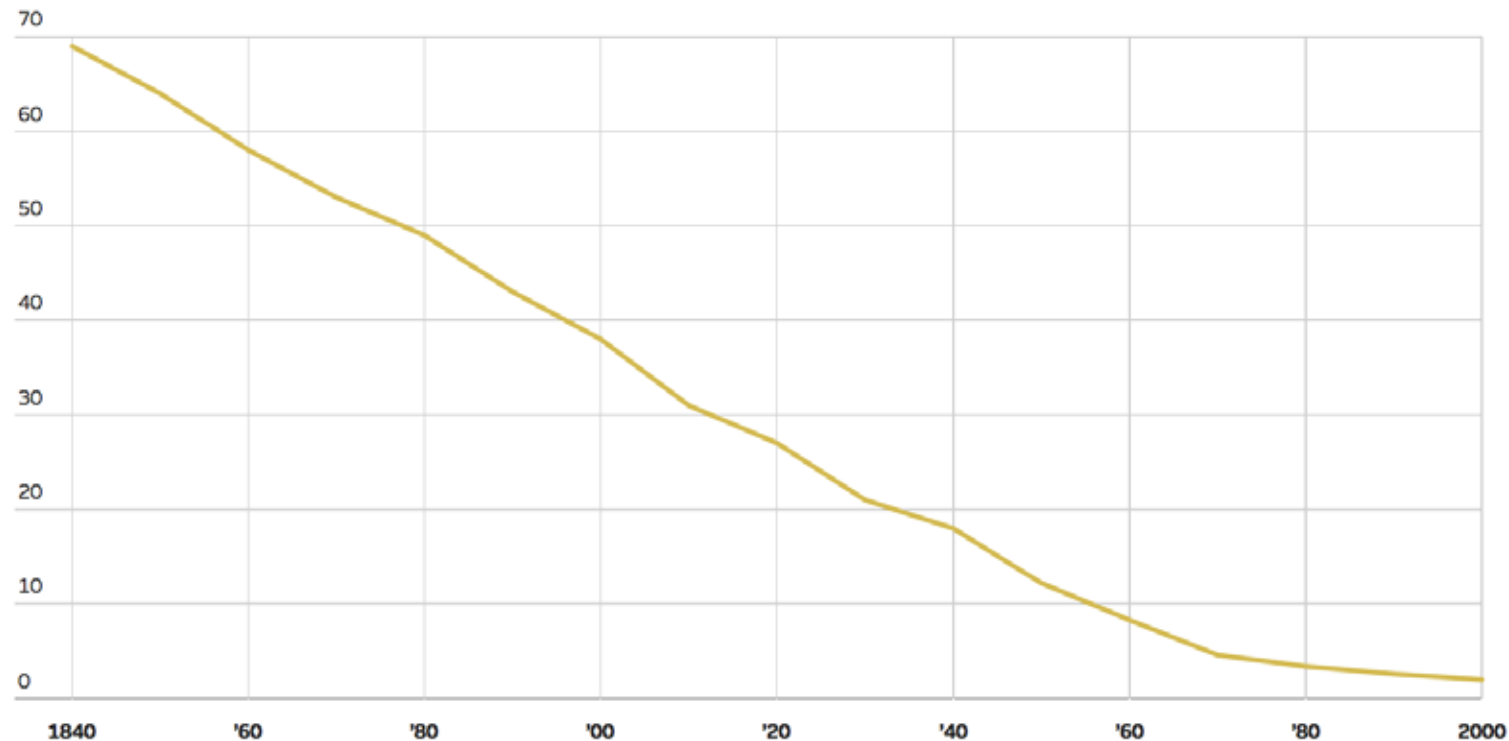




Source: Dr. Terry Griffin, Kansas State University



% of American workforce in agriculture, 1840-2000



Source: USDA,

Lessons Learned



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CORONAVIRUS

In Minnesota, 10,000 pigs are being euthanized a day





Staged Strategies for Food Supply

1. Pull food INTO households and community
2. Fortify Existing Assets, like grocery stores and meat processors
3. Build DIRECT supply chains
4. Access Regional Supply Chains - Ex. Backhauling



COVID-19/EMERGENCY 14-DAY MEAL KIT

Developed March 2020: Kathy Draeger, U of MN Extension Regional Sustainable Development Partnerships

PURPOSE

By developing, selling, and helping to deploy meal kits, Minnesota's rural grocery stores serve as a critical source of emergency food access. This meal kit fact sheet will help grocers working in their communities to prepare and deploy pre-made boxes with 14 days of emergency food that is healthy, shelf stable, easy to prepare, calorie sufficient for vulnerable populations facing hardship due to coronavirus.



Strategy 3 - Build Direct Supply Chains

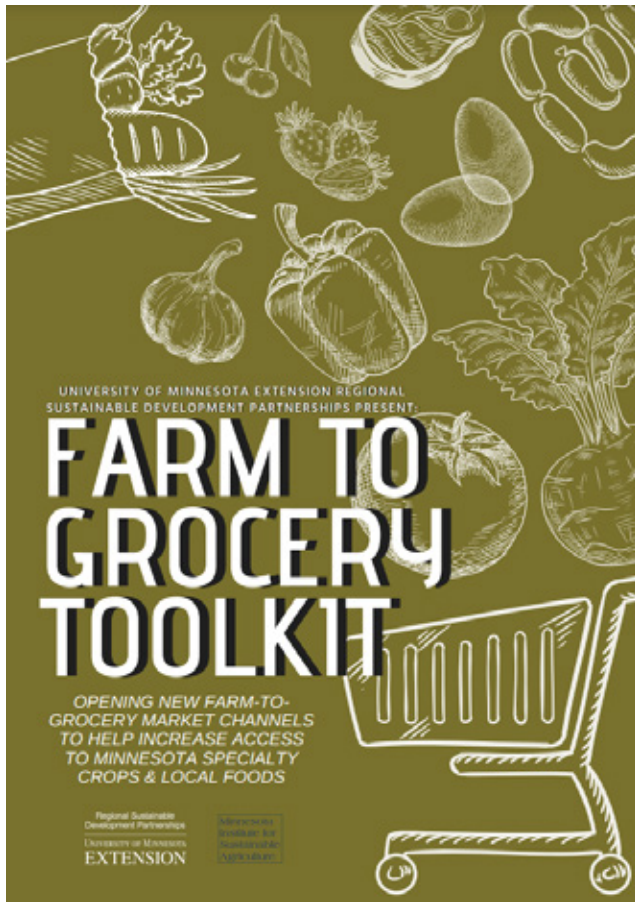
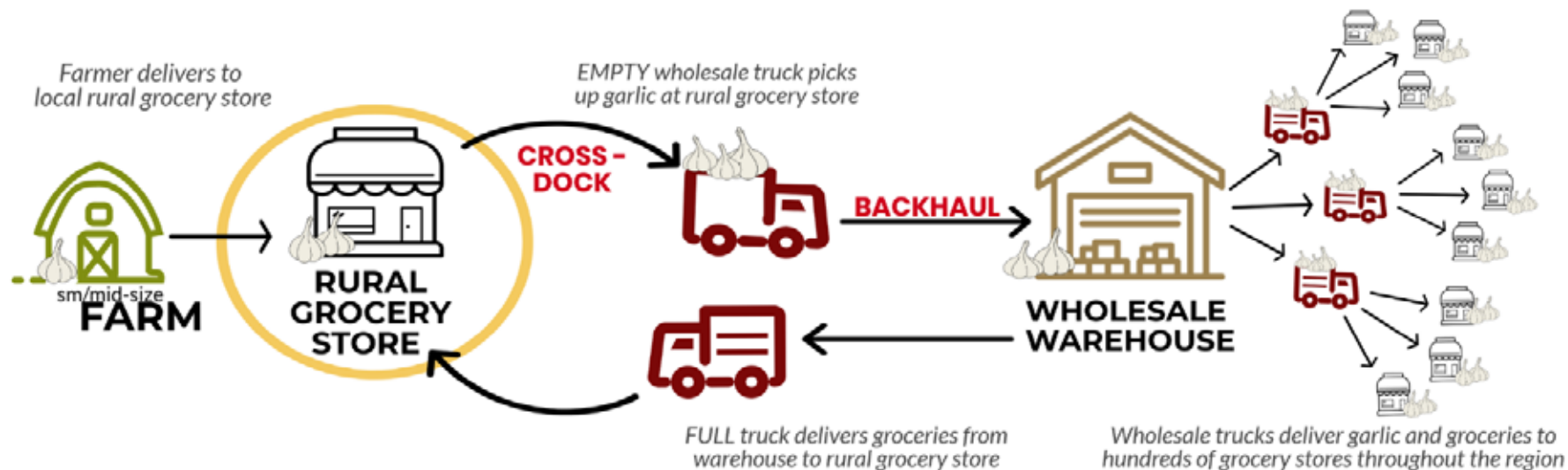


Figure 1. Farm to Rural Grocery to Wholesale (F2G2W) Supply Chain





Scientists and farmers working together to solve our food supply challenges

Preparation and Planning



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Questions

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~ Caitlin Durkovich, National Security Council and Deputy Homeland Security Advisor for Resilience and Response, April 2023 Space Weather Workshop



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 - Ag technology, production, storage, processing and distribution
 - Review by geographic region and production profile

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- How could agriculture pivot and provide food on local, regional, and national levels?
 - Foodshed analysis, alternative distribution and supply chains



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- More question to be framed and answered



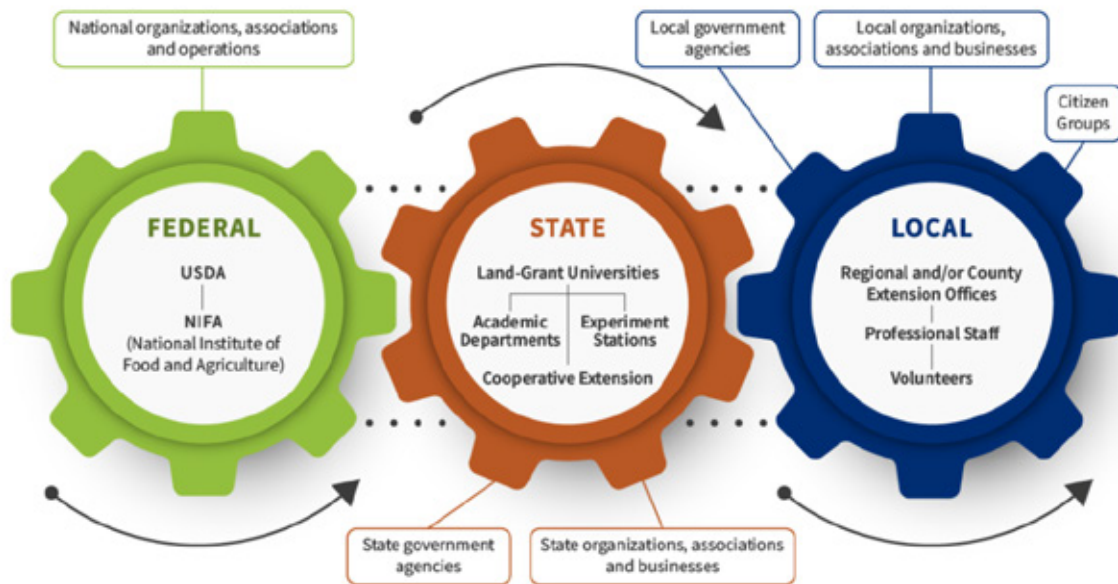
Space Weather Impacts on Agriculture: A conceptual framework for analysis*

DEGREE AND DURATION OF DISRUPTION				
Supply Chain Stage	Mild -Short Duration (loss of GNSS)	Moderate -Short Duration	Severe -Short to Mid Duration	Severe -Prolonged
Planting	Yellow	Yellow	Yellow	Dark Red
Harvest and Storage	Dark Green	Dark Green	Yellow	Dark Red
Processing	Dark Green	Yellow	Dark Red	Dark Red
Distribution	Dark Green	Yellow	Dark Red	Dark Red

*Modify for geographic region and specific food and energy crops



Cooperative Extension Services puts *“research into action: bringing cutting-edge discoveries from research laboratories to those who can put knowledge into practice.”*



<https://www.nifa.usda.gov/about-nifa/how-we-work/extension/cooperative-extension-system>





DROUGHT RESOURCES



WILDFIRE RESOURCES



OIL SPILL RESOURCES

WHAT IS EDEN?

The Extension Disaster Education Network (EDEN) is a collaborative multi-state effort by Cooperative Extension Services across the country to improve the delivery of services to citizens affected by disasters. EDEN's mission is to reduce the impact of disasters through research-based education.



Carol Bauer



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Contact

Kathy Draeger

✉ draeg001@umn.edu

📞 612.625.3148

🌐 rsdp.umn.edu



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