THE GOOD ACRE
FOOD + COMMUNITY

Warehouse Location Evaluation for THE GOOD ACRE

CARLSON SCHOOL OF MANAGEMENT
UNIVERSITY OF MINNESOTA

Situation

THE GOOD ACRE's GOAL :

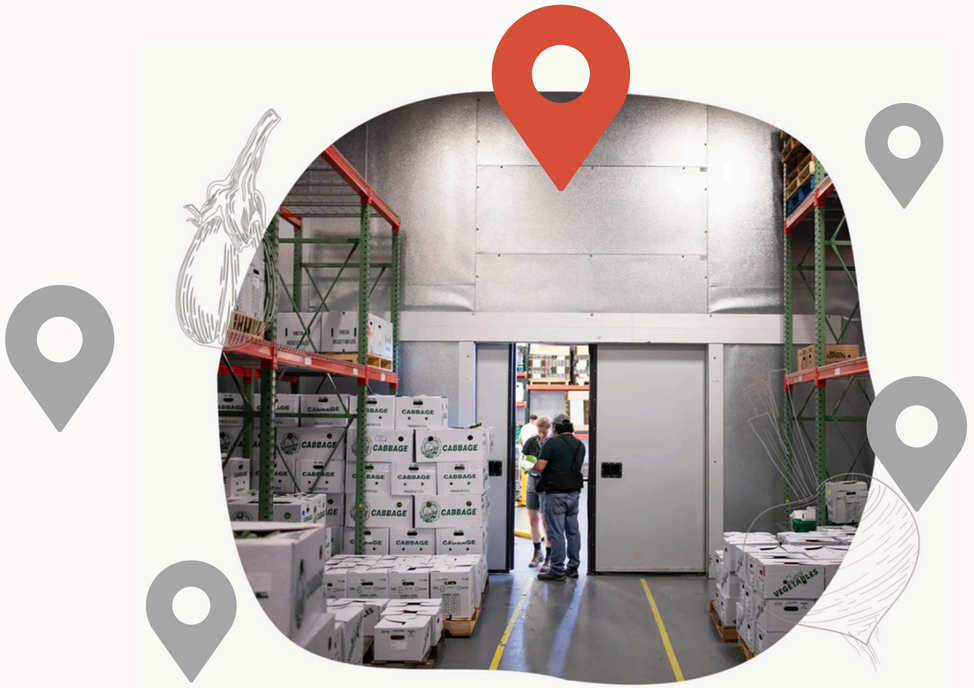
"Strengthening connections between farmers and communities.

To achieve this, TGA is considering a location for its next aggregation hub"

Our Mission

Our Mission :

“ To identify the optimal location to expand TGA’s network of aggregation hubs among five candidate locations in Minnesota ”



The optimal location for extensive connection

The optimal location for extensive connection

“ Fergus Fall in Otter tail county ”

1. Otter tail
2. Kandiyohi
3. Olmsted
4. Steele
5. St.Louis

Our Mission

Our Mission :

“ To identify the optimal location to expand TGA’s network of aggregation hubs among five candidate locations in Minnesota ”

Key Question - What is optimal ?

THE GOOD ACRE's goal

Optimal

Are there many farmers in the county?

Are there many sales opportunities?

Is the cost of building a hub favorable in this area?

Key Question - What is optimal ?

Optimal

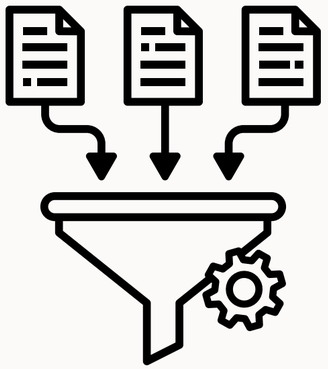
Are there many farmers in the county?(Supply)

Are there many sales opportunities?(Demand)

Is the cost of building a hub favorable in this area?(Cost)

How we evalutate ?

① Search Data,
Decide which data to use
and clean data



②□ Scored each factor
& multiplied by weight

	The number of farms	Sales	...
Kandiyohi	4	5	
Olmsted	3	2	
Otter Tail	5	4	...
St.Louis	2	1	
Steele	1	3	

③ Ranked counties
by the total score

Through this, we could evaluate **supply, demand and cost** of each county

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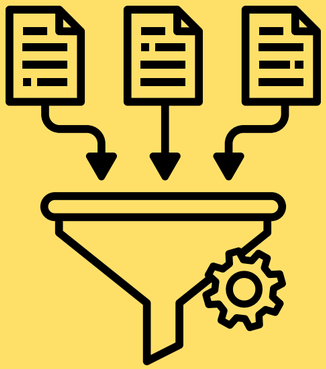

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How - Major Factors Exploration

Supply

Count the number of farmers and assess their scale

Factors

- The number of farmers
- Harvested land acre for crops
- The number of animals in farms

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Demand

How can we measure demand?

- Current sales of farmers in each county
- Potential sales by assessing the market size

Factors

- Sales of commodities from farmers($)
- Potential number of customers (weighted score)

How - Major Factors Exploration

Supply

Count the number of farmers

Factors

The number of farmers

Harvested land acre for crops

The number of animals in farms

Factors

Sales of commodities from farmers($)

Potential number of customers (weighted score)

Potential number of customers

based on the importance of consumer for TGA

	# of facilities *(value of each county)*	x	weight	=	score
CSA	*a*		20	=	a x 20
Foodhub	*b*		20	=	b x 20
Healthcare	*c*		10	=	c x 10
Edu	*d*		9	=	d x 9

Source: USDA and GIS Data. For more information, refer to the data resource page

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Cost

What will be the major cost?

- Transportaiton Cost
- Land Cost

How can we measure?

- Transportation Infrastructure (the number highway, freight corridor,...)
- Average Land Cost per Acre($)

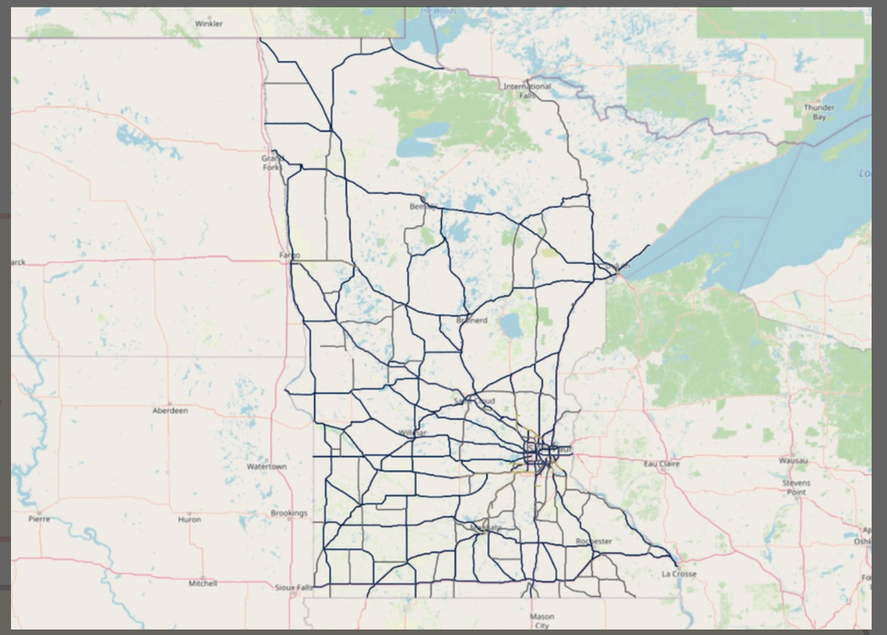
Factors

- Ease of transportation
- Average Land Cost per Acre($)

How - Major Factors Exploration

Supply

Count the number of farmers



Source : Open Street Map API

Factors

Sales of commodities from farmers($)

Potential number of customers

Ease of transportation

	# of facilities *(value of each county)*	x	weight *importance*	=	score
Critical Urban Freight Corridor	*a*		5	=	a x 5
Critical Rural Freight Corridor	*b*		4.5	=	b x 4.5
Other State-designated truck route*	*c*		3.5	=	c x 3.5
Primary Highway Freight System	*d*		2.5	=	d x 2.5
National Network(NNO	*e*		2	=	e x 2

** Optional*

asure?

Factors

Ease of transportation

Average Land Cost per Acre($)

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How - Major Factors Exploration

7 Key Factors

Supply

Which means many farmers and supply amount?

Factors

- The number of farmers
- Harvested land acre for crops
- The number of animals in farms

Demand

How can we measure demand?

- Present sales of farmers
- Market composition(the kind of buildings)

Factors

- Sales(present demand)
- Potential number of customers (weighted score)

Cost

What will be the major costs?

- Transportaiton Cost
- Land Cost

How can we measure?

- Development status of transportation (the number highway, freight road,...)
- Average Land Cost

Factors

- Ease of transportation
- Land cost

How we evalutate ?

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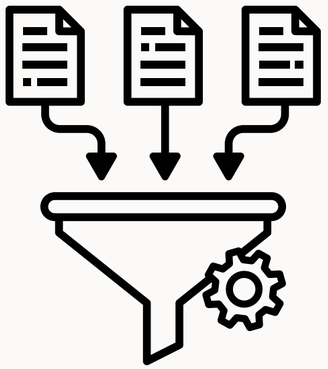

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Optimal Score =

		Factors value score(1~5)	X	Weight(Importance)
Supply	+	The number of farmers	X	30%
	+	Harvested land acre for crops	X	12.5%
	+	The number of animals in farms	X	12.5%
Demand	+	Sales (present demand)	X	20%
	+	Potential number of customers	X	10%
Cost	+	Ease of transportation	X	10%
	-	Land cost	X	5%

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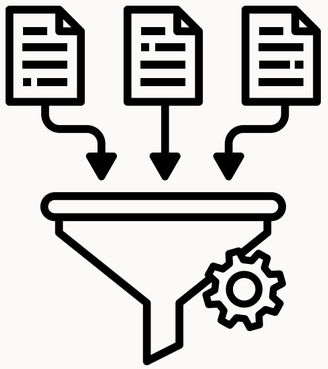

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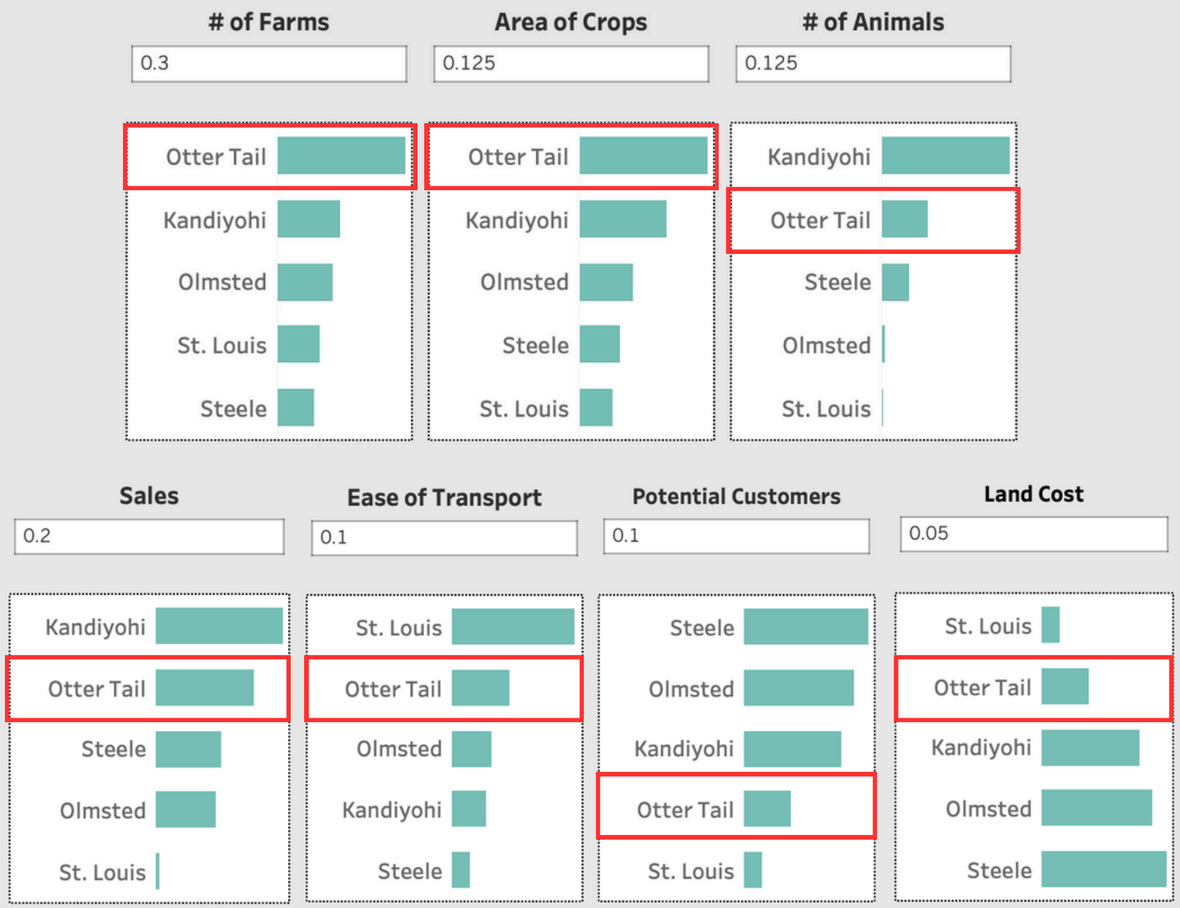
Let’s Go to Dashboard!

So, our pick is

“ Fergus Fall in Otter tail county ”



#1 Largest number of farms (2,497)

#1 Land capacity (569,822 acres)

#2 The number of animals (Livestock volume, 971,725)

#2 Sales ($ 529,106 K)

#2 Ease of transportation (112)

#3 Potential number of customers (845)

#4 Land cost ($3,867 per acre)

With our analysis,

① You can consider **“7 Key Factors”**

② Our model has **flexibility**

- **Change the data and weight** according to business situations

③ **Easy to use and explore** - collaborate with your team and decide!

Thank you

Data resource

- **The number of animals in each county : USDA**
  https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_2_County_Level/Minnesota/

- **Sales data : USDA**
  https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_2_County_Level/Minnesota/st27_2_002_002.pdf

- **The number of potential customers**
  Healthcare : https://gisdata.mn.gov/dataset/health-facility-hospitals
  Edu : https://gisdata.mn.gov/dataset/struc-school-program-locs
  CSA & Foodhub : USDA

- **Ease of transportation : OpenStreetMap using osm API**
  https://www.openstreetmap.org/#map=5/38.01/-95.84

- **Land cost : Minnesota Land Economics**
  https://landeconomics.umn.edu/landdata/LandValue/intro.aspx

Data resource

Factor	Calculation method	Data Source	Data column we used
The number of farm	The number of operations data (Nass) per county	Live case data	Data_Item: FARM OPERATIONS - NUMBER OF OPERATIONS, Domain: TOTAL, Type: Economics
Capacity - Crops land area	Current land * 0.8 + Potential land * 0.2	Live case data	Current land - ACRES BEARING, ACRES HARVESTED, Domain: TOTAL, Type: Crops Potential land - ACRES IN PRODUCTION, ACRES GROWN, ACRES NON BEARING, Domain: TOTAL, Type: Crops
Capacity - Animal	The number of animals inventory in each county	https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_2_County_Level/Minnesota/	Alpacas, Bison, Cattle (Excl Cows), Cattle, Cows, Chickens, Broilers, Chickens, Layers, Chickens, Pullets, Replacement, Chickens, Roosters, Chukars, Deer, Ducks, Elk, Emus, Equine, Horses & Ponies, Equine, Mules & Burros & Donkeys, Geese, Goats, Goats, Angora, Goats, Meat & Other, Goats, Milk, Guineas, Hogs, Honey, Bee Colonies, Llamas, Ostriches, Partridges, Hungarian, Peafowl, Hens & Cocks, Pheasants, Pigeons & Squab, Quail, Rabbits, Live, Sheep, Incl Lambs, Turkeys
Sales	The value of sales by commodity per county	https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_2_County_Level/Minnesota/st27_2_002_002.pdf	Vegetables, melons, potatoes, and sweet potato, Fruits, tree nuts, and berries, Livestock, poultry, and their products, Grains, oilseeds, dry beans, and dry peas
The number of potential customers	Identify potential customers from the open source data, and calculate the weighted total number for each client type	Healthcare : https://gisdata.mn.gov/dataset/health-facility-hospitals Edu : https://gisdata.mn.gov/dataset/struc-school-program-locs CSA & Foodhub : USDA	Healthcare, Edu, CSA, Foodhub
Ease of transportation	The weighted total number for different road types	OpenStreetMap, using osm APIhttps://www.openstreetmap.org/#map=5/38.01/-95.84	Critical Urban Freight Corridor * 5 + Critical Rural Freight Corridor * 4.5 + Other State-designated truck route (optional) * 3.5 + Primary Highway Freight System*2.5 + Section is on the National Network (NN) * 2
Land cost	Average estimated land cost per acre	https://landeconomics.umn.edu/landdata/LandValue/intro.aspx	