

Growth and Wealth Creation in the Upper Midwest: Is it Sustainable?

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Summary

- Demand for agricultural goods will grow faster than supply in the developing world
- The Upper Midwest is well-positioned to capture these export opportunities:
 - Presence of agricultural production cluster
 - (Relative) resilience to climate change

Outline

- Global demand for agricultural imports
- Upper Midwest agricultural production cluster:
 - The “Golden Triangle”
 - Crop and livestock production shift
- Climate change to benefit Upper Midwest?
- Implications



Geographic Definition

What states am I including in the Upper Midwest?

Iowa

Kansas

Minnesota

Nebraska

North Dakota

South Dakota

Global Demand for Agricultural Imports

Referring to China, “With increasing production constraints and strong demand growth, additional agricultural imports may be anticipated”

- OECD/FAO Agricultural Outlook 2013-2022

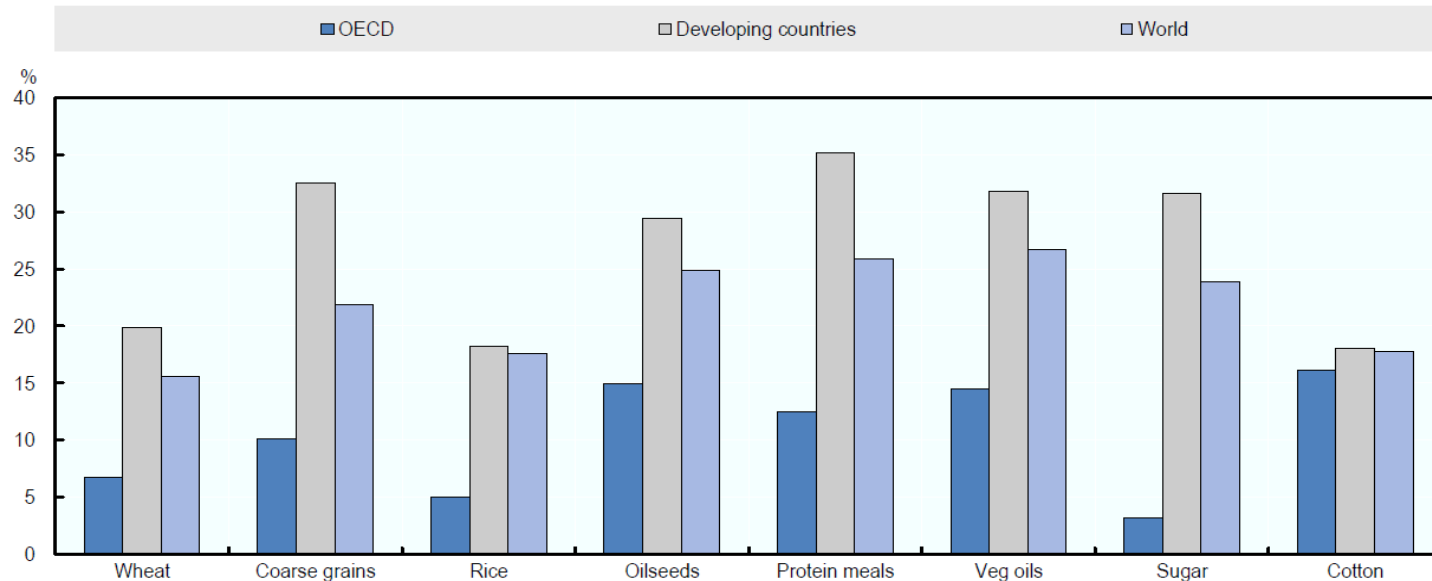
“As the world’s population growth expands, the demand for raw materials and manufactured goods seems likely to continued to expand”

- The Rise of the Great Plains, Texas Tech University



Global Demand for Agricultural Imports

Figure 1.10. Higher consumption of crop products
Per cent change 2022 relative to average 2010-12



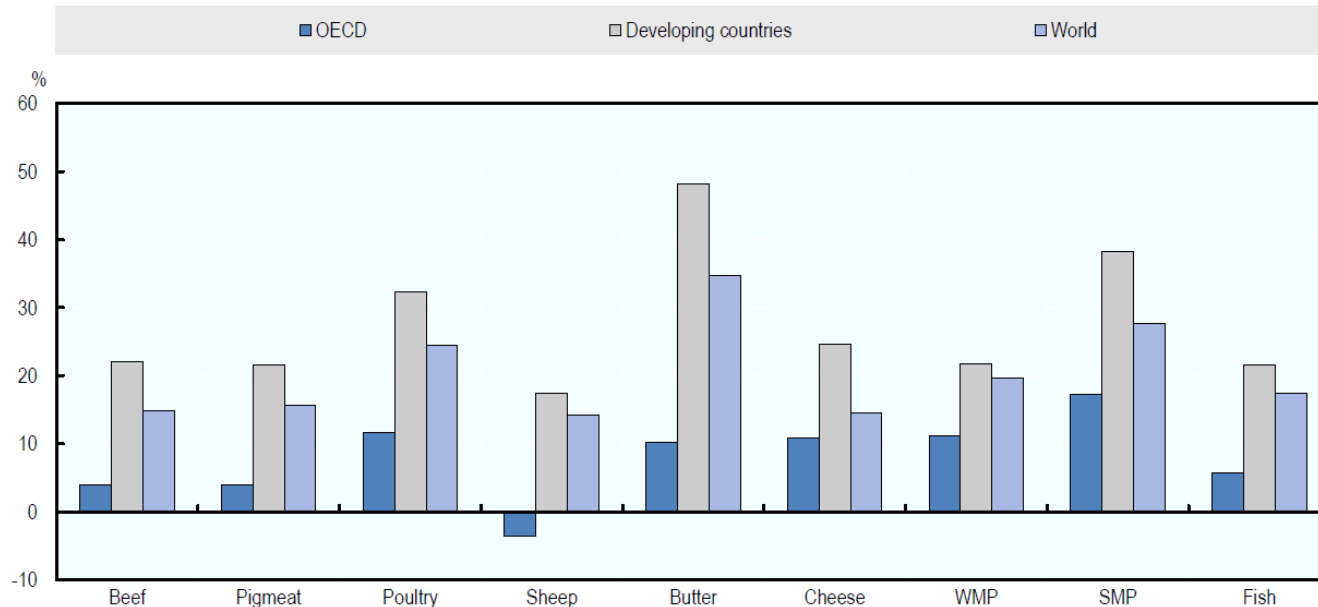
Source: OECD and FAO Secretariats.



Global Demand for Agricultural Imports

Figure 1.11. Higher consumption of livestock and fish products

Per cent change 2022 relative to 2010-12



Source: OECD and FAO Secretariats.

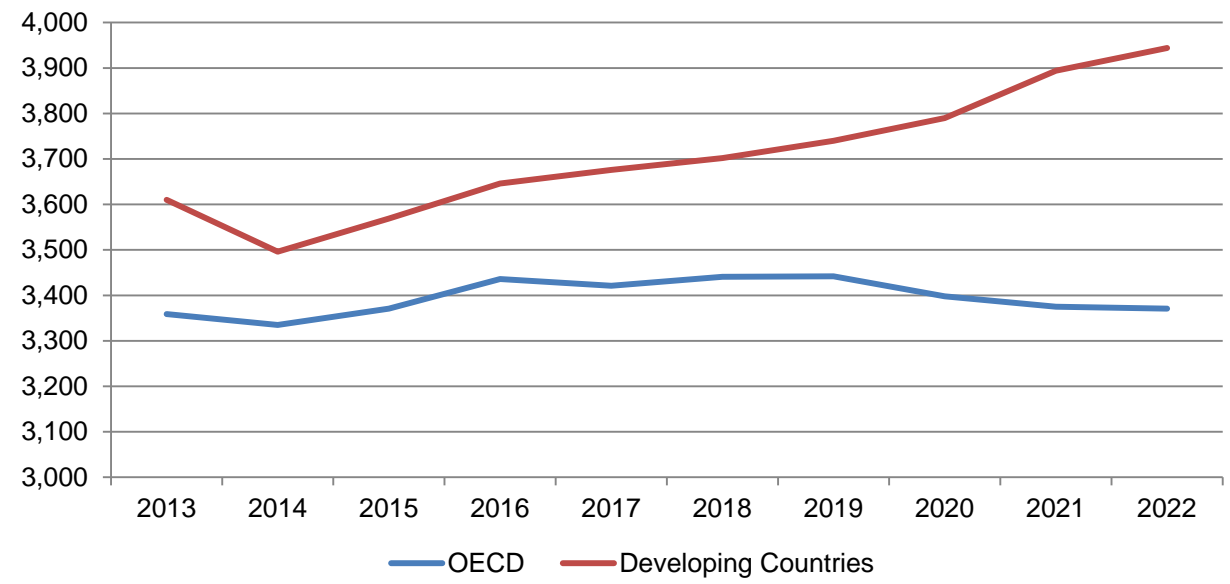


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Global Demand for Agricultural Imports

Source: OECD and FAO Secretariats

Annual Imports of Coarse Grains (kt)



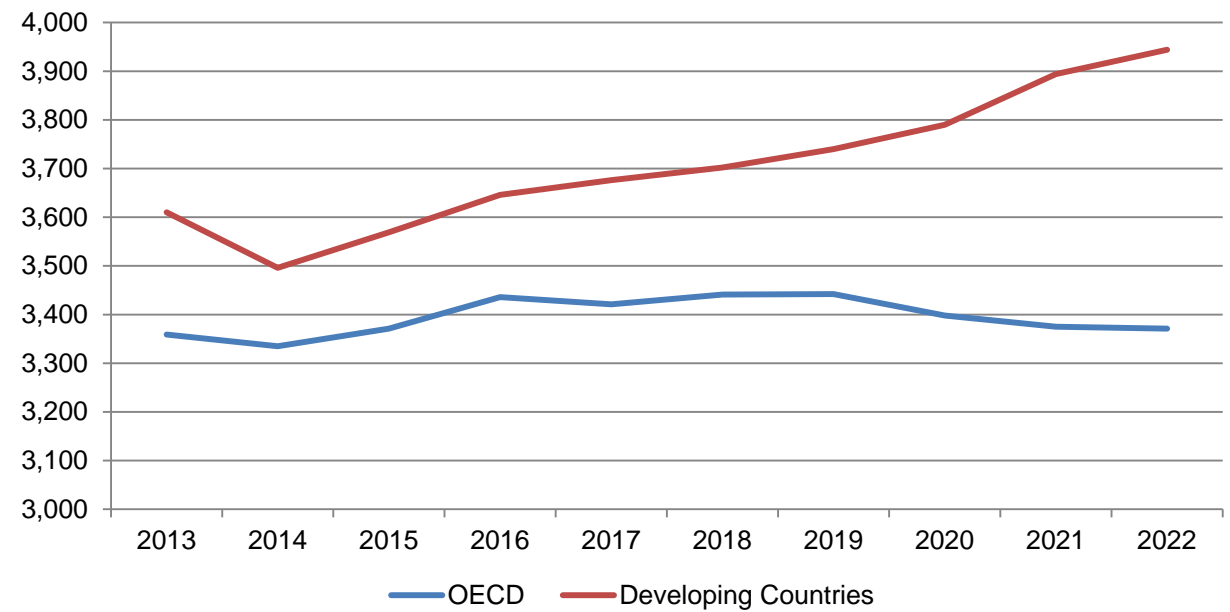


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Global Demand for Agricultural Imports

Source: OECD and FAO Secretariats

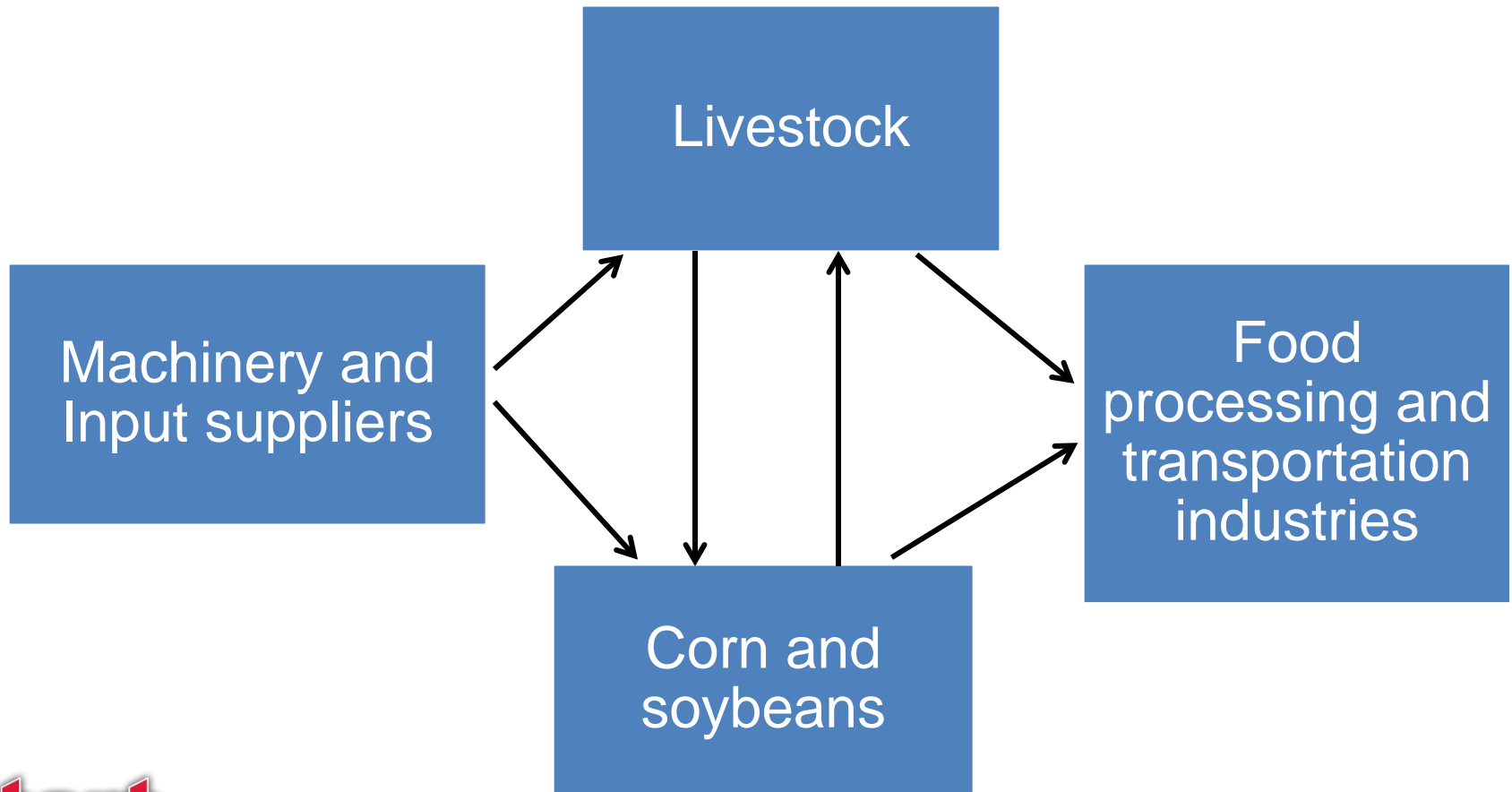
Annual Imports of Pigmeat (kt)





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Upper Midwest Agricultural Production Cluster Historic



**Start
Something.**

Upper Midwest Agricultural Production Cluster Take the Example of Nebraska

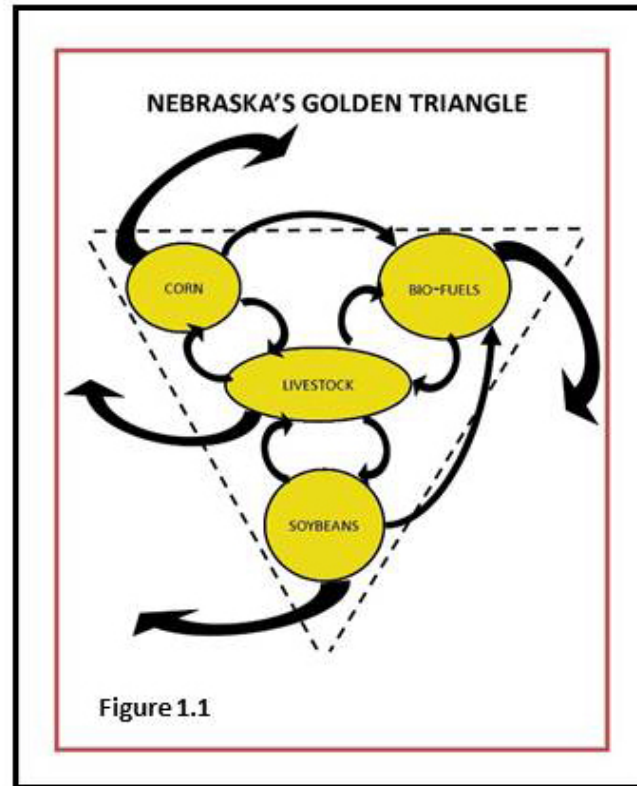
- #1 in irrigated acres with nine million acres
- #1 in commercial red meat production
- #1 (tied with Texas) for cattle-on-feed numbers
- #2 in corn-based ethanol production
- #3 in corn for grain production
- #4 in soybean production
- #5 in all hay production
- #6 in all hogs and pigs, and
- #7 in hog slaughtering

Source: Nebraska Department of Agriculture

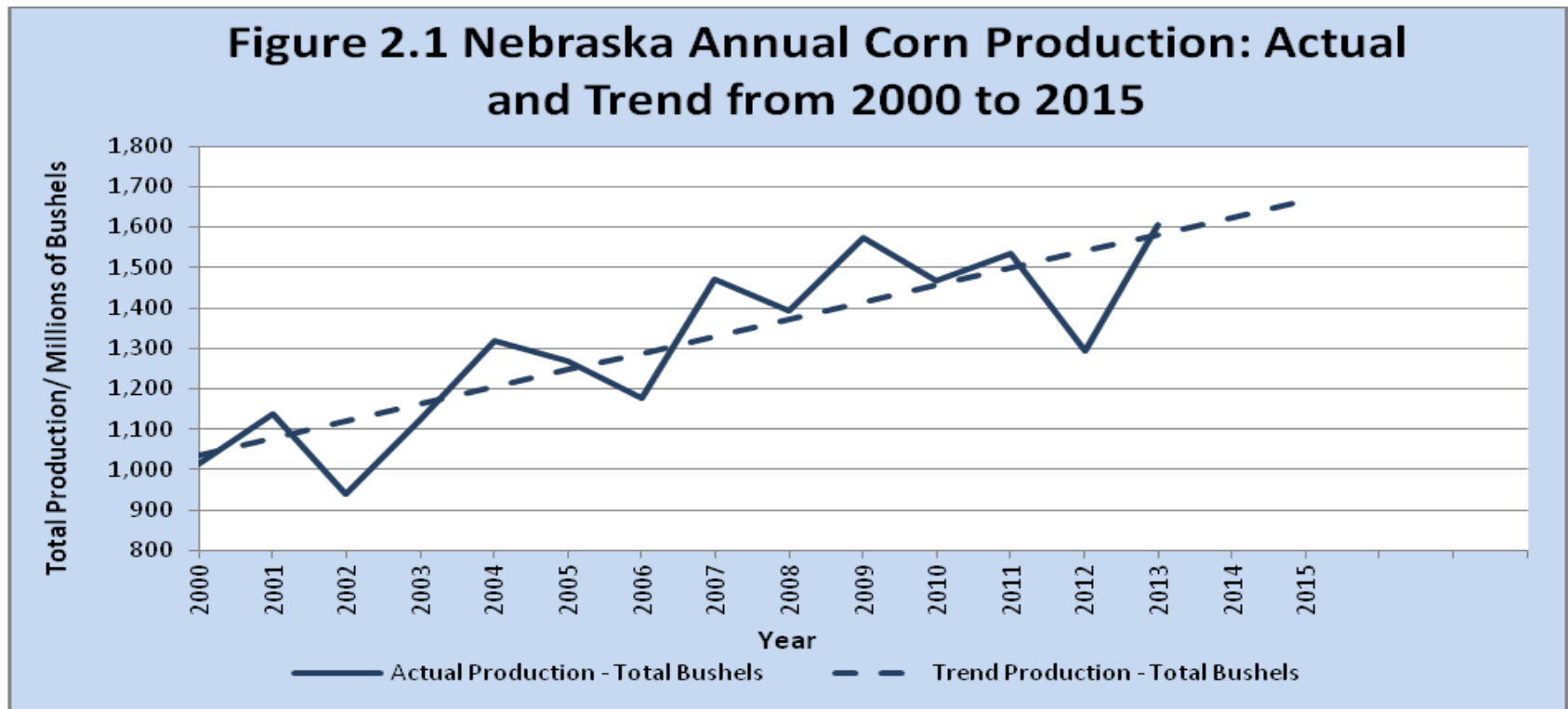


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Upper Midwest Agricultural Production Cluster Golden Triangle



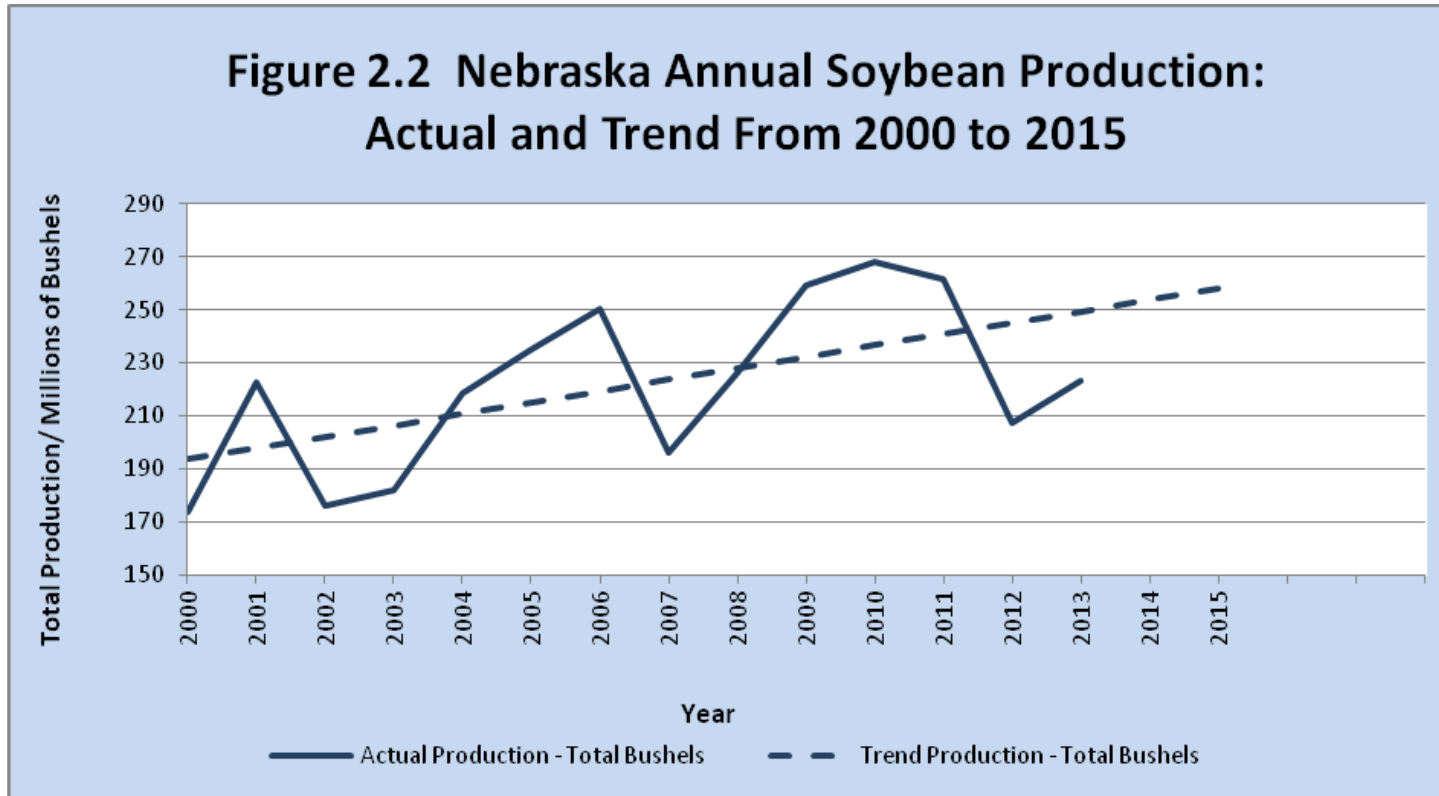
Upper Midwest Agricultural Production Cluster Nebraska Example - corn production (Source: USDA)





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Upper Midwest Agricultural Production Cluster Nebraska
Example - soybean production (Source: USDA)



Upper Midwest Agriculture Production Cluster

With the surge in crop production,

Other components of the Golden Triangle
have room to grow

In particular, livestock production should flow
to the Upper Midwest

Farm incomes should grow

Trends in Annual Pig Crop, 2003-2012

Source: U.S. Livestock Industry Trends and Nebraska's Role (Brooks et al., 2013)

Table 3.2. Select State Share of U.S. Annual Pig Crop: 2003, 2008, and 2012

<i>Region</i>	<i>Percent Share of U.S. Annual Pig Crop</i>		
	<i>2003</i>	<i>2008</i>	<i>2012</i>
	(percent)	(percent)	(percent)
<i>Top Five States</i>			
Iowa	16.0	17.0	18.4
North Carolina	20.8	19.6	16.4
Minnesota	10.1	10.3	11.1
Illinois	8.0	8.3	9.3
Missouri	6.6	6.7	7.1
<i>Subtotal</i>	61.5	61.8	62.4
<i>Ranked Sixth</i>			
Nebraska	6.8	6.8	6.9
<i>Other Nebraska Neighbors</i>			
South Dakota	2.5	2.9	3.5
Kansas	3.0	3.0	2.9
Colorado	2.7	2.8	2.6
Wyoming	—	—	—
<i>Subtotal</i>	8.2	8.7	9.0
Other States	23.4	22.7	21.7
United States	100.0	100.0	100.0

Trends in Cattle on Feed, 2003-2013

Source: U.S. Livestock Industry Trends and Nebraska's Role (Brooks et al., 2013)

Table 2.4. Select State Share of U.S. Cattle on Feed Jan. 1 Inventory: 2003, 2008, and 2013

Region	Percent Share of U.S. Cattle on Feed Inventory		
	Jan. 1, 2003	Jan. 1, 2008	Jan. 1, 2013
	(percent)	(percent)	(percent)
<i>Top Five States</i>			
Texas	20.0	20.1	20.4
Nebraska	17.4	18.2	19.1
Kansas	17.0	17.8	16.9
Iowa	8.3	9.1	9.6
Colorado	7.9	7.7	7.7
<i>Subtotal</i>	70.5	72.9	73.7
<i>Other Nebraska Neighbors</i>			
South Dakota	3.0	2.7	2.2
Wyoming	0.6	0.5	0.5
Missouri	0.5	0.4	0.4
<i>Subtotal</i>	4.1	3.6	3.1
Other States	21.7	19.7	19.2
United States	100.0	100.0	100.0



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Upper Midwest Agricultural Production Cluster Farm Income

Farm Income Growth 2003-2012 (Billions of \$)

Iowa	341%
Kansas	45%
Minnesota	353%
Nebraska	116%
North Dakota	176%
South Dakota	119%
United States	87%

Source: United States Department of Agriculture

Upper Midwest Agricultural Production Cluster

Recent strength in the agricultural production cluster should continue

The cluster will continue to attract more investment

Portions of the region feature reliable crop production (i.e., abundant groundwater)

Relatively speaking, climate change may benefit the Upper Midwest



Climate Change To Benefit Upper Midwest?

A stable aquifer also can support agricultural production in dry years

Portions of the Upper Midwest also benefits from stable regions of the Ogallala Aquifer

Aquifer stable in Nebraska and South Dakota

Aquifer declining in Kansas, Oklahoma, Texas



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Climate Change to Benefit the Upper Midwest?



**Start
Something.**

Climate Change to Benefit Upper Midwest?

Change in Annual Returns to Crop Production (Millions \$)

Region	ECH	CSIRO	CNR	MIROC
Northern Plains (KS, ND, NE, SD)	\$1,254	\$1,671	-\$914	\$255
Lake States (MN, WI, MI)	\$41	\$902	\$1,001	-\$37
Corn Belt (IA, MO, IL, IN, OH)	-\$1,114	-\$2,165	-\$2,112	-\$4,053

Climate Change Scenarios
 ECH = modest change; CSIRO= modest change;
 CNR= moderate, baseline scenario;
 MIROC=most extreme temperature increase and precipitation decrease

Source: Malcolm et al. (2012), Agricultural Adoption to a Changing Climate, USDA

Climate Change to Benefit Upper Midwest? Percent Change in Acres in Production

Region	ECH	CSIRO	CNR	MIROC
Northern Plains (KS, ND, NE, SD)	7% to 20%	7% to 20%	-7% to 7%	-7% to 7%
Lake States (MN, WI, MI)	-7% to 7%	-7% to 7%	-7% to 7%	7% to 20%
Corn Belt (IA, MO, IL, IN, OH)	-7% to 7%	-7% to 7%	-7% to 7%	-7% to 7%

Climate Change Scenarios

ECH = modest change; CSIRO= modest change;

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MIROC=most extreme temperature increase and precipitation decrease

Source: Malcolm et al. (2012), Agricultural Adoption to a Changing Climate, USDA

Implications: relative stability in land prices Take the Example of Nebraska

Year	Annual Farm Income	Average Value of Farm Land Per Acre
2009	\$3.1 billion	\$1,340
2010	\$3.8 billion	\$1,520
2011	\$7.7 billion	\$1,940
2012	\$5.8 billion	\$2,590
2013	\$6.7 billion	\$3,050
2014	\$5.8 billion	
2015	\$5.6 billion	

Sources: USDA and UNL Department of Agricultural Economics

Implications

Elevated agricultural land prices should be maintained

Suppliers of agricultural inputs and machinery should continue to benefit from growth in domestic demand

Retail and service businesses based in the Upper Midwest should benefit from strong demand