The Perfect Fit: Optimizing Warehouse Selection for The Good Acre

Group 4:
Charlotte Wang
Rahma Hassan
Abraham Perunthekary George
Aakash Patil
Harshal Sable

The Problem and The Plan

The Business Problem:

Steele, Kandiyohi, Otter Tail, Olmsted, and St. Louis are potential locations based on their geographical positioning and potential to support TGA's operational goals.
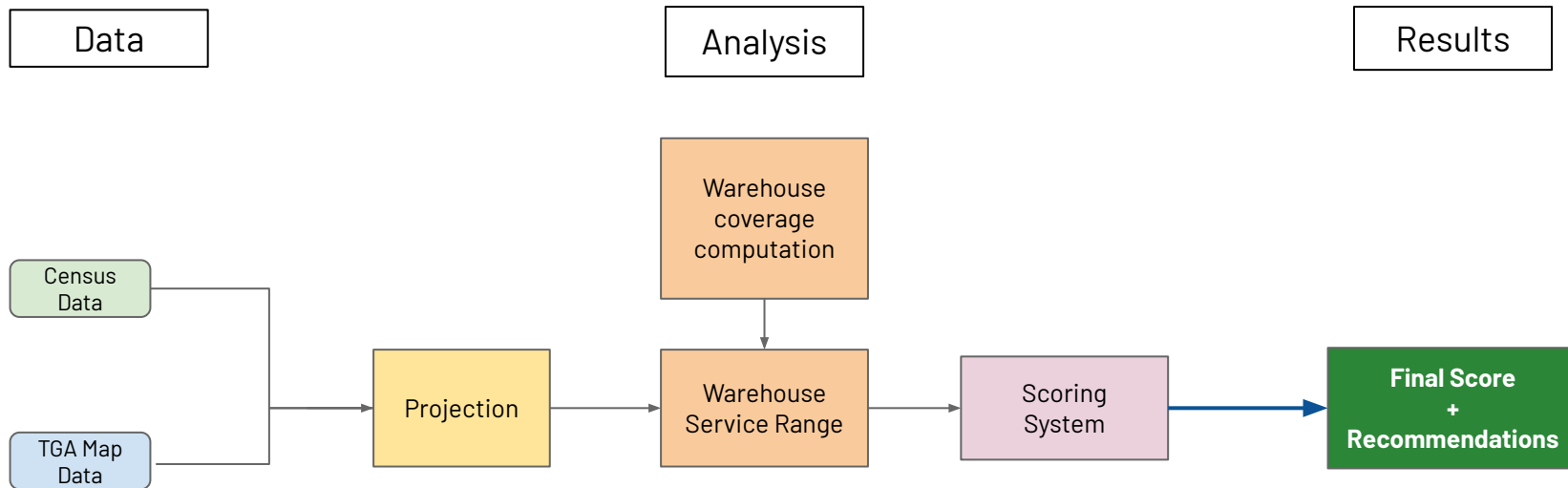
"How do we determine the best location for the new warehouse to **maximize operational efficiency, promote equity, and generate the highest impact** for farmers and the community?"

How do we solve this?

This project evaluates these counties **by analyzing farm density, marginalized group density, current infrastructure** to provide actionable insights for TGA's decision-making, ensuring that the chosen locations align with your mission.

Solution Outline

Solution Outline

Data Used and Simplified

Chosen Metrics:

- **Number of Farms**
- **Acres Operated**
- Farms with **Marginalized Groups**
- **Current suppliers**
- **Current buyers**

Grouping Farms by Revenue:

Annual Sales Revenue

Emerging Farm	$1 - $49,999
Mature Farm	$50,000 - $99,999
High-Yield Farm	$100,000+

Solution Outline

Data

Analysis

Results

Census Data

TGA Map Data

Warehouse coverage computation

Projection

Warehouse Service Range

Scoring System

Final Score + Recommendations
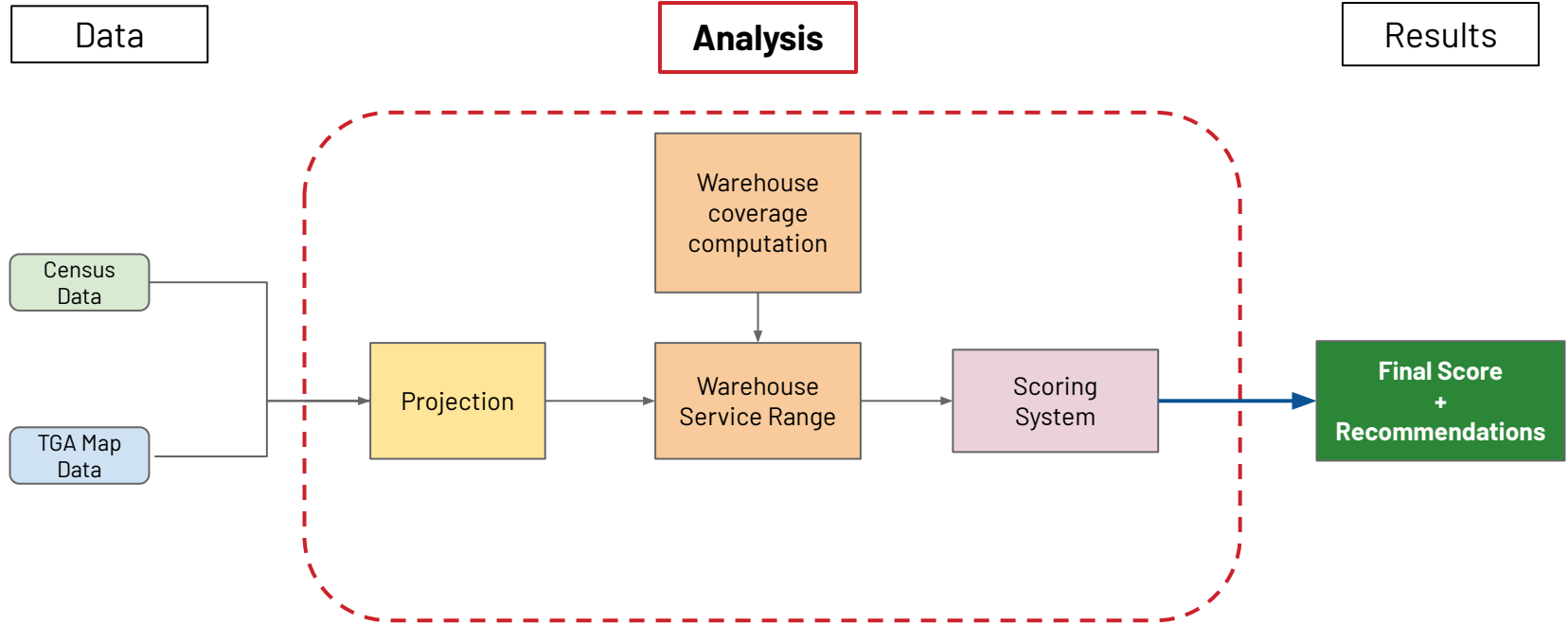
Projections Are Critical for Informed Decisions

We analyzed 2017 and 2022 Census data to forecast future trends, accounting for pandemic disruptions and expected recovery to pre-pandemic activity levels.

- **Bridging the Gap:** 2017 and 2022 Census data provide historical insights, but fail to capture evolving trends in agriculture.

- **Forecasting Recovery:** Projections anticipate a gradual return to pre-pandemic activity, offering a more realistic view of future opportunities.

- **Strategic Precision:** By modeling future trends, projections empower TGA to make forward-looking decisions that align with long-term goals.

These projections allow for more informed decision-making tailored to future challenges and opportunities.
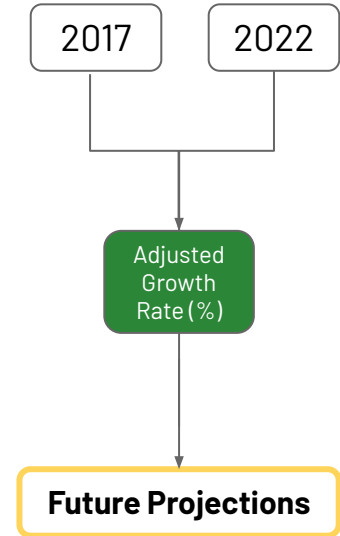
Warehouse Coverage Spanning Multiple Counties

Warehouses can **service nearby counties**:

- We assessed coverage by evaluating the **average distance suppliers** travel to aggregators.

- This distance helped **estimate a coverage area** around the proposed location.

- Using this area, we extrapolated key metrics (farm numbers, acreage, marginalized groups) and identified existing stakeholders.

What we get is the total potential suppliers + current stakeholders a warehouse can service
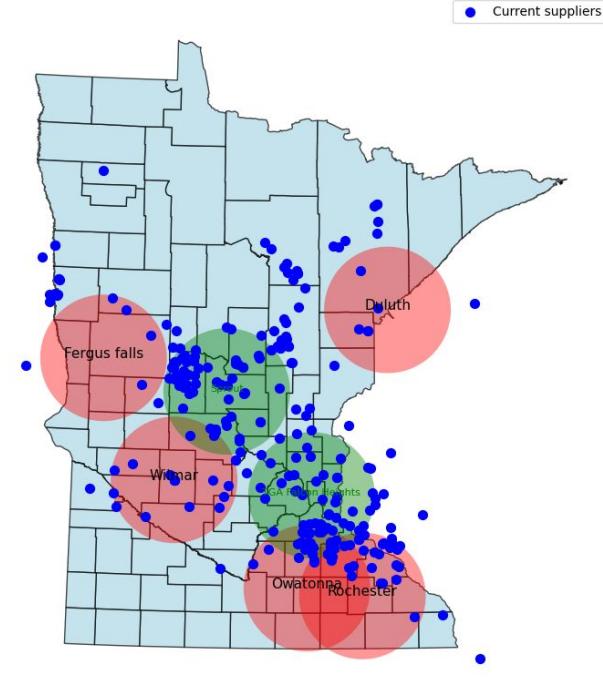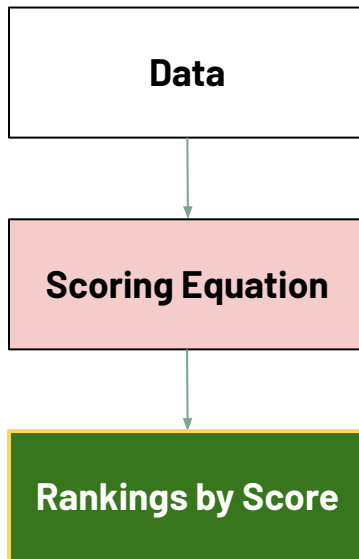

Minnesota county map with potential + existing warehouses

Flexible Scoring System

Recognizing the focus on emerging farmers and marginalized groups, we built flexibility into the scoring system:
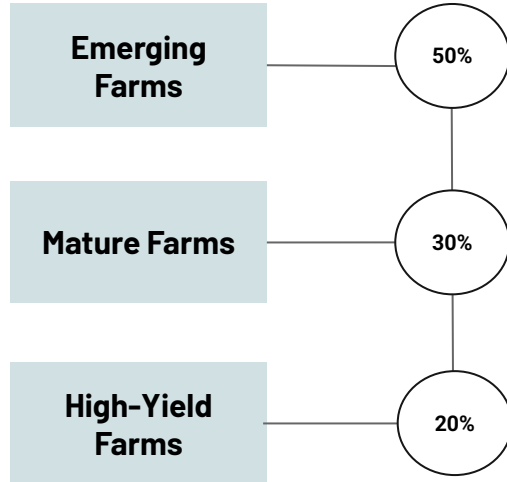
- The system combines our findings into a straightforward scoring model.

- You can adjust weightages for farm types (emerging, mature, high-yield).

- Weightages for other metrics (farm numbers, acreage, marginalized groups) are also customizable.

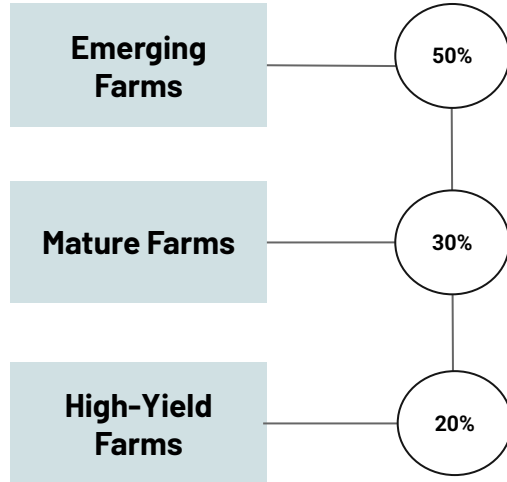**What we get is a clear, adaptable score for each county, that enables flexible decision-making.**

Data

Scoring Equation

Rankings by Score

How We Score and Decide by County

Emerging Farms	50%
Mature Farms	30%
High-Yield Farms	20%

How We Score and Decide by County

How We Score and Decide by County

Weightages 1

Emerging Farms	50%
Mature Farms	30%
High-Yield Farms	20%

Weightages 2

Number of farms	30%
Acreage	15%
Marginalized Groups	25%
Existing Suppliers	20%
Existing Buyers	10%
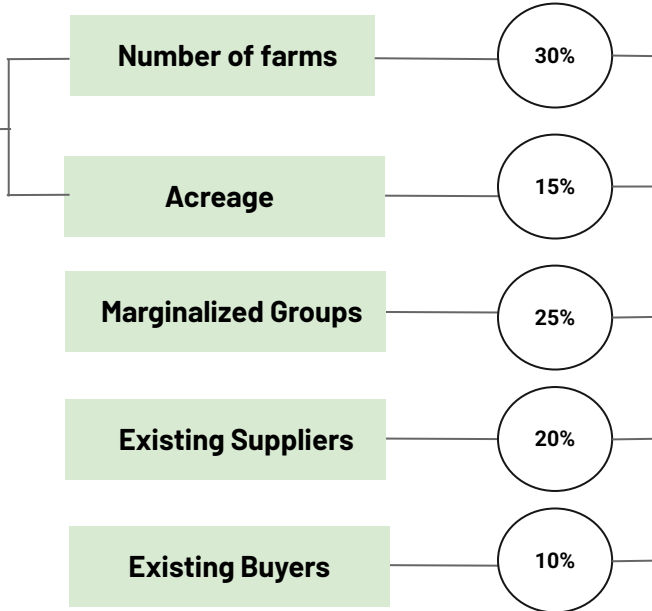
Final Score by county
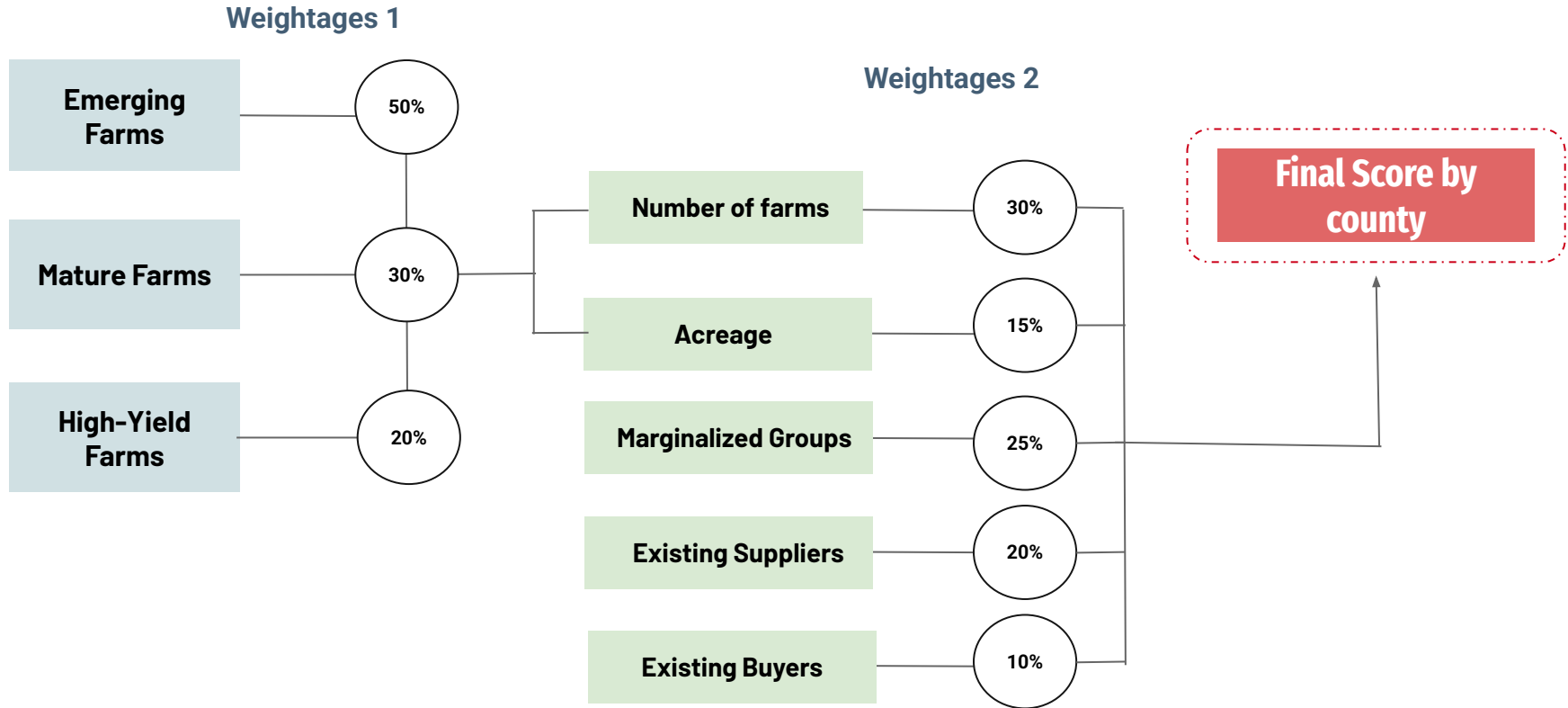
Solution Outline

What We Recommend - Yielding the Top Pick

1. **Steele** (score = 1.39) 🏆

- **Top Rank for Emerging Farms:** Leading with 6,846 farms, showcasing strong growth potential and opportunities for farmer support.
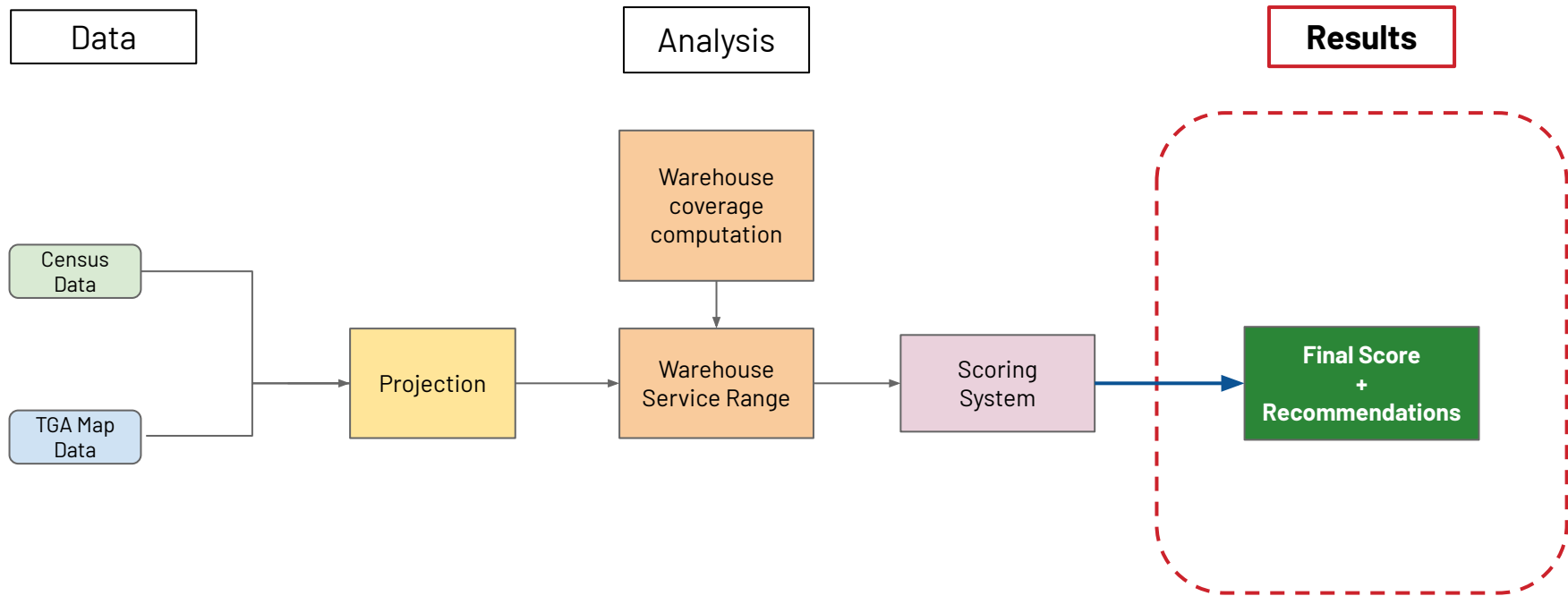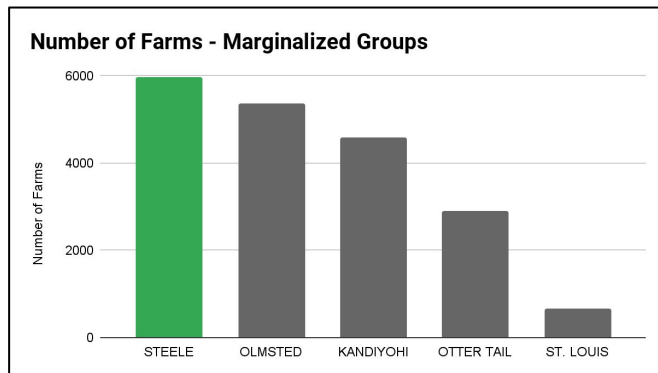- **Support for Marginalized Groups:** Involves 5,980 individuals from marginalized groups.
- **Extensive Acreage:** Over 1.6M acres in high-yield farms, providing substantial potential for scaling operations.
- **Strong Buyer Network:** 36 existing suppliers ensure reliable demand.

Number of Emerging Farms by County

Number of Farms - Marginalized Groups
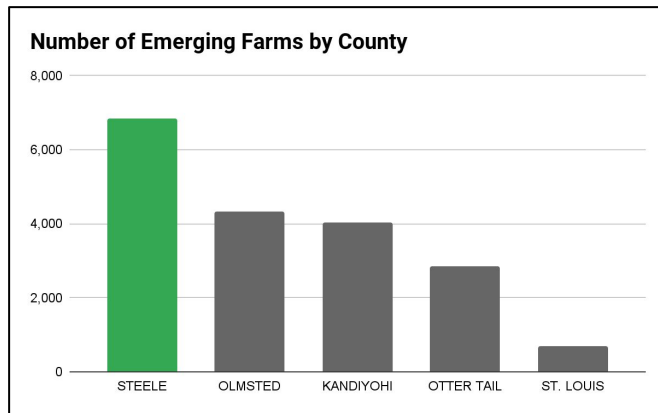
What We Recommend - After Steele

2. Kandiyohi (score = 0.85)
- Balanced Growth Potential
- Localized Market Connectivity
- Community-Focused Agriculture

3. Otter Tail (score = 0.46)
- Emerging Yet Promising
- Market Connectivity Advantage

4. Olmsted (score = 0.15)
- High Overlap
- Low Farm Density
- Limited Impact

5. St. Louis (score = 0.024)
- Low Emerging Farm Numbers
- Minimal Impact
- Infrastructure Saturation

Low Land Use for Agriculture around St.Louis

Close Proximity of Olmsted and Steele

Land Use Strata

- >75% Cultivated
- 50-75% Cultivated
- 15-50% Cultivated
- Agri-Urban:>100 homes/sq. mi.
- Commercial:>100 homes/sq.mi.
- <15% Cultivated
- Non-Agricultural
- Water

Unprojected, Geographic Coordinates

Prepared by Geospatial Science and Survey Section

USDA
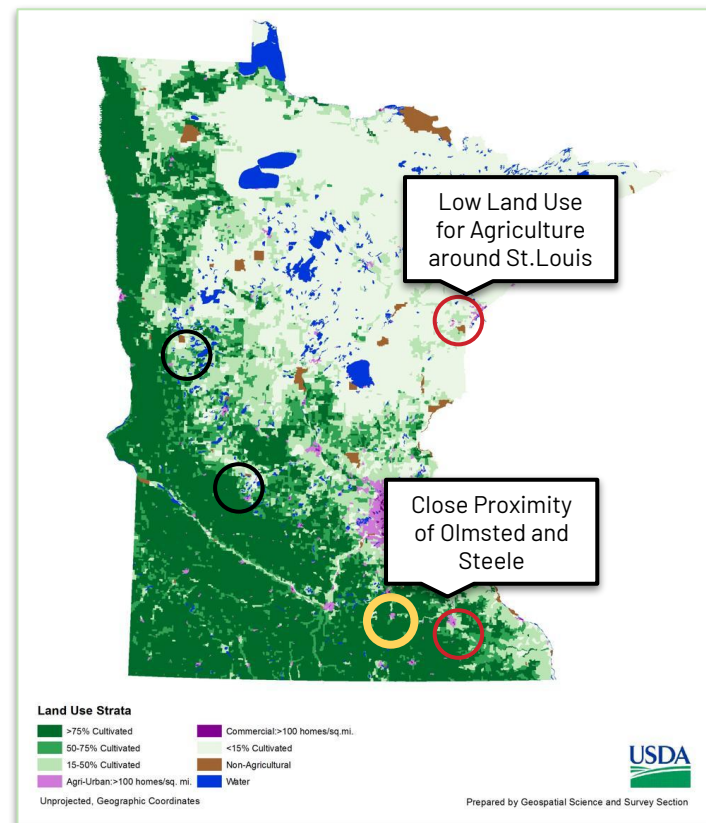
Thank you!

# What We Recommend - Yielding the Top Picks

3. Otter Tail (score =)

- **Emerging Yet Promising:** Otter Tail offers a balanced foundation, with 2x more emerging farms compared to St. Louis and Olmsted
- **Market Connectivity Advantage:** With nearly 4x the supplier network of Olmsted.

4. Olmsted (score =)

- **High Overlap:** Redundant coverage with Steele.
- **Low Farm Density:** Fewer farms and acreage compared to Steele and Kandiyohi.
- **Limited Impact:** Minimal contribution to equity and farmer outreach.

5. St. Louis (score =)

- **Low Emerging Farm Numbers:** Limited alignment with priority focus areas.
- **Minimal Impact:** Fewer marginalized groups in agriculture.
- **Infrastructure Saturation:** Existing networks reduce the need for new warehouses.
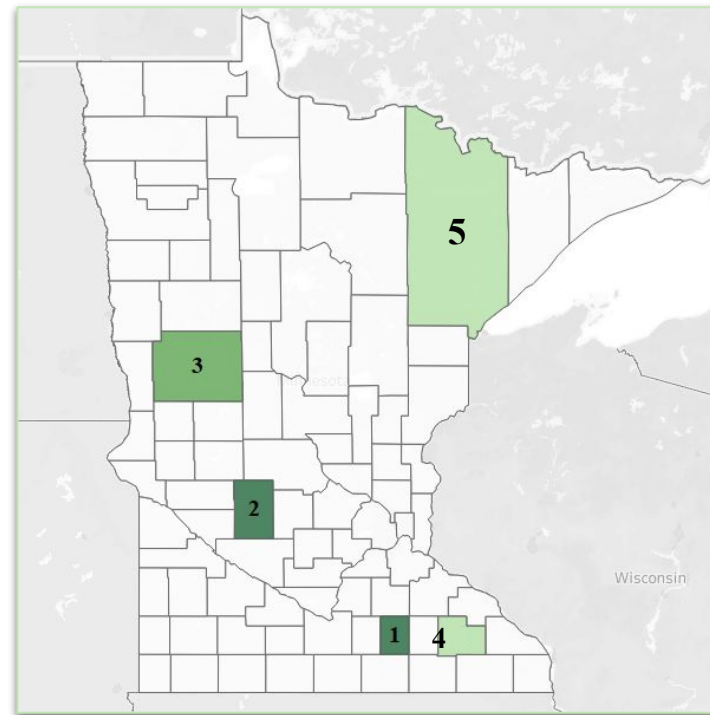
Data Sources and Key Insights

- **The NASS Quick Stats Data** provided county-level insights on:
  - **Farm numbers** by revenue group.
  - **Acres** operated by acreage group.
  - Proportion of **marginalized groups**.

- **The Good Acre Map** provided insights on:
  - **Current suppliers**
  - **Current buyers**
  - Current aggregation locations

Data_Item
Economic
COMMODITY TOTALS - OPERATIONS WITH SALES
FARM OPERATIONS - ACRES OPERATED
Demographic – Marginalized Groups
PRODUCERS, ASIAN - NUMBER OF OPERATIONS
PRODUCERS, BLACK OR AFRICAN AMERICAN - NUMBER OF OPERATIONS
PRODUCERS, FEMALE - TOTAL NUMBER OF OPERATIONS
PRODUCERS, HISPANIC - NUMBER OF OPERATIONS
PRODUCERS, MILITARY SERVICE, ACTIVE DUTY NOW OR IN THE PAST - NUMBER OF OPERATIONS

Fields Used

Bucketing	Sales	Acres
Emerging Farms	$ 1–49,999	1–180 Acres
Mature Farms	$ 50,000–99,999	180–500 Acres
High-Yield Farms	$100,000+	500+ Acres

Farm Categorization

What We'll Talk About

Methodology

Looking at USDA NASS and TGA food hubs map data, we chose key farm metrics and supplier-buyer distribution to holistically rank counties.

Scoring System

Formulated a scoring equation **to score and rank the five counties based on key metrics** ensuring an informed and equitable decision making process.

Dashboard

Build a dashboard to **visualize and compare key metrics across the five counties**, enabling dynamic exploration of data and informed decision-making.