



Nebraska Agriculture Trends
Part One

One in Four

One in four of every job in Nebraska is related to agriculture. There is a wide span of agricultural jobs in Nebraska, including careers in the areas of insurance, equipment sales and repair, technology, irrigation, engineering and many more.



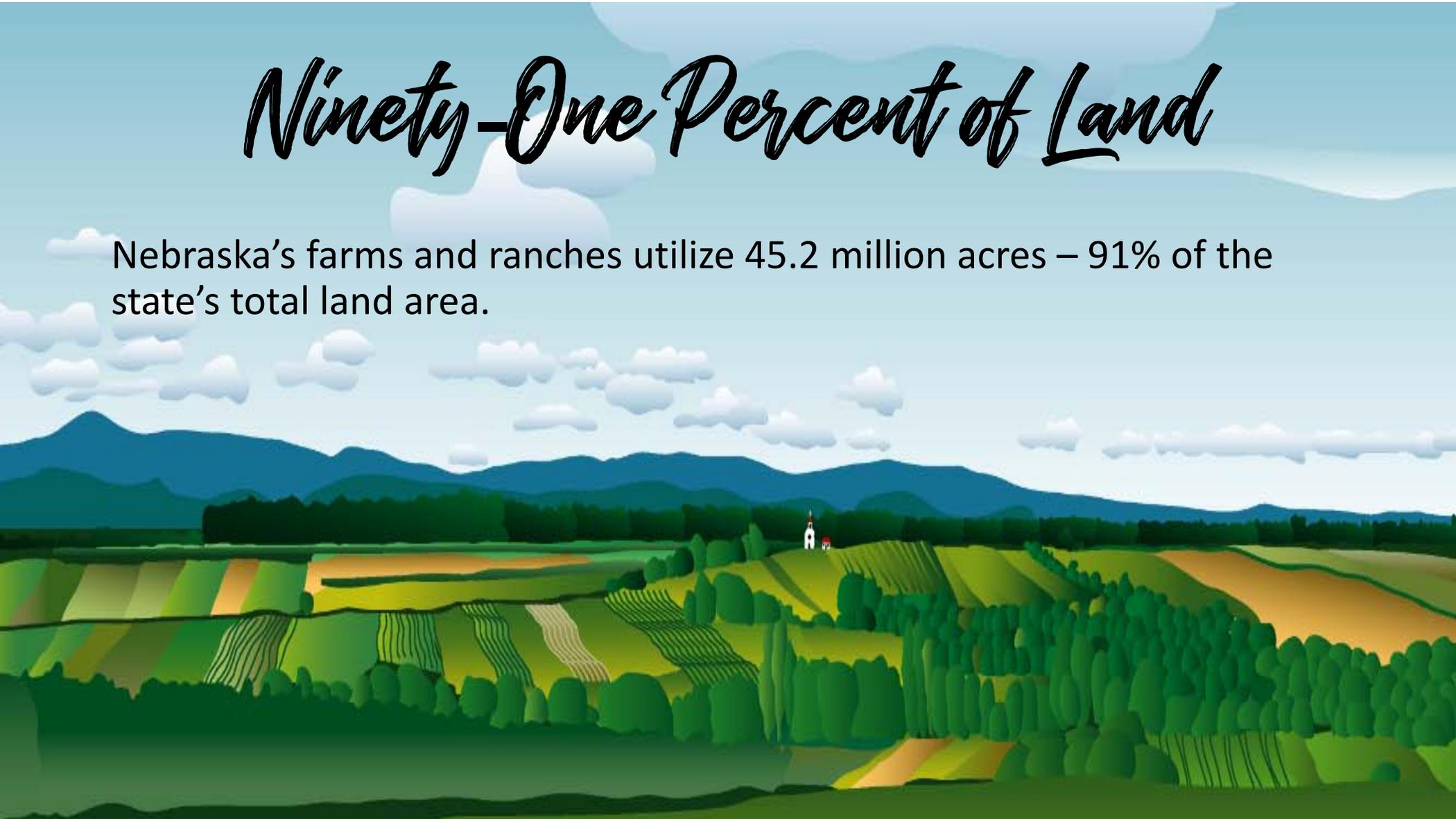


Expansive and Diverse

Nebraska agriculture has been described as expansive and diverse with an abundance of natural resources. The landscape varies from large pastures dotted with feeding cattle, to miles of rolling hills bursting with a wide variety of crops, and everything in-between.

Ninety-One Percent of Land

Nebraska's farms and ranches utilize 45.2 million acres – 91% of the state's total land area.



Half in the Sandhills

There are nearly 23 million acres (9,307,806 ha) of rangeland and pastureland in Nebraska – half of which are in the Sandhills.



Most Important Asset

While Nebraska has everything needed to support all types of agriculture, including abundant water, and ample amounts of cropland and pasture, many would say its most important asset is its people.



One Generation to the Next

Farms and ranches in Nebraska have been handed down from generation to generation, and families still serve as the hub of the state's number one industry, agriculture.



From East to West

Nebraska also has the infrastructure needed to transport grain, livestock and all types of agricultural products to their intended destination. The railroads, semis, trucks and other vehicles have the necessary pathways to move from east to west and north to south throughout the state.





With monikers like Cornhuskers and The Beef State, it doesn't take long to figure out corn and cattle are two of the top commodities produced in Nebraska. The state has been among the leading producers in each category nationally for many years.

The Cornhusker State

Climate Change Across the State

Nebraska's climatic conditions vary greatly from one end of the state to the other due to a significant drop in elevation from west to east. For instance, in northwest Nebraska, where the elevation reaches over 3,400 feet above sea level, the humidity levels are relatively low, and the annual average rainfall is 18 inches. In the southeast corner of the state where elevation is only 840 feet above sea level, the average annual rainfall is much higher at over 30 inches.

Geography

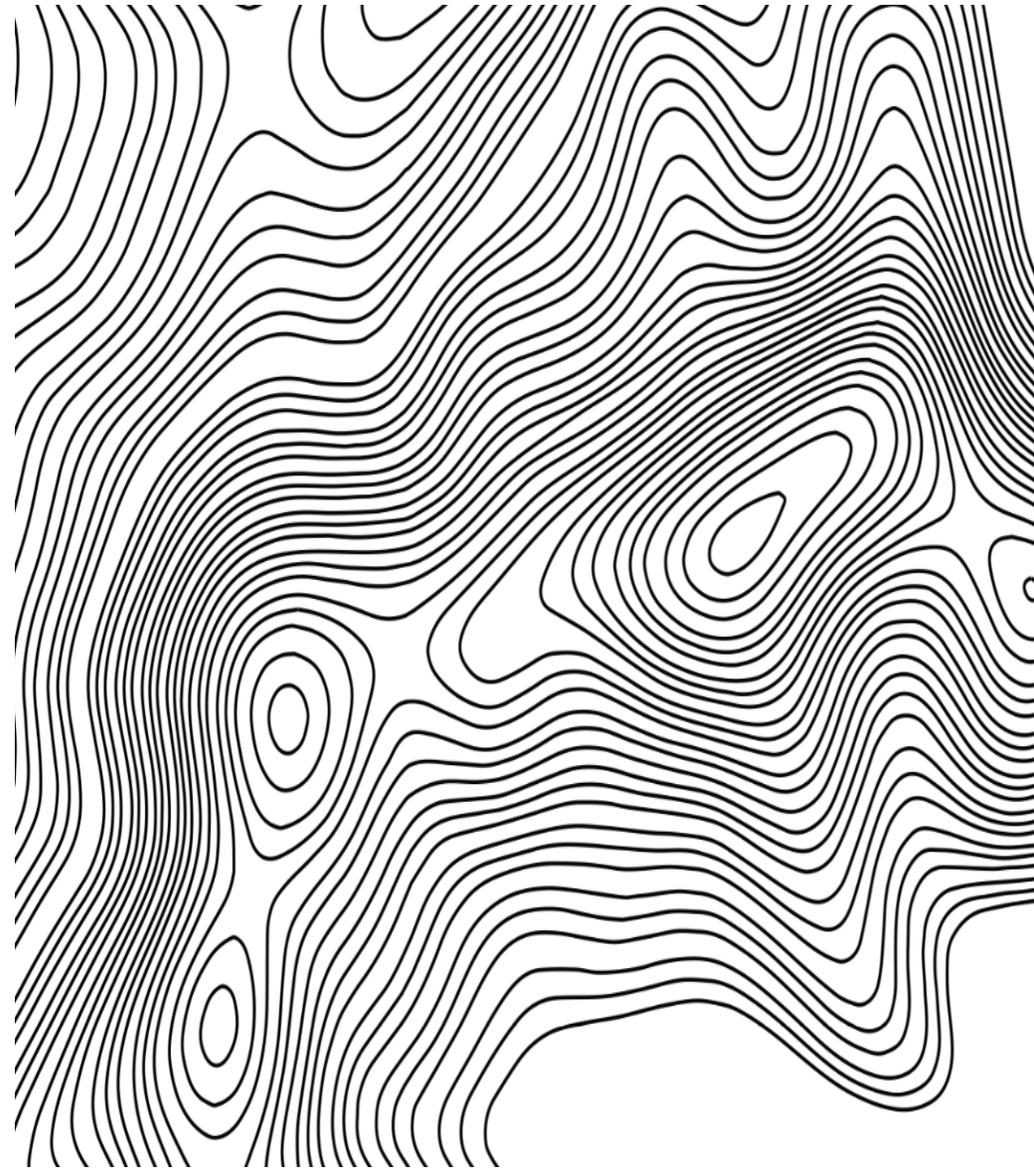
From picturesque rolling hills, to fertile valleys, to expansive plains, to the awe-inspiring Sandhills, the geography of Nebraska is one of the most unique in the United States. The landscape changes dramatically, especially traveling from west to east. There is an elevation drop of 4,584 feet in the

430 mile distance from Panorama Point in the west, to the southeast corner of the state along the Kansas border. Nebraska also borders the magnificent Missouri River and is home to the unique Platte River ecosystem, as well as massive Lake McConaughy, which covers a surface area of 35,700 acres.

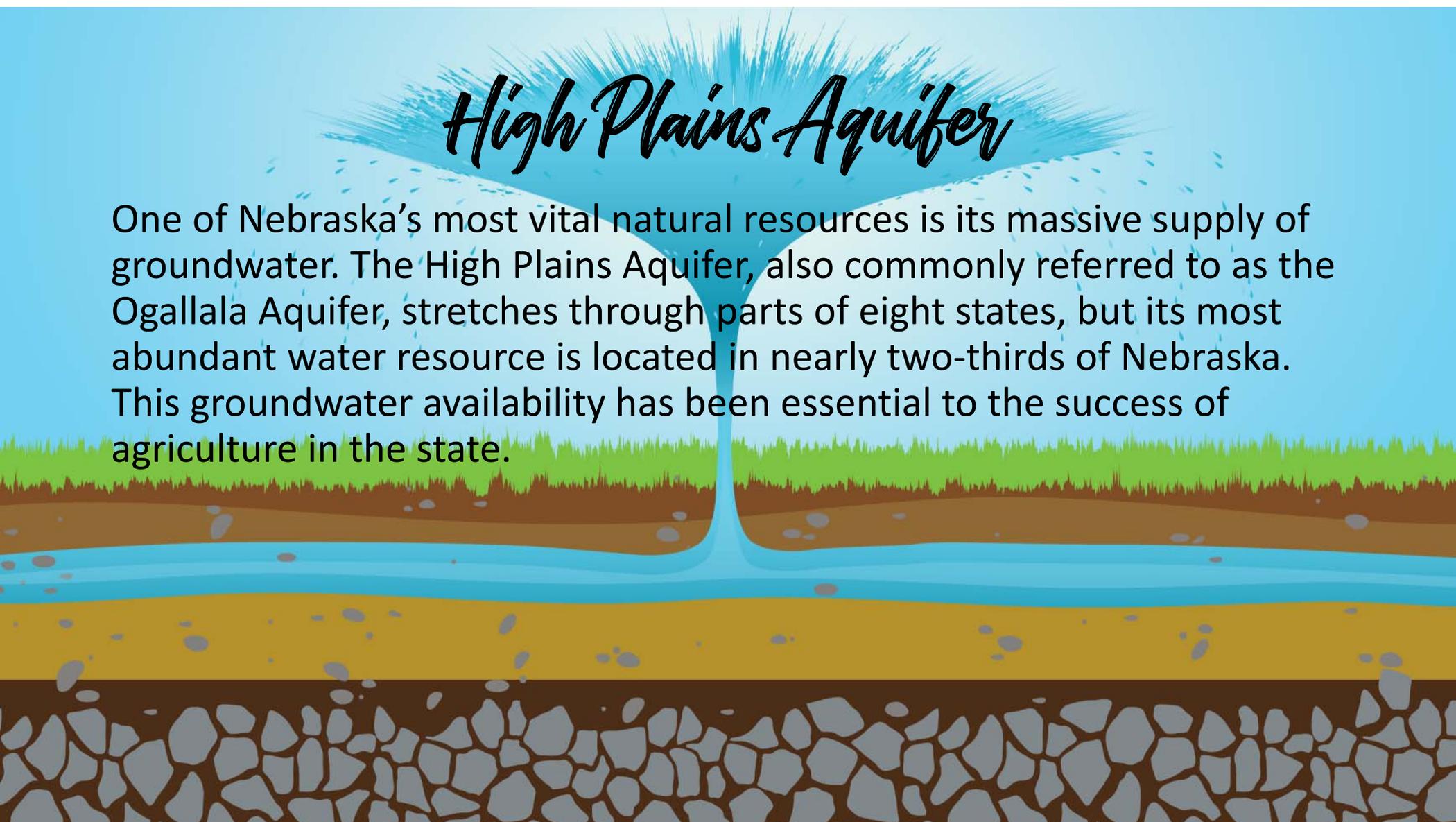


Going up

From east to west, Nebraska experiences a 4,584-foot elevation difference, and the average annual precipitation decreases by one inch every 25 miles, allowing Nebraska to have a diverse agricultural industry from one side of the state to the other.



High Plains Aquifer



One of Nebraska's most vital natural resources is its massive supply of groundwater. The High Plains Aquifer, also commonly referred to as the Ogallala Aquifer, stretches through parts of eight states, but its most abundant water resource is located in nearly two-thirds of Nebraska. This groundwater availability has been essential to the success of agriculture in the state.

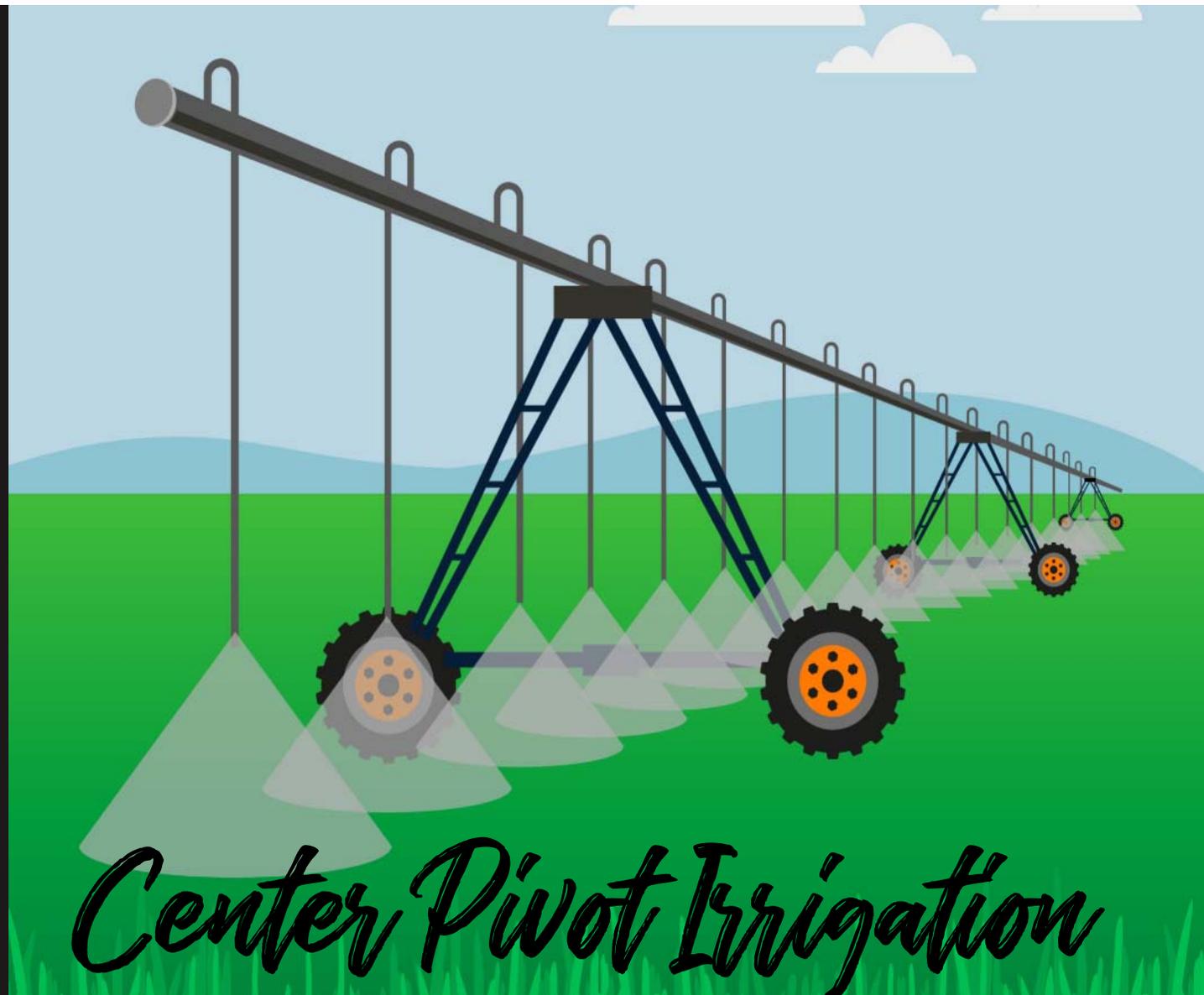
Water Water Everywhere

If poured over the surface of the state, the water in those aquifers would have a depth of 37.9 feet (11.6 meters). The state has 96,547 registered, active irrigation wells supplying water to over 8.3 million acres of harvested cropland and pasture. Of the total cropland harvested during 2012, 44% was irrigated.

Miles of Rivers and Streams

Nearly 24,000 miles of rivers and streams add to Nebraska's bountiful natural resources.

Center pivot irrigation is the most common method of providing water to row crops in the state. As a result, four of the largest manufacturers of center pivot systems in the world are located in Nebraska.



Cash Receipts

Cash receipts from farm marketing contributed over \$21.5 billion to Nebraska's economy in 2016 and 6.0% of the U.S. total.



Top Five Exports

Nebraska's top five agricultural exports in 2016 were soybeans, corn, beef and veal, feeds and fodders, and processed grain products.



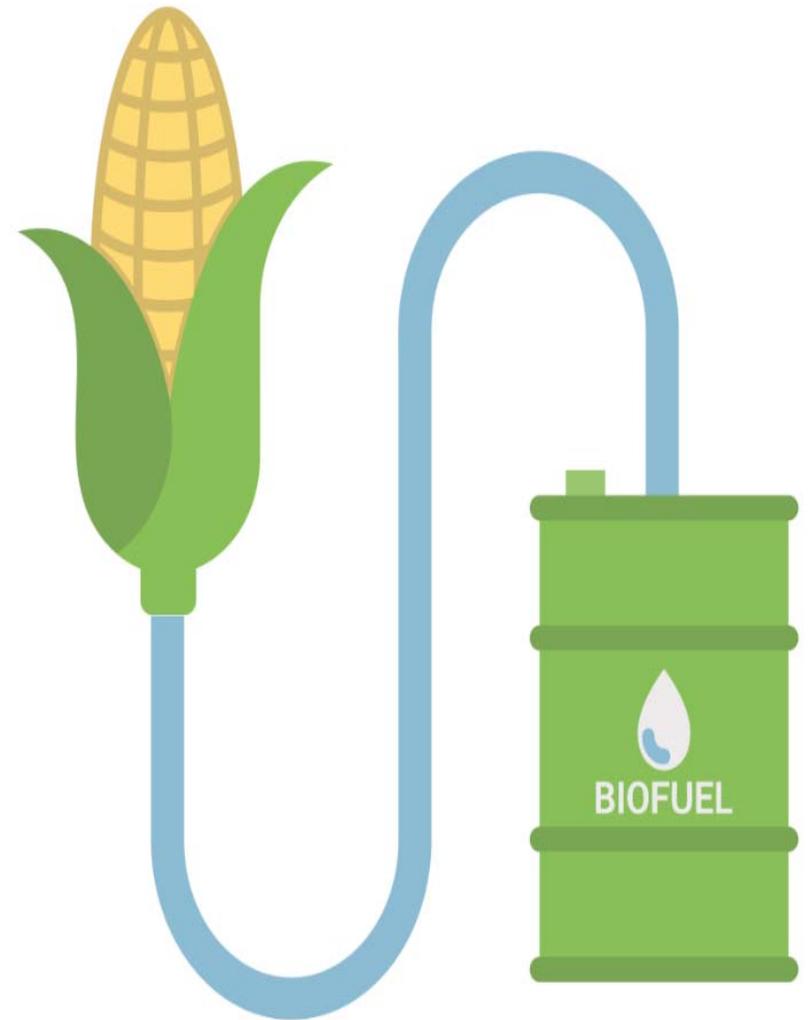


Average Farm Size

Nebraska had 47,400 farms and ranches during 2017. The average operation consisted of 954 acres.

Ethanol Production

In 2017, Nebraska ranked second in ethanol production capacity, with 25 operating plants having a production capacity of more than 2.1 billion gallons (2,177,175,000 gallons). Approximately 36% of the state's 201 corn crop was utilized in ethanol production.



Livestock and Poultry

Livestock or poultry operations were found on 49% of Nebraska farms.



Top Ag Counties

The top five counties ranked by agricultural sales from the 2012 Census were Cuming, Custer, Dawson, Lincoln, and Phelps.



Certified Organic

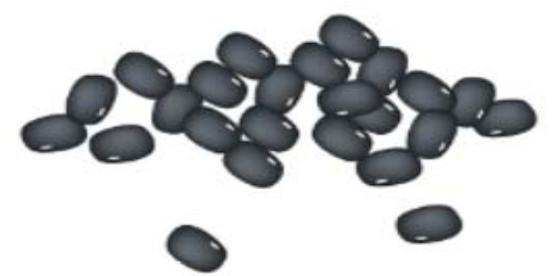
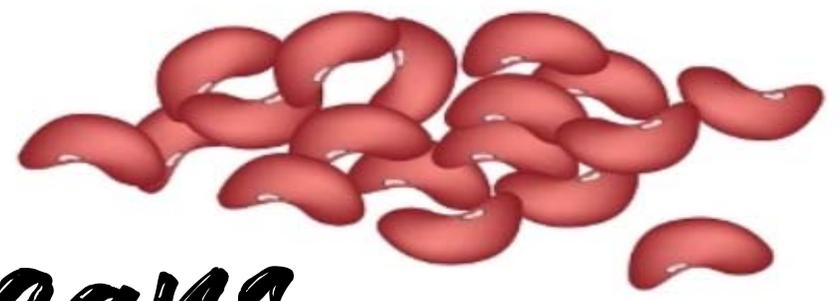
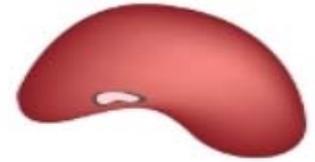
In 2015, Nebraska was 12th nationally in certified organic cropland acres (85,172) and in 2011 eighth in certified organic pasture acres (53,174).



Increase in farms and farmers

During the 5-year period between 2007 and 2012, Nebraska experienced a 5% increase in the number of farms and a 10% increase in the number of new farmers.





Dry Beans

On the Pulse of Nebraska

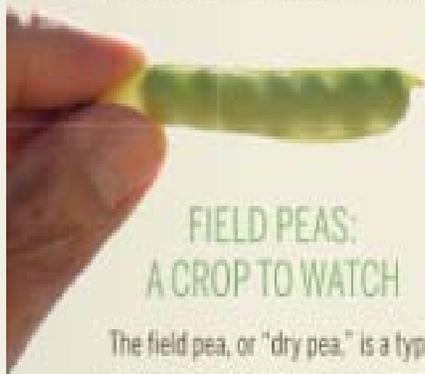
Nebraska is a top producer of pulses, a group of crops that includes field peas, dry beans, chickpeas and lentils.



Nebraska is No. 1 in the nation for the production of Great Northern beans.

REASONS TO EAT PULSES

1. Highly nutritious
2. Important health benefits
3. Add to climate change mitigation and adaptation
4. Promote biodiversity and sustainable agriculture
5. Promote economic accessibility and food security



FIELD PEAS: A CROP TO WATCH

The field pea, or "dry pea," is a type of legume. Food trends, including plant-based and gluten-free diets, may help create a new demand for this highly nutritious food.

The field pea is gaining popularity in Nebraska, which already has about 100,000 acres in production.

100K There are about 100,000 acres of field peas growing in Nebraska.

NEBRASKA PRODUCES
11 PERCENT OF THE NATION'S
DRY EDIBLE BEANS.

Source: University of Nebraska - Lincoln



Lots of Beans

Nebraska is the No. 1 nationwide producer of Great Northern beans, No. 2 producer of light-red kidney beans, No. 2 producer of pinto beans, and No. 4 overall producer of dry edible beans.



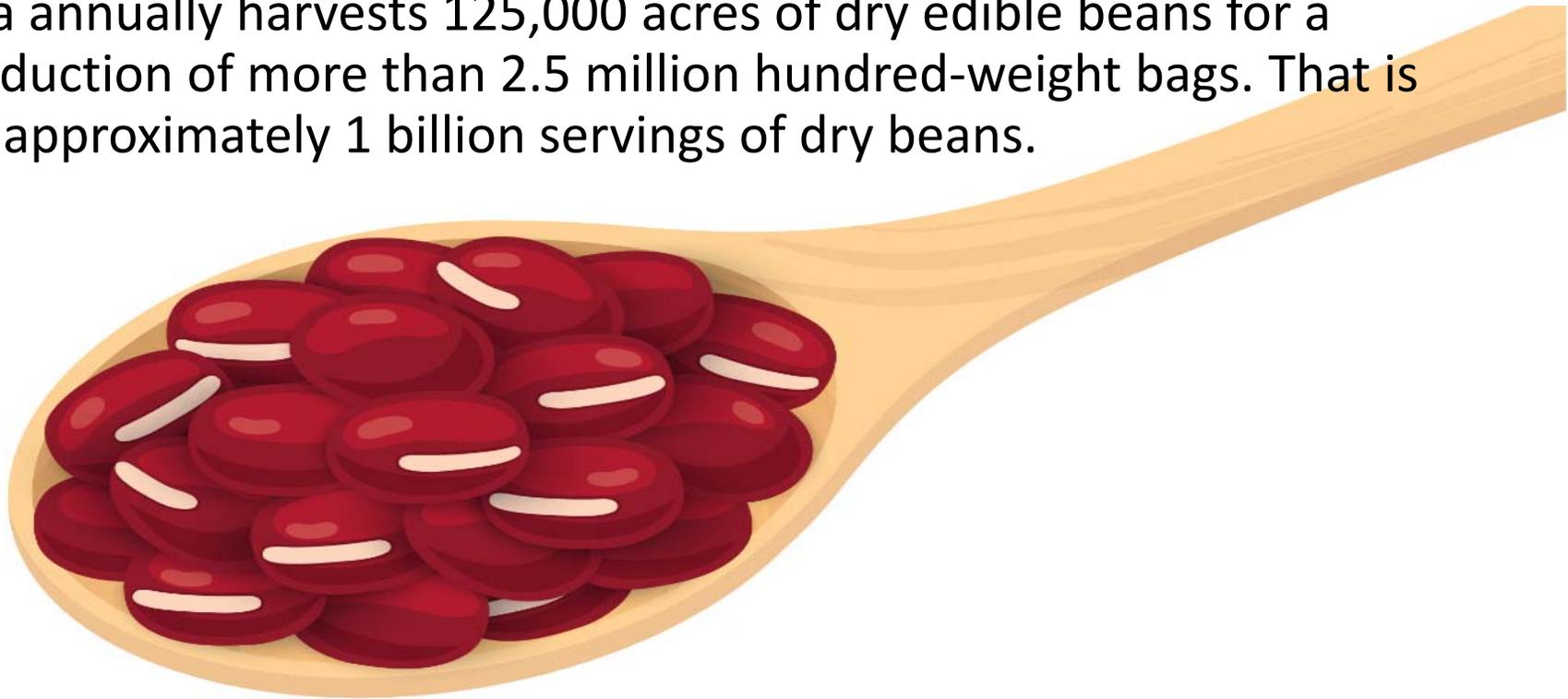
Many types of, Beans

Also grown are black beans, navy beans and garbanzo beans.



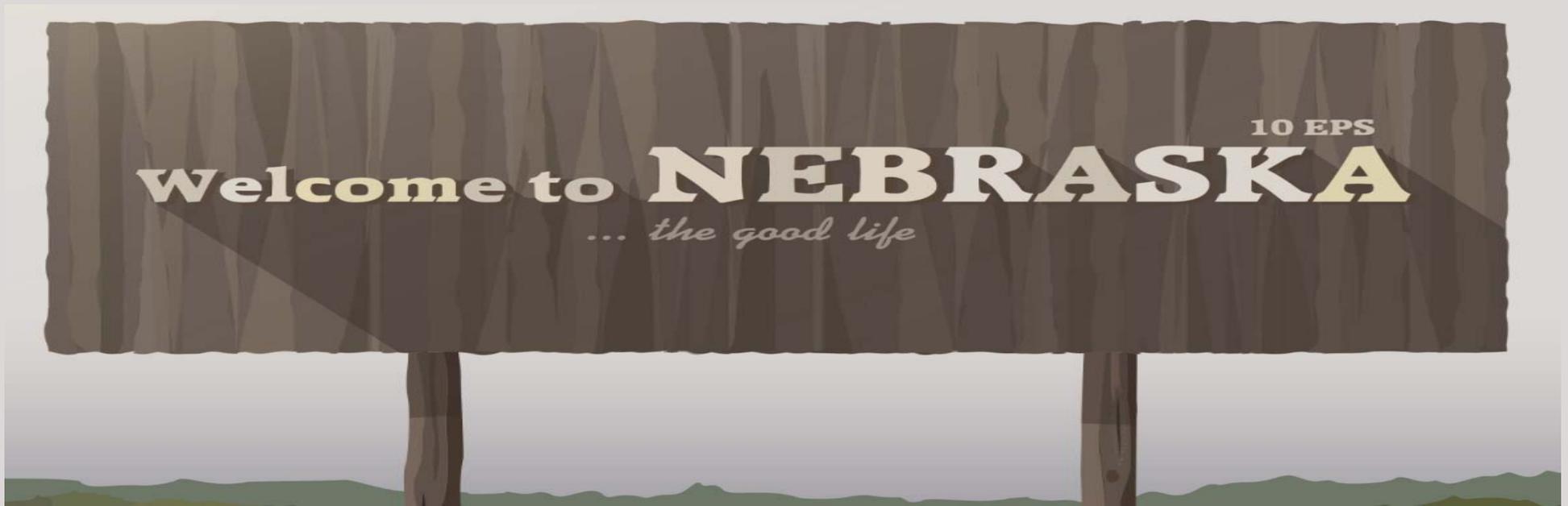
1 A Billion Servings

Nebraska annually harvests 125,000 acres of dry edible beans for a total production of more than 2.5 million hundred-weight bags. That is equal to approximately 1 billion servings of dry beans.



Grown in Western Nebraska

Dry edible beans are predominately grown in western Nebraska due to the arid climate in that region. The crop usually is grown under irrigation.



Harvest Time

When the plants have dried and are ready for harvest, the plants are cut close to the ground in the early morning while they're covered with dew. The whole plant is allowed to dry in windrows before being combined. The combining process breaks the pods open and separates the dry edible beans from the plant material. After harvest, the beans are delivered to local processors where they are graded, cleaned and packaged for shipping to canners, grocery stores, and overseas markets.



Additional Challenges for Bean Producers

Dry edible bean producers face all of the normal challenges of crop production, along with several other layers of complexity.



Increased Risk

Dry edible bean growers face market dynamics less standardized than other commodities. The result of these less-than-perfectly-competitive markets potentially increases their risk.



Oligopsony

Oligopsony is the mirror image of oligopoly. Instead of having few sellers of a product, there are few buyers. The market power oligopsonists hold is derived from their ability to force a lower price on producers in a similar way that oligopolists can influence the market price in an upward direction. Simply put, oligopolists aim to extract consumer surplus from buyers. Oligopsonists aim to extract producer surplus from sellers (profit).



Less than Four

There are less than four main processors of dry edible beans that producers can sell to.

There are no standardized futures contracts for dry edible bean production. If producers desire to hedge risk, the typical arrangement is that they may contract a forward price with one of the processors, but not for the entirety of the crop.

Influence of Processors Payments



The prices paid by processors seem to have more influence from substitutes in production (soybeans) than global demand and prices.

Contracts are not always for the best

Another key detail is that there are times when processors allow producers to contract their entire crop. If the processor is willing to accept all downside market risk, the global price (that they have contracted to receive) is surely bullish. In short, there could be speculation that processors are exercising their market power by eliminating the possibility for producers to share in the profits of higher global prices.



Inferior good



While it's true U.S. consumers continue to increase per capita consumption of animal protein, it is also true that demand for healthier alternatives has increased.

Unfortunately, studies show that dry edible bean consumption is negatively correlated with income. In other words, dry beans are considered an inferior good.

Superfoods

When the health benefits of beans are compared to foods like quinoa, chia, nuts, pumpkins or lentils, they compare favorably. These foods are all often associated with the moniker of "superfood."



superfood

Price Stays Low

The price of beans at the retail level is low, and this reflects a lack of value-added beyond the processing level of the supply chain. For beans to be edible, useful and tasty, a significant amount of preparation is required. This value added is almost always the result of in-home production, which is both a benefit and curse. Because beans are sold in need of more value added, they are flexible in their use. Unfortunately, this low cost has firmly segmented beans as an inferior good — something you only buy if you have to.



Expansion Possible

The dry edible bean market is profitable for producers to continue to expand. When this is combined with the murky nature of the supply chain and the inferior nature of demand, the outlook for the industry is positive.

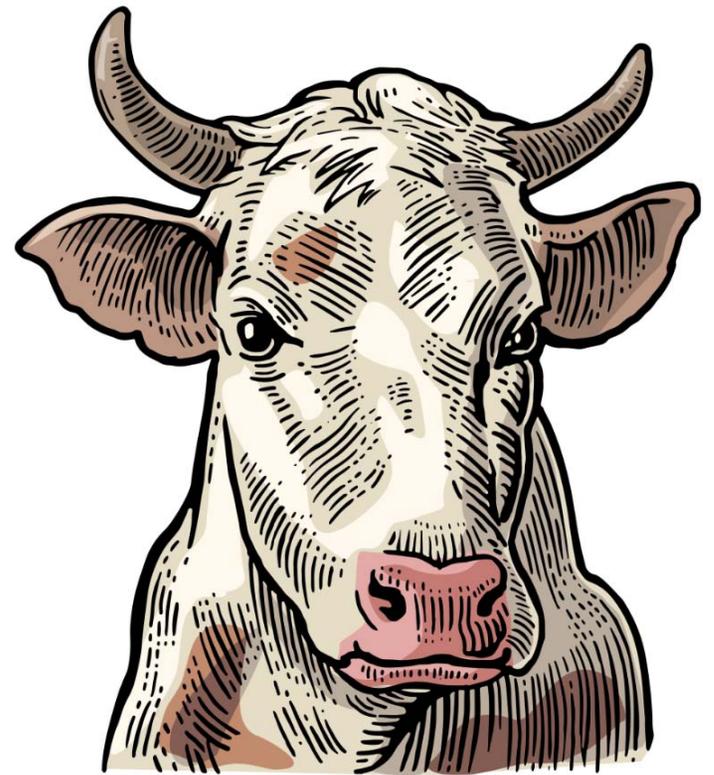




Beef Packing

Largest Ag Sector in Nebraska

Beef production is the largest sector of agriculture in Nebraska, and Nebraska is the only state that is a national leader in every aspect of beef production: cow/calf, backgrounding, corn growing, cattle feeding, and processing.



Beef Exports

Nebraska topped all other U.S. states for beef exports in 2017 for a second year in a row, its governor said in February 2018 in a statement that cited the state's abundance of feed grain, packing capacity and cattle feeding operations.



Largest Packing Plants

Jim Robb, director of the Colorado-based Livestock Marketing Information Center, in part, attributed Nebraska's top beef export ranking to it being the home of some of the nation's largest packing plants. It is also in the western Corn Belt and feedlots are located throughout the state.



Before the Feedlot

Calves born on one of Nebraska's 19,000 cow/calf ranches typically spend the majority of their lives on grass before being sent to a feedlot for finishing.



Life on the Feedlot

Cattle typically spend 3-6 months in the feedlot being fed a balanced ration of corn, forages, distillers' grains, and vitamin and mineral supplements.



Corn Feeding

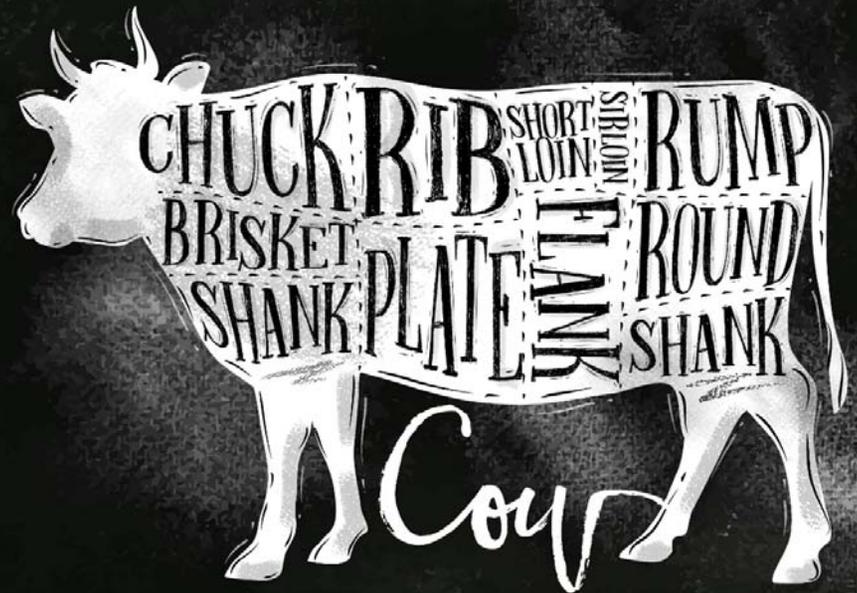
Corn feeding allows Nebraska producers to get greater marbling and tenderness in the final beef product. Corn-fed Nebraska beef is known worldwide for its flavor, tenderness, and quality.



All Parts

Cattle outnumber people in Nebraska more than three to one.

Every part of a cow is used for a wide variety of products, including leather, fishing line, biodegradable outboard motor oil, pet chew toys, and gummy candies.



More Cows than Ever

In January(2018), Nebraska started off the year with a higher beginning cattle inventory than the state has seen since the 1980s.



Five Percent Increase

All cattle and calves in Nebraska as of Jan. 1 totaled 6.8 million head — a 5% increase from last year, according to USDA's National Agricultural Statistics Service. The last time the inventory was that high at the start of the year was in 1984 when numbers reached 6.9 million.



Congratulations!

Nebraska Gov. Pete Ricketts issued a statement following the USDA report.

"Congratulations to Nebraska's cattle producers on achieving the distinction of the most cattle on feed of any state," he said. "Consistent focus on opening new markets, like China, and telling the story of Nebraska beef through international promotion efforts are supporting growth in the industry. We look forward to continued partnership with industry leaders to help create more opportunities to grow our state's number one industry and the Beef State."

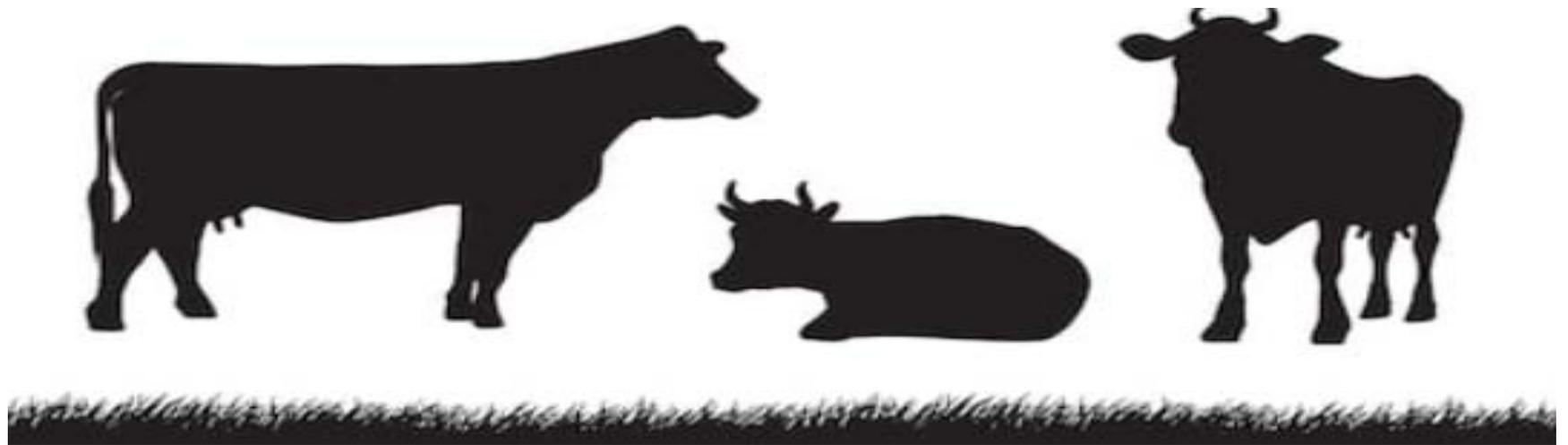
Fourth Nationally

It comes as no surprise that Nebraska, known for having the highest number of cattle on feed, saw the biggest increase from cattle on feed — up 12% from last year for a total of 2.77 million. Nebraska has always maintained a strong cow-calf herd. With 1.9 million beef cows, Nebraska ranks fourth nationally behind Texas, Oklahoma, and Missouri for beef cow numbers.



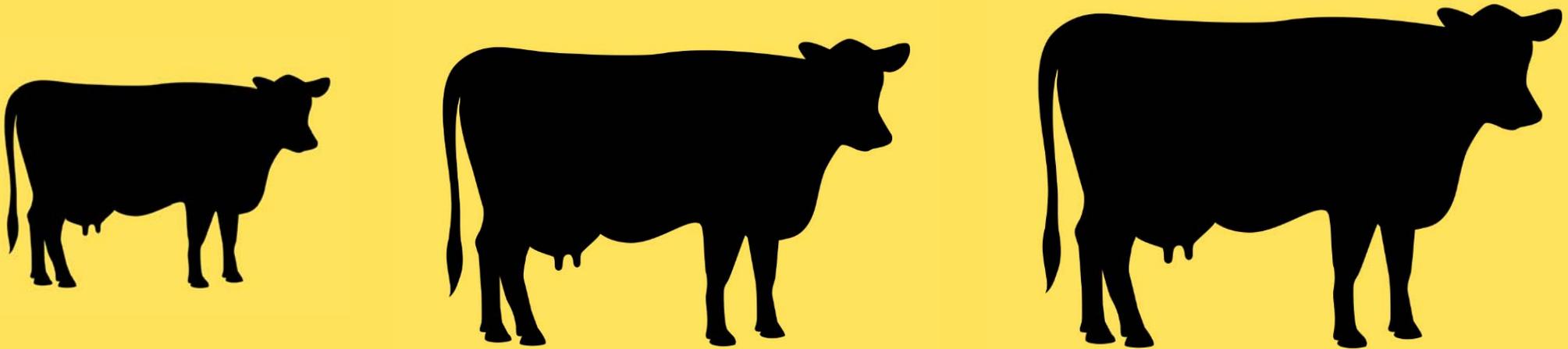
Slowing on the National Level

While total cattle numbers also increased nationally, to 94.4 million head — a 1% increase over January 2017 numbers — Jeff Stolle, vice president of marketing at Nebraska Cattlemen, says the increase may be slowing on a national level.



Replacement Heifers

"On the inventory report that came out the middle of the last week, the indication was beef replacement heifers were down 4% from the first of January 2017," Stolle says. "We're not seeing as aggressive expansion over the last year or so compared to the previous two to three years, according to USDA data."



Build Demand Domestically

Overall red meat supply will likely continue to increase moving forward. The challenge is to build demand domestically and internationally to use the additional supply at price levels that will maintain profitability.



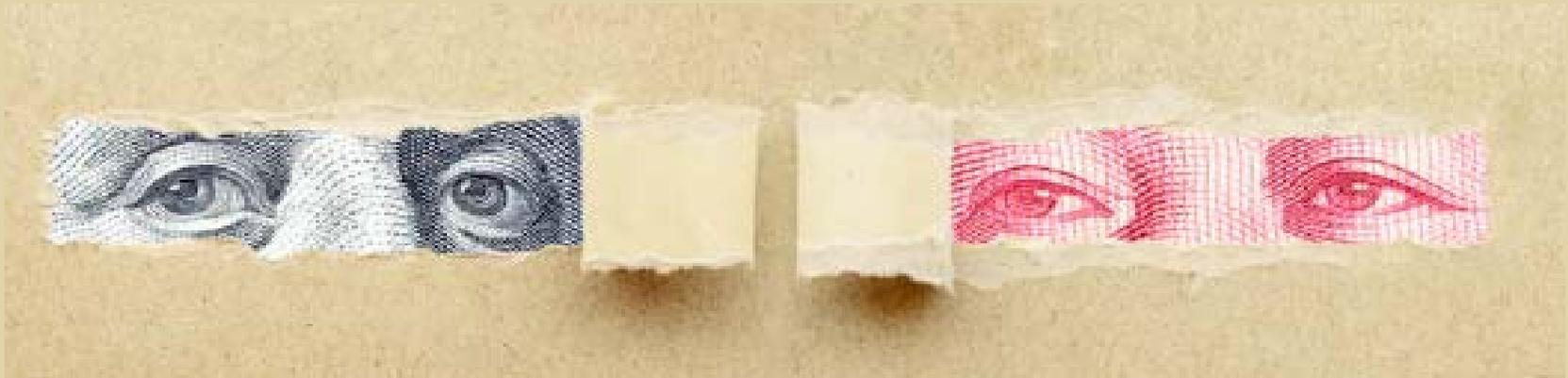
Tariffs

U.S. beef is being hit with retaliatory tariffs by Canada and China, which will raise prices to importers and send them shopping else where. Import tariffs on U.S. beef to Canada and China are top of mind for the U.S. beef industry.



Tariffs on Beef

Across the globe, China raised its 12 percent import tariff on U.S. beef to 37 percent on July 6. The tariff comes as the U.S. is just starting to make inroads into China's grain-finished beef market after being banned for 13 years.



Chinese Market

It's a small market, but U.S. beef was doing a good job in taking market share from competitors. U.S. exports grew at a steady pace from zero sales to \$30 million in sales in just six months.



Sales were Forecasted to Grow

The U.S. Meat Export Federation was forecasting those sales to grow to \$70 million in 2018 and reach up to \$400 million in three or four years. Without those restrictions, USMEF projects U.S. beef exports to China could reach \$4 billion annually in the next five years



Come to an Agreement

“We need our country and the Chinese government to come and find a way that both of our economies can mutually benefit in the long-term because the future of our economies are intertwined. ... We are two of the biggest economies in the world,” Kent Bacus, director of international trade and market access for National Cattlemen’s Beef Association said.



Not Happy with New Deal



USA CEO Bill Bullard says the new NAFTA agreement does not allow the U.S. to reinstate country-of-origin labeling (COOL) requirements for beef. That means that multinational packers can continue sourcing cheaper cattle and beef from Canada and Mexico and sell that beef to unsuspecting American consumers as a product of the United States.

Importing Live Cattle

He said the agreement contains the same rules of origin for cattle and beef as contained in the original NAFTA, as well as in the failed TPP agreement.

“Those rules allow Mexico to import live cattle from South America, slaughter them in Mexico, and then export the resulting beef duty-free to the U.S. where it can be mislabeled as a product of the United States,” Bullard said. “Even consumers abroad can receive USA labeled beef that is actually sourced from foreign cattle.”



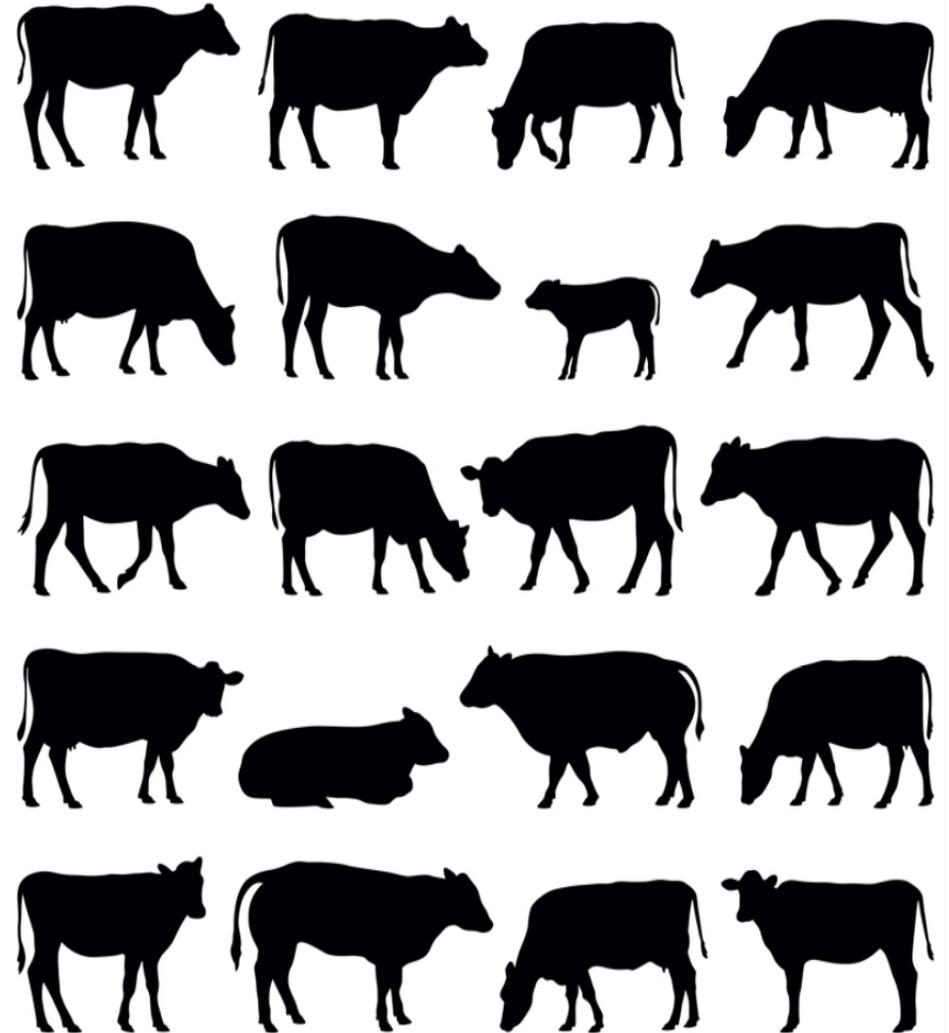
Unlimited Imports

“Every time our industry’s price-point is sufficient to signal an opportunity to strengthen and grow our industry, unlimited imports of cheaper cattle and undifferentiated beef enter the U.S. market and drive that price-point downward, thus eliminating opportunities for U.S. farmers and ranchers,” Bullard said.



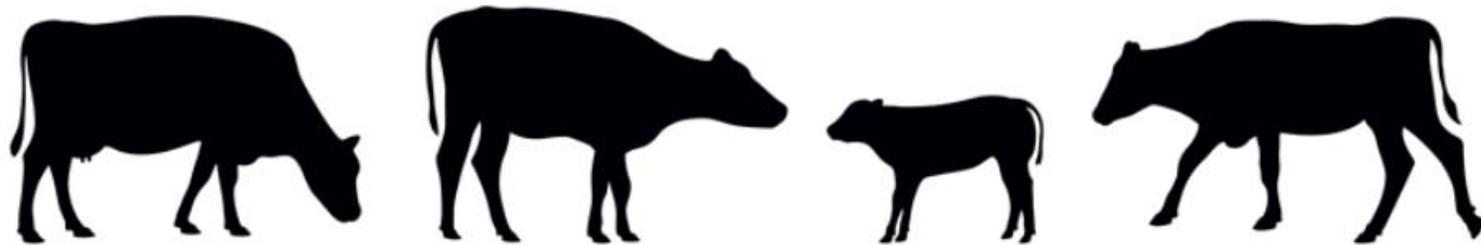
Two Million Cattle

Since NAFTA, the U.S. has imported on average over 2 million tariff-free Mexican and Canadian cattle each year.



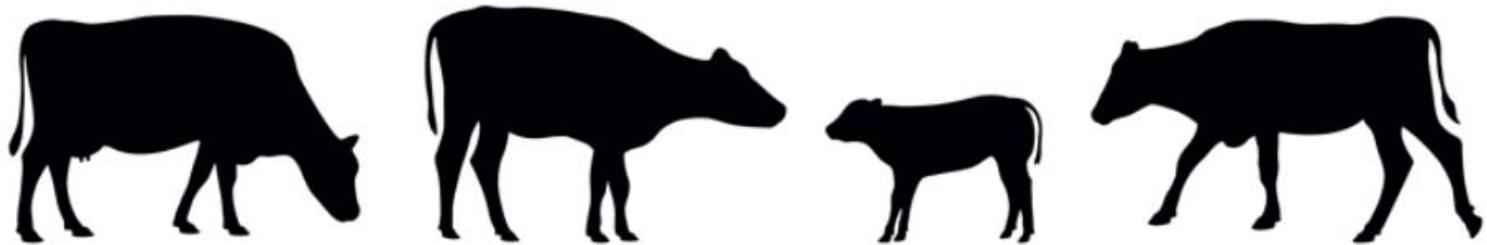
Produce Cattle in the US

“If we negotiated a trade agreement that allowed us to produce those cattle in America, our industry could support well over 6,000 new ranches, each with a 300-head herd size,” Bullard said. “Instead, our trade agreements continue to encourage both Canada and Mexico to overproduce.”



New Agreement

The U.S. domestic live cattle supply chain has decreased by 6.5 million domestic cattle since NAFTA and industry leaders worry will “worsen our industry’s downward trend.”



Before the Tariffs

An official with the Omaha beef production plant, which became the first American packer to ship beef to China when that market reopened last summer, says sales to the country are going well.

Jerry Wiggs is the senior director of export sales and marketing for Greater Omaha Packing Company. “Like any new market, it has its challenges,” Wiggs said. “However, if I do a comparison of where I was in the first eight months of, say, shipping to Europe, compared to where we are eight months into shipping beef to China, we are probably a 1,000% more...shipping into China than what we were into the European Union.”

Greater Omaha Packing Company

The Greater Omaha Packing Company processes around 2,300 head of cattle per day and employs over 1,000 people. The company ships beef to all 50 states and 70 countries around the world.



**GREATER
OMAHA**

Greater Omaha Packing

Greater Omaha Packing has also been making changes to its new cold storage building that doesn't rise quite as high as the neighboring 10-story, 1920s-era Livestock Exchange Building.

But at 86 feet tall (about eight stories), the new building is a sign that the neighborhood is still a busy hub of beef slaughter — and a lot more high-tech than in those old days.



New System

The new building will house a system of robotics and conveyors, controlled by software, to sort and store as many as 65,000 boxes of refrigerated beef cuts.



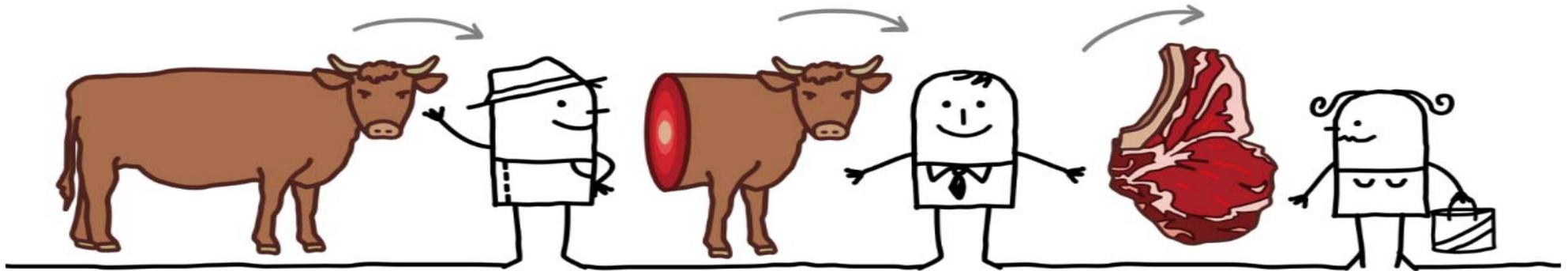
New Software

The software will track which of the company's 5,000 edible products is in each box, what it weighs and when it was packed, and it will make decisions about which box to ship at which time to maximize profit, Davis said. It's the next step in how Greater Omaha has shifted its business over the decades to do more processing in-house.



Smaller Portions

Decades ago, plants such as Greater Omaha's produced large sides and quarters of beef that weren't sliced up until they arrived at the supermarket, restaurant or distributor. Today, more customers want beef cuts that are individually portioned for the home cook or restaurant chef. That means a lot more, and smaller, boxes of beef to store and track right at the plant.



Smaller Packages

“The smaller the package that we make, the more value it is to our customers and the more profit it is for us,” said Henry Davis, president of the company.

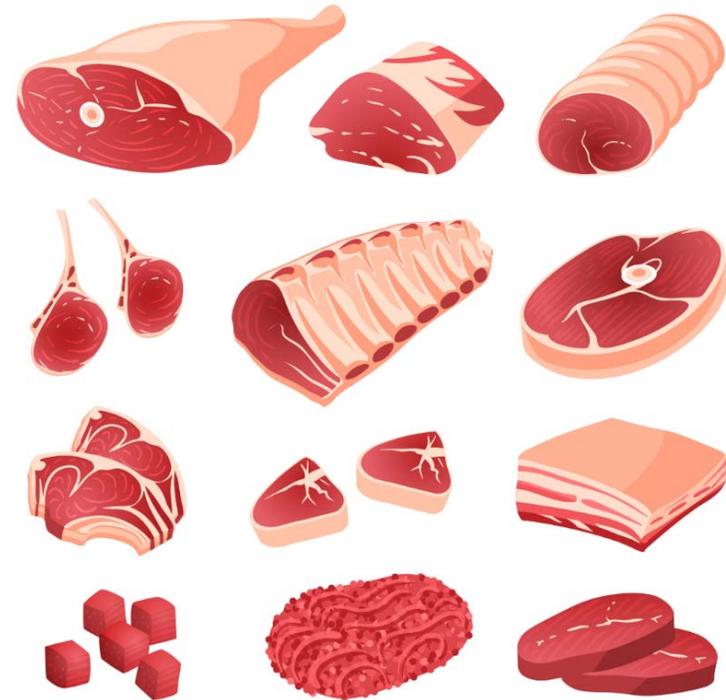


Value Added

The new addition will free up space elsewhere in the plant for the company to grow other product lines.

Production of “value-added” cuts will triple to about 300,000 pounds a week. Those are higher-end cuts individually sealed in special packaging that allows for longer shelf life and more international distribution.

And production of ground beef will nearly double, to about 1.1 million pounds a week.



Fifth Largest

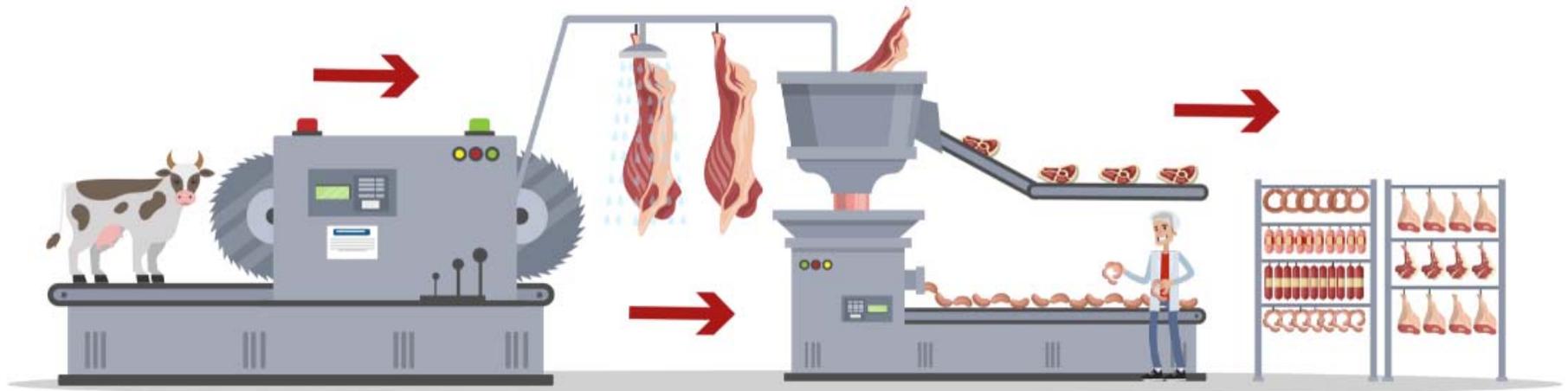
Greater Omaha, with \$1.7 billion in revenue, says it is the fifth-largest U.S. beef packer, behind only the “Big Four”: Tyson, Cargill, JBS, and National Beef.



**GREATER
OMAHA**

Livestock Processing Labor

The project also will free up 59 workers to be reassigned to other jobs — important at a time when livestock processing labor is hard to come by, because of low unemployment, industry growth and a chill in immigration.



Trend Towards Robotics

Greater Omaha's move fits in with a larger trend toward robotics in agriculture, seen in farm fields, dairy milking parlors, and food logistics systems.

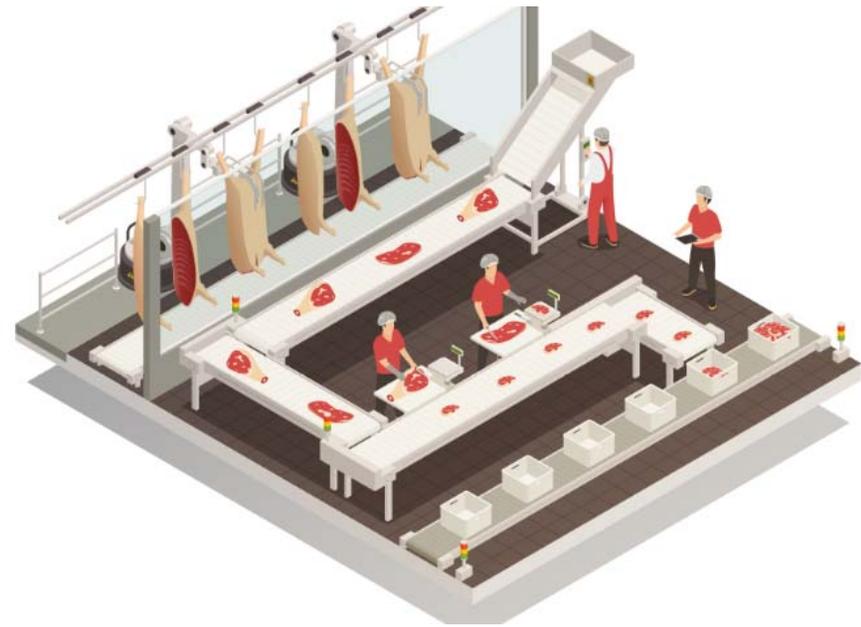
"As agriculture enters the era of farm labor scarcity, many agricultural producers are looking to smart technologies and robotics to help adapt their businesses to be more labor-efficient," said David Slaughter, professor of biological and agricultural engineering at the University of California, Davis.



Meat Packing Workers

Accurately breaking down a beef carcass is still too precise a job to be turned over to robots, because of the variance in size among large livestock, Davis said.

But other tasks can be mechanized. Meanwhile, Greater Omaha will hire 10 to 12 technicians to operate the new cold storage system and software. The plant employs about 1,150 people total.





Middle Class of China Growing

There is great potential for U.S. beef in China because of its growing middle-class population.

Cargill working with buyers in Asia

Agribusiness Cargill is working with cattle suppliers and with buyers in Asia to determine how it could meet the needs of Chinese customers and China's restrictions.

"Based on our knowledge of the agreement, as well as our knowledge of the U.S. beef supply chain, only a small percentage of the total U.S. cattle supply will be eligible for beef products that are exported to China," said Mike Martin, a spokesman for the Minnesota company. Cargill processes 5,000 head of cattle daily at a plant in Schuyler, Nebraska, sourced from the surrounding area.



Chinese Have Tighter Rules

China is expected to have tighter rules than some of the United States' other trade partners.

The extra costs of raising beef to China's expected specifications might add up to \$150 per animal, estimated John Butler, chief executive officer of Beef Marketing Group, a Manhattan, Kansas, company that operates six feedlots in Nebraska and 12 in Kansas, with a total of about 325,000 cattle.



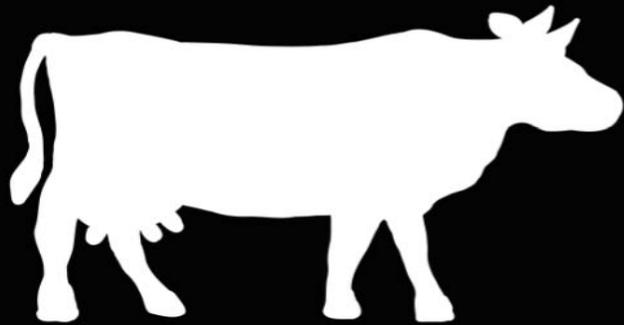
Traceability System

The costs would come in part from the expense of a traceability system, so buyers could track individual cattle to their place of birth. That's one of the demands China is likely to place on imports, according to news reports, analysts and industry leaders.



Hormones

There are also extra costs in raising cattle without two types of growth promoters commonly use in the United States: hormone implants and non-hormonal feed additives called beta-agonists. China will likely test beef for residue of those. While their use wouldn't be explicitly banned, beef would have to be free of any traces. Butler said for his business it wouldn't be worth the risk of a positive test, which could shut down shipments



Stumbling Block

James Timmerman, chief financial officer for Nebraska Beef in Omaha, said restrictions on tracing cattle to the ranch of origin would be a “stumbling block.” His plant doesn’t currently export to countries that require traceability back to the farm or ranch where the animal was born.



Grass Fed Beef

Most beef imported into China is grass-fed or a cheap “commodity” quality beef, with a different taste and texture from the primarily grain-fattened American cattle, said Don Close, animal protein analyst at Rabobank.



Grass Fed Cheaper than Grain Fed

“To immediately assume that there will be this massive demand for high-quality fed beef? That’s the unknown.”

It could take time for Chinese consumers to develop a taste for the new product, he said. Many may not be able to afford it. Unlike in the U.S., grass-fed beef is cheaper in China than grain-fed.



Chinese In Home Beef Preparation

Chinese home cooks are unfamiliar with how to prepare beef — most is served at restaurants, and there will be a learning curve for consumers. U.S. packers also will need to prepare to sell to a market where the fastest-growing channel for selling meat products is e-commerce through online giant Alibaba.



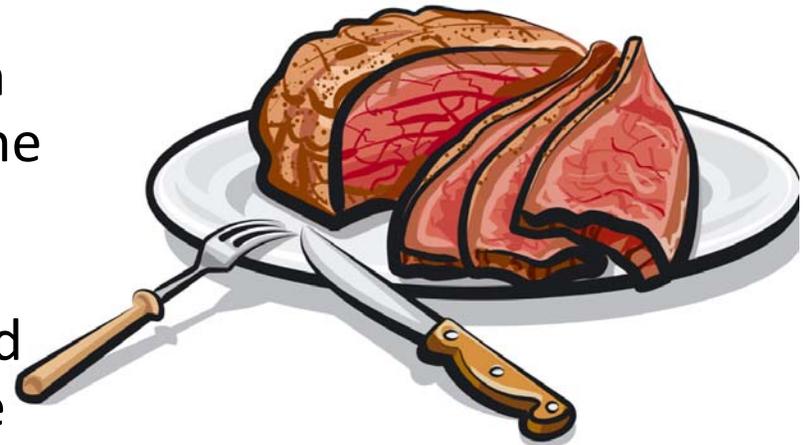
Cold Storage Surplus

Growing surpluses of red meat and poultry in cold storage raises anxiety for the U.S. meat industry that increasingly depends on exports. Such concern has increased as Mexico and China – among the largest buyers of U.S. meat – have imposed tariffs on U.S. pork in response to U.S. tariffs on steel, aluminum, and other goods.



How Much Meat We Eat

Any reduction in U.S. beef, pork and poultry exports would come at a time when production of all red meat and poultry is on the rise. Americans are expected to consume 222 pounds of red meat and poultry on average in 2018, the largest total in more than a decade. A reduction in exports would put even more red meat and poultry on the U.S. market, pushing prices lower on all products.

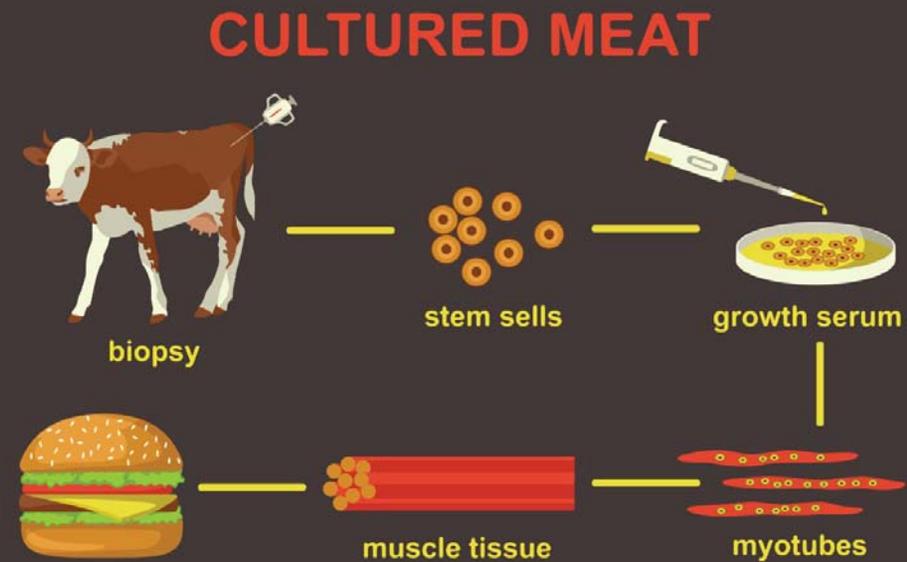


Top biggest meat processing companies

- 1. Tyson Foods, Inc.: \$33.30 billion, 115,000 employees, 84 plants, Dakota City, Madison, Columbus, Lexington, Omaha.
- 2. JBS USA: \$31.30 billion, 61,659 employees, 47 plants, Grand Island and Omaha.
- 3. Cargill Meat Solutions: \$18 billion, 35,000 employees, 33 plants, Nebraska City, Schuyler, Columbus.
- 4. Smithfield Foods Inc.: \$13.09 billion, 46,050 employees, 40 plants, Lincoln, Omaha, Crete.
- 5. Sysco Corp.: \$11.8 billion, NA, operates in Lincoln.
- 6. ConAgra Foods Inc.: \$8.2 billion, employee and plant counts not available, based in Omaha. (Based on sales, 6 and 7 are tied)
- 7. Hormel Foods Corp.: \$8.2 billion, 19,700 employees, 42 plants, Fremont.
- 8. National Beef Packing Co. LLC: \$6.80 billion, 9000 employees, 6 plants, owned in part by Nebraska farmers and ranchers.
- 9. Keystone Foods, LLC: \$6.3 billion, 7,075 employees, 13 plants.
- 10. OSI Group: \$5.9 billion, 19,400 employees, 46 plants.

Cultured Meat

A future where lab-grown and plant-based “meat” is also mainstream may not be that far off. Expect to hear a lot about alternative meats in 2018: The industry is at a turning point thanks to investment from big names like Bill Gates, and big food companies like Tyson and Cargill.



Technology Expected to Disrupt

“Technology will begin to disrupt the traditional food chain in 2018 as enterprising manufacturers aim to replace farms and factories with laboratories,” market research company Mintel said in its recent annual food and drink trends report.



Plant Based

Plant-based versions of familiar foods such as burgers and chicken strips are already available at some Midwestern supermarkets and restaurants. Food scientists process plant proteins to imitate real meat in ways that the smashed-bean veggie burgers of the '90s never did.



New Type of Meat

“This is a new type of meat that can really change the world,” said Nick Halla, chief strategy officer for Impossible Foods.

The company makes the Impossible Burger, a patty sold in restaurants that looks and cooks much like a beef hamburger. Impossible credits its “heme” soy protein ingredient for its meaty taste and red color.

Meet the
**IMPOSSIBLE
BURGER!***



**Made entirely of plants!*

Beyond Meat Investor

Beyond Meat investor Tyson Foods — a major employer in Nebraska, with plants in Omaha, Lexington, Dakota City, and Madison — said plant protein burgers fit in with the company's portfolio of protein-centric products and will help Tyson meet growing global demand for protein.

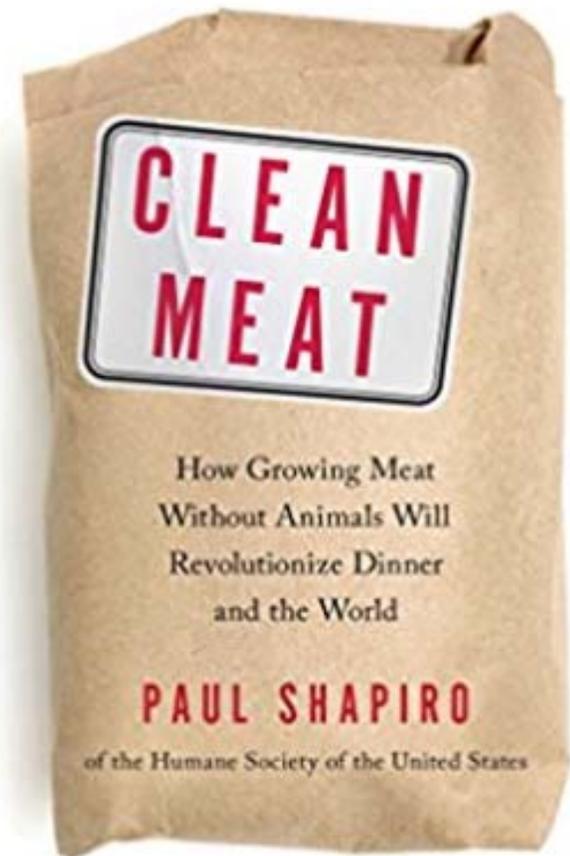


Tyson Foods, Inc.

Clean Meat

On the lab-grown meat side, companies including Hampton Creek and Memphis Meats are racing to commercialize their versions, said Paul Shapiro, a former vice president at the Humane Society of the United States and the author of a new book, “Clean Meat,” that chronicles these businesses and their investors.

“Read Paul Shapiro’s compelling and optimistic book.”
-ERIC SCHMIDT, Executive Chairman of Alphabet, Google’s parent company

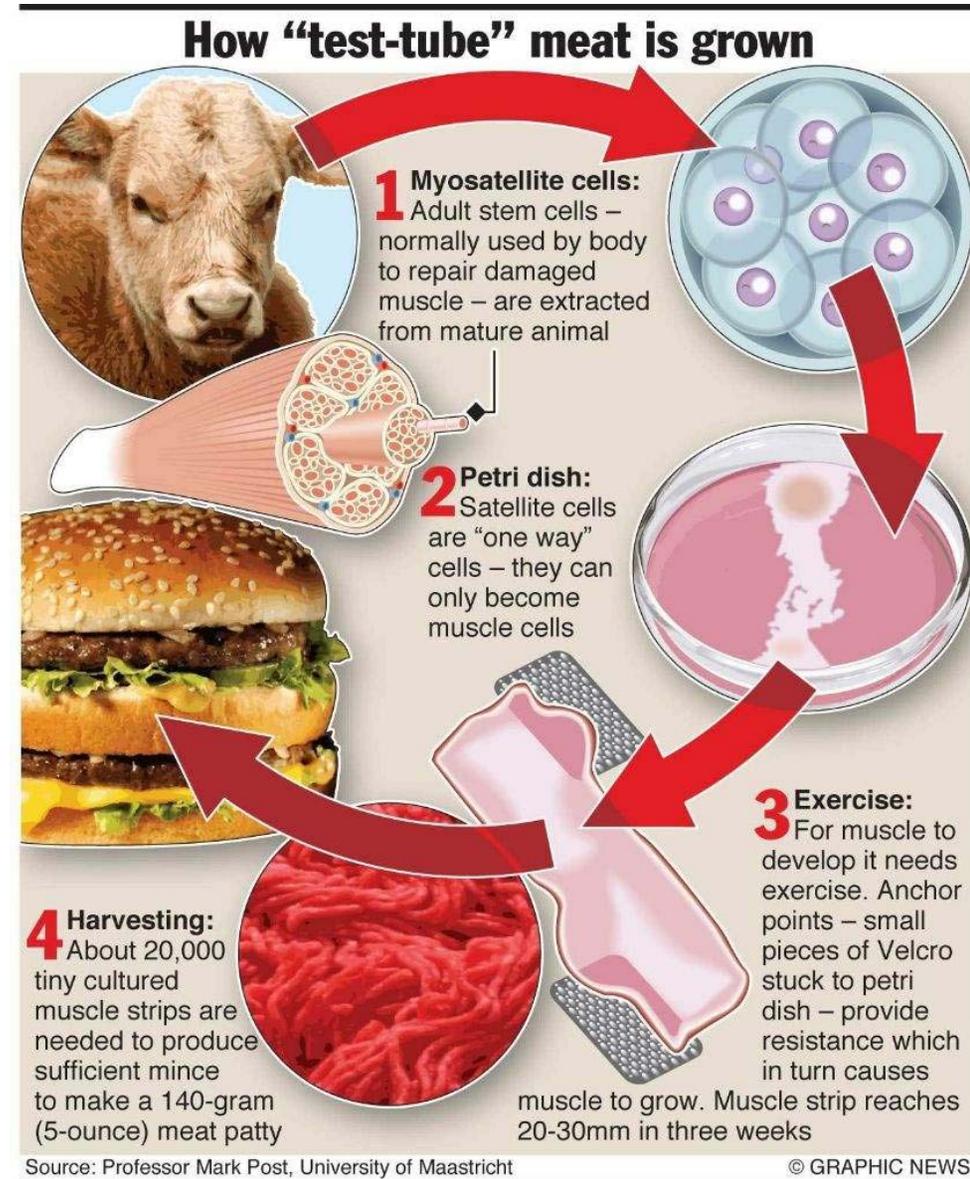


With a foreword by Yuval Noah Harari, author of *Sapiens*

A Few Years

Hampton Creek says its product will be sold in restaurants later this year. Memphis Meats says it will be a few years. Cost is a barrier.

According to the companies these are not alternatives to meat, they are actual animal meats, simply grown with fewer resources than we use to produce animal meats today. Its backers liken it to “clean energy.”



Another Investor

“There’s a reason Cargill is investing in this — it recognizes that the future of protein production doesn’t have to come out of live animals,” Shapiro said. The Minnesota-based agribusiness, with meat processing plants in Nebraska, is an investor in Memphis Meats.



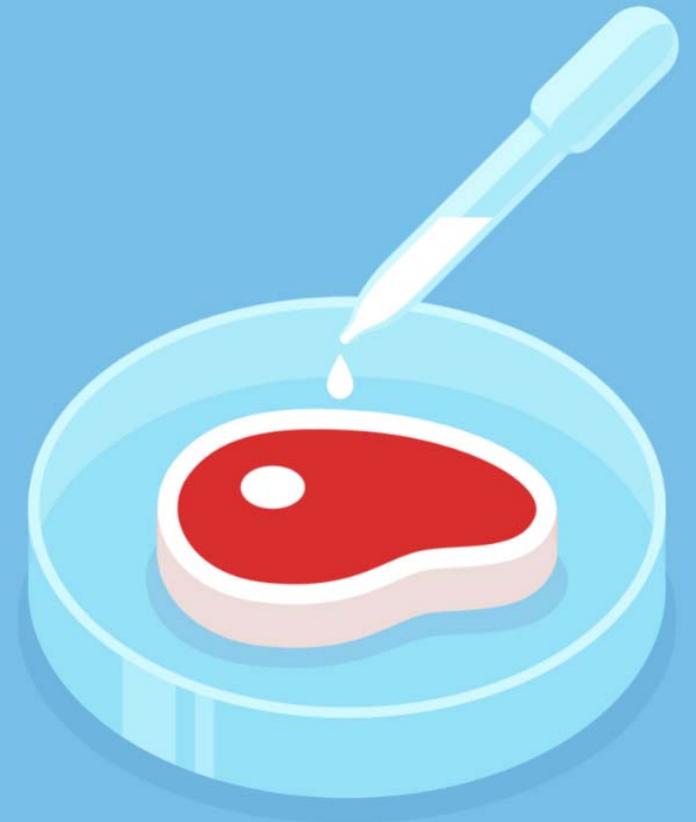
Meat From a Tank

Of course, it remains to be seen whether consumers will want to eat meat from a tank. And Cargill says it is still investing plenty in its livestock-based protein business, noting \$850 million spent in the past two years on acquisitions, plant expansions, and renovations, and new facilities.



Cultured Meat

“We believe consumers will continue to crave meat, and our goal is to bring it to the table in a safe, responsible and sustainable way,” said Sonya Roberts, president of growth ventures for Cargill Protein. “Cultured protein products will provide greater choice and help meet the needs of those consumers who seek options.”



Milk Consumption

Advocates for lab-grown meat point to the milk aisle to illustrate how quickly new products can put a squeeze on conventional ones.

Cow's milk has been losing shelf space and sales to competitors like soy milk, almond milk, and newer pea-protein milks.

Sales of dairy milk will continue to fall, market research company Mintel said. Mintel forecasts dairy milk sales to fall 11 percent between 2015 and 2020, to \$15.9 billion. Meanwhile, U.S. sales of non-dairy milk will grow by about 50 percent, to \$3 billion.





Milk Production Growing

Ironically, total U.S. milk production has been growing. Americans are passing on milk but eating more yogurt, butter, and cheese. Similarly, if consumers replace burgers with plant matter, they still may order up real-beef steaks.

Bite Out of Sales

If the new products do take a bite out of meat sales, Nebraska could be vulnerable, its economy relying on a livestock industry that employs tens of thousands of people in a labor force of 1 million.



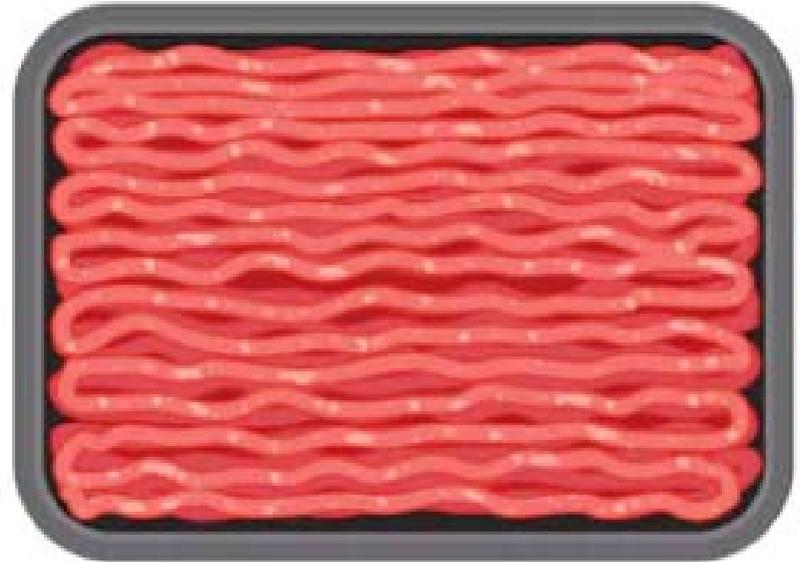
Not Just Yet

Still, the advice to farmers is don't sell your herd just yet. A pair of recent reports, from ag lenders CoBank and Rabobank, conclude that the new meat alternatives aren't going to make a significant dent in demand for meat, at least not anytime soon.



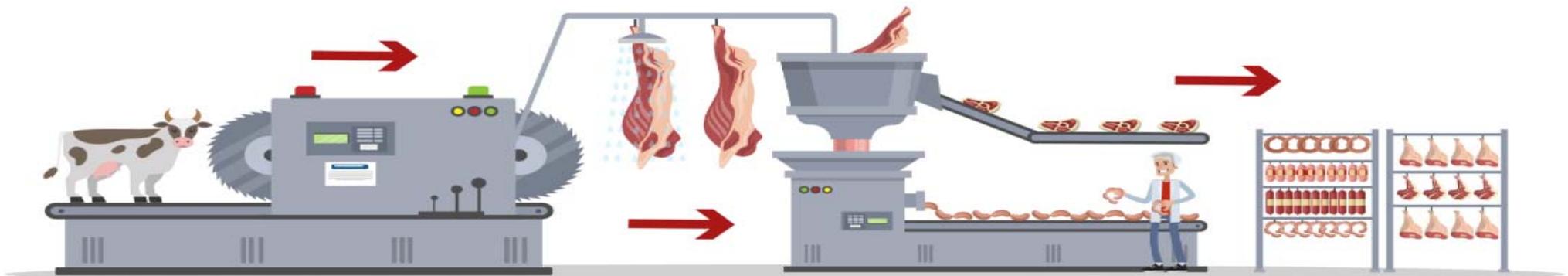
Biggest Supplier

On any given Monday, America's biggest supplier of ground beef has 1,000 jobs unfilled, pushing Cargill Inc. to aggressively sweeten the pot on benefits to retain existing workers and hire new ones.



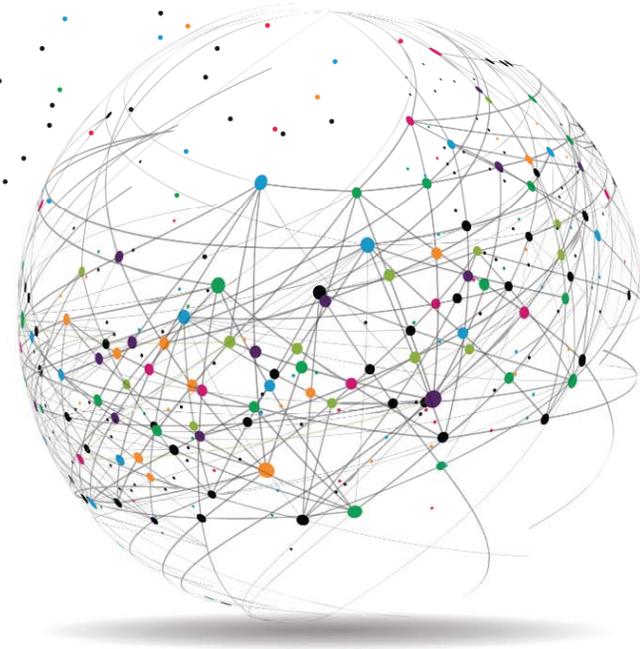
Openings in Meatpacker Jobs

The openings, largely at the meatpacker level, are the result of the Trump administration's tough stand on immigration and a U.S. unemployment rate reaching decade lows. While the number represents less than 1% of Cargill's work force, the shortage is slowing output and hindering production of new higher-margin products, executives say.



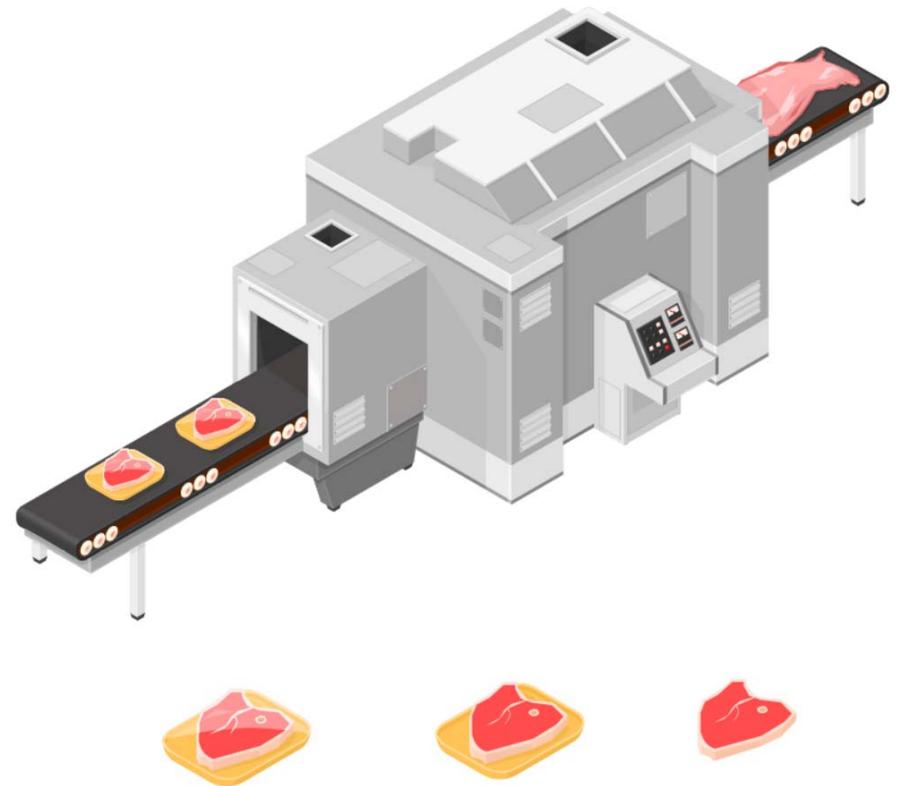
Global Demand

With global demand for meat rising in a robust economy, Cargill and other industry leaders say the need to expand gives them little choice but to boost worker benefits -- with added pay in some cases, as well as new housing, health care, and busing incentives.



Continued Growth

Companies are adding plants, but “whether or not they can run those plants efficiently is kind of a jump ball,” Christine McCracken, New York-based analyst for Rabobank International, said by telephone. “What we’re seeing today doesn’t indicate that they’ll be able to fully ramp up production.”



Recruiting Workers

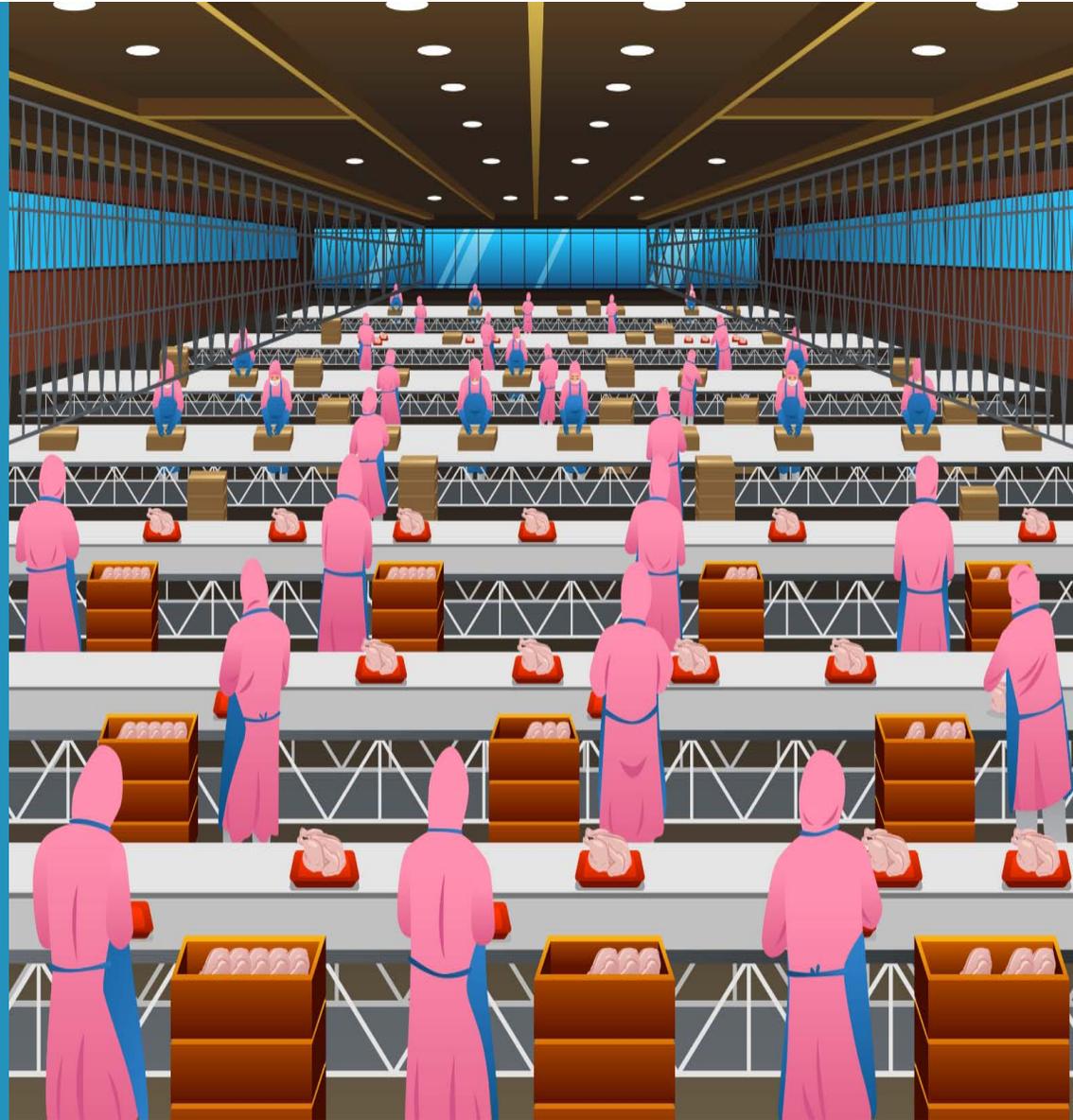
“Recruiting and retaining qualified workers in the meat and poultry processing industries was always difficult,” wrote in a note in July. “But it is now a perpetual grind.”



WE
NEED
YOU

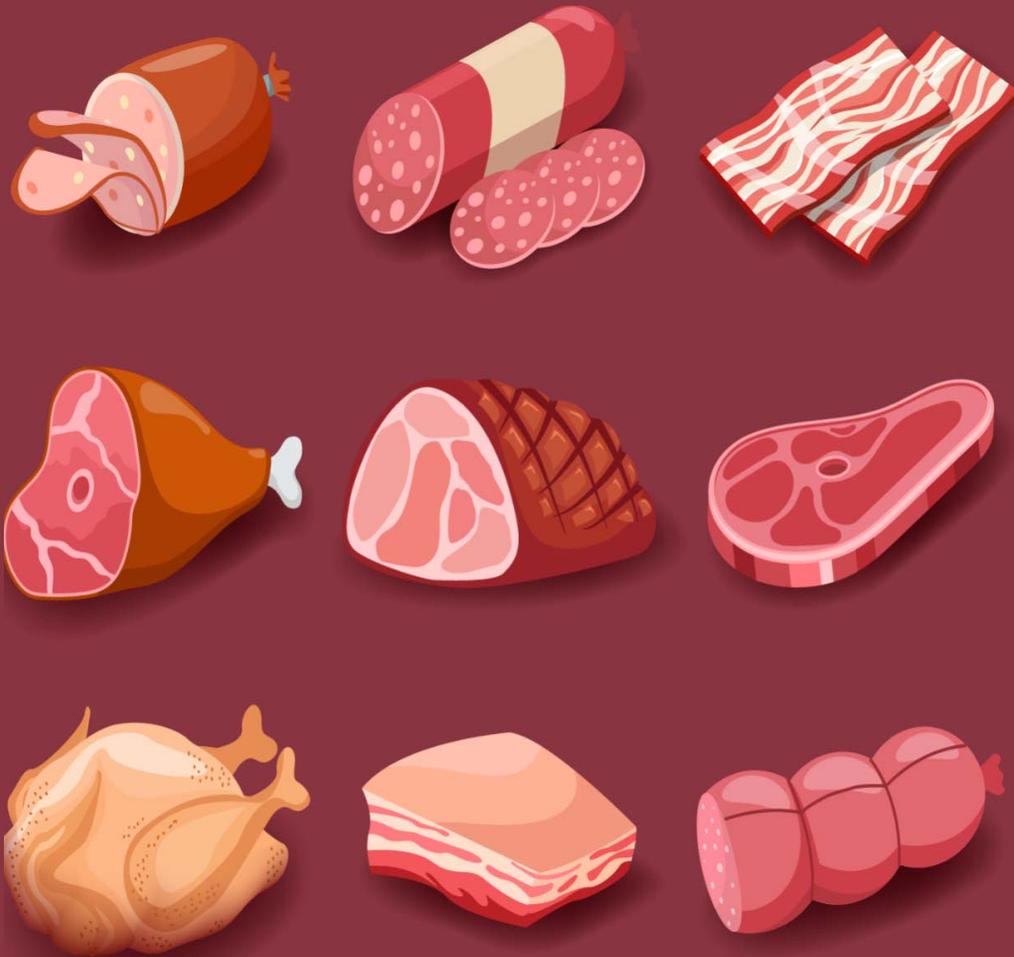
Tight Labor Conditions

In its August 2018 earnings call, Pilgrim's Pride Corp., the second-largest U.S. chicken company, said it expects tight labor conditions "will govern the pace of industry capacity additions in the near to mid-term."



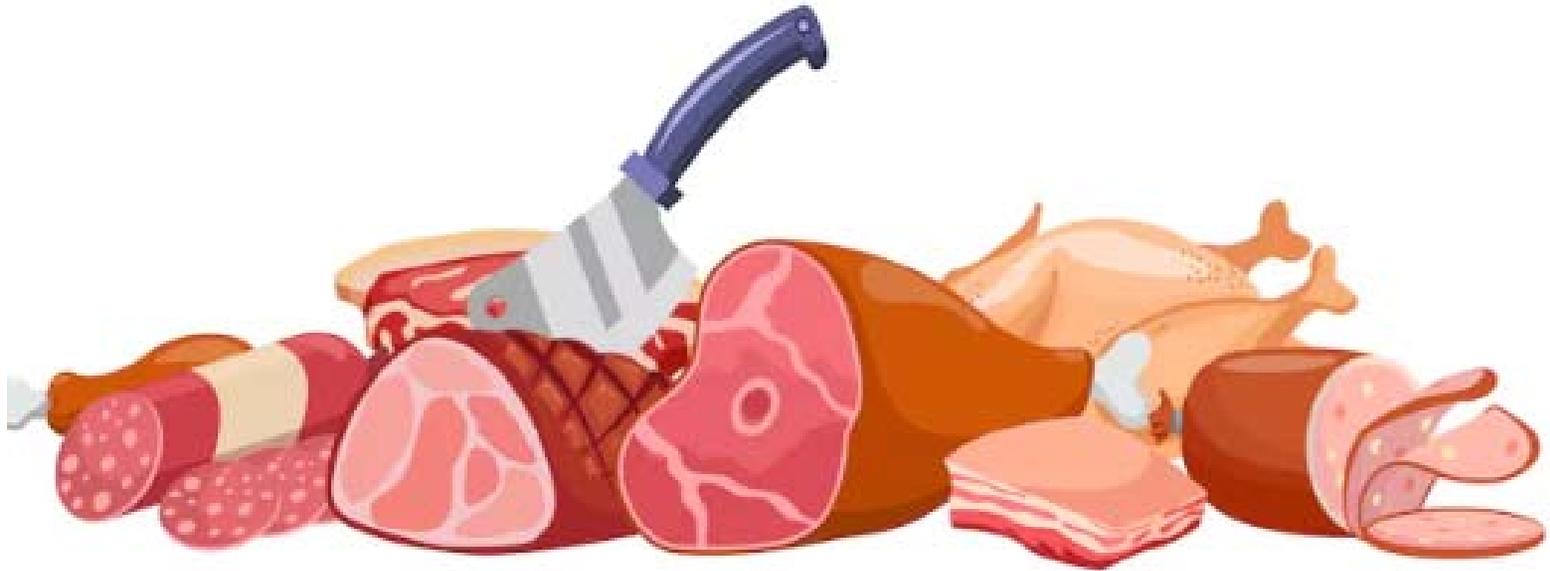
Glut of Meat

While consumers haven't yet been affected with a glut of meat still available, the unfilled jobs are preventing Cargill from producing higher-margin meat products, according to Brian Sikes, the agribusiness giant's head of protein.



Value Added Not Possible

The unfilled jobs mean “we can’t do some value-added activities that we might get paid more for at the end of the line because we don’t have the staff.” Sikes said in an interview at his Wichita Kansas office.



Automation and Robotics

Companies are experimenting with automation and robotics. For instance, Cargill has robots that stack boxes. But the progress is slow and expensive and, in the meantime, the company has had to be “creative” with incentives to draw new meatpackers.



Imports and Exports of Beef

One of the interesting trade events this year is that while U.S. beef exports are growing, so are U.S. beef imports. U.S. imports are up in 2018 compared to 2017, 1.23 billion pounds versus 1.21 billion pounds. When comparing 2018 and 2017 numbers from our normal import partners, the U.S. is importing less from Mexico by about 40 million pounds. But, the U.S. has found more beef from Canada, New Zealand, and Nicaragua.

Ground Beef is the Key

Why do we both export and import such large amounts of beef? The key is that all beef is not the same. We export high value and low value cuts of beef, steaks for example. Most of our imports are trimmings to make more ground beef. The industry doesn't have enough cull cows and lean beef to make all the ground beef that consumers want to buy.



Net Exports

On balance, net exports (exports minus imports) have totaled 20.6 million pounds in 2018 so far, which is a big improvement from 2017's -121 million pounds during the same span. This big swing for the U.S. in the world market has been driven by South Korea. South Korea's beef import from the U.S. is up by 69.5 million pounds in 2018 compared to 2017.

