

America's Corn Model Feeding Us Lies

October 2020

Z

ea Mays. Also known as corn, maize, tesonite, and grain, the ancient kernel has been passed down many centuries, being genetically modified and grown to peoples' demands. Over the last 200 years in American History, the convergence of mass corn crop production and the average American lifestyle have become too intertwined, making the American public blind to the impenetrable market corn has become, created equally by the government and individual farms. Human industry may have been in full swing for over a century now, but as a resultant, there has been a decline in almost every ecosystem on the planet. As Micheal Braungart states in Cradle to Cradle, "Nature doesn't have a design problem. People do." Within this atlas, major topics like distribution, production, consumption, and waste of the American Corn Belt will be highlighted, drawing attention to the unsustainable and harmful system we have created within the last 200 years. Even though The United States of America has designed the corn market to keep growing exponentially, there may be a way to squander the destructive and harmful business that is the American corn belt system today.

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P

roduction Pg. 18 - 29

C

onsumption Pg. 30 - 43

W

aste Pg. 44 - 51

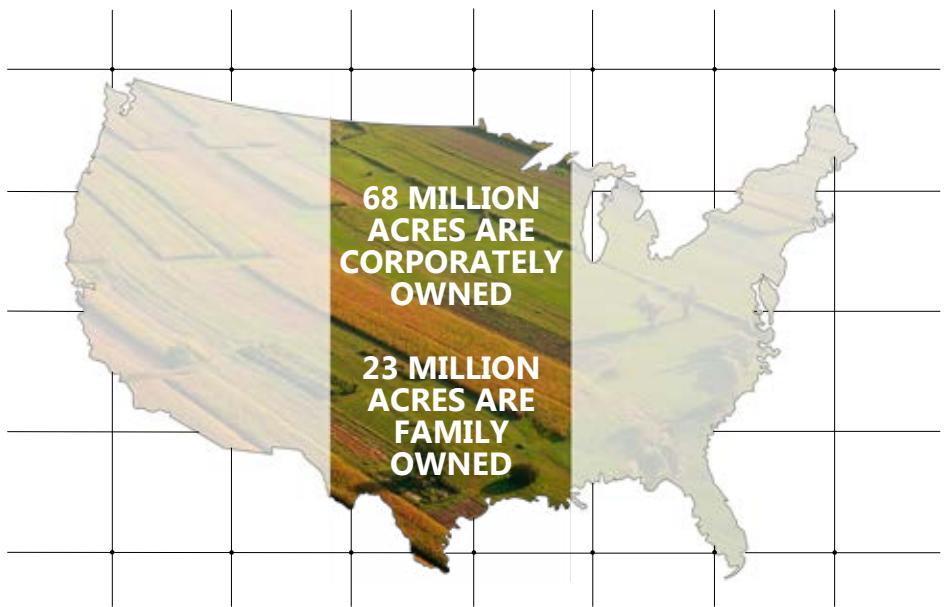
D

istribution of corn and its products throughout the United States is unsustainable and harmful to the national footprint of the crop and its presence in the average American lifestyle. Presently, America uses multiple transportation methods like semi trucks, railways, and even barges to divert our corn surpluses across the nation. The largest city consumers of corn and their communities may not be adjacent to the United States Corn Belt, therefore the farmers must deliver their crop to the major production plants and cities in which they can be transformed and consumed by the general public.



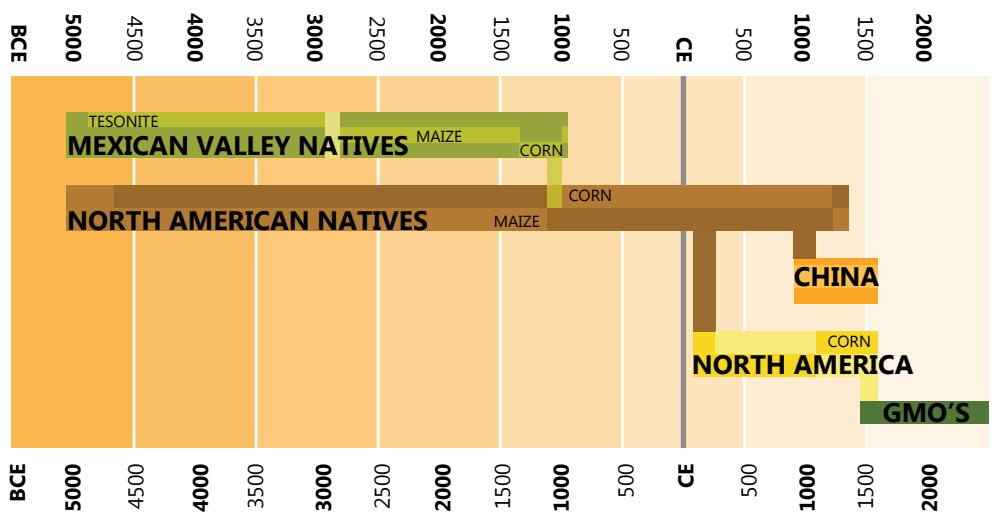
CORPORATE V FAMILY OWNERSHIP:

WHAT THE UNITED STATES CORN BELT LOOKS LIKE



ZEA MAYS: KNOWN HISTORY

EVOLUTIONARY HISTORY



THE UNITED STATES CORN BELT: AN IMPACTFUL YESTERDAY & HOPEFUL TOMORROW

DISTRIBUTION

DISTRIBUTION



Man-powered machines are in high demand due to the lack of true engineering feats thus far in history



Steam powered plowing engines introduced to American corn farms



Combined harvesting, cleaning, and threshing introduced in corn fields



Transcontinental Railroad is completed for the mass transport of crops, goods, and even people



Affordability of steam tractors is much more feasible for smaller farms



Advances in machinery included John Deere founding his notorious company in the early 1910's



The Great Depression sent many families and corn businesses into a state of disarray and unemployment

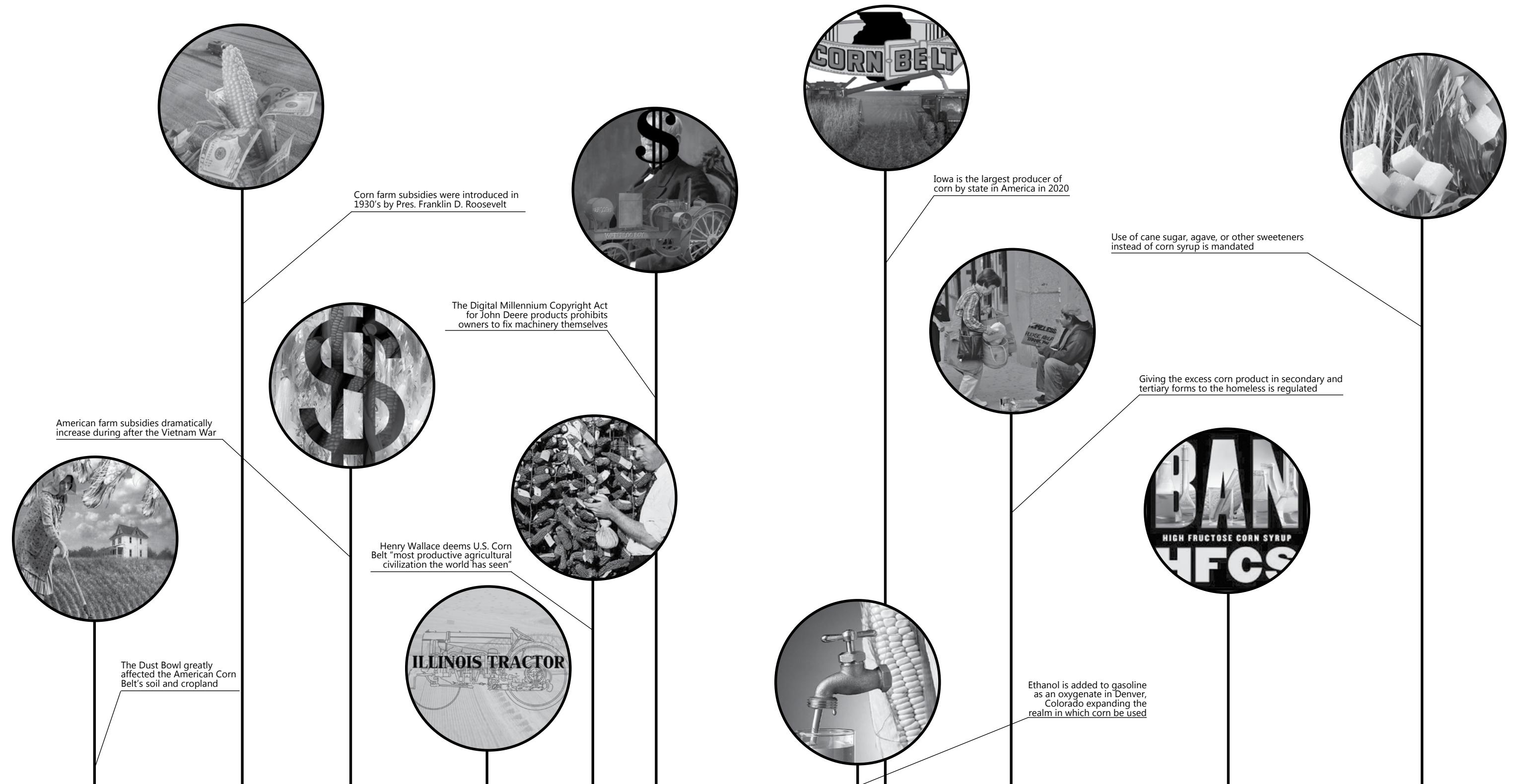
1820

1845

1870

1895

1920



1945

1970

1995

2020

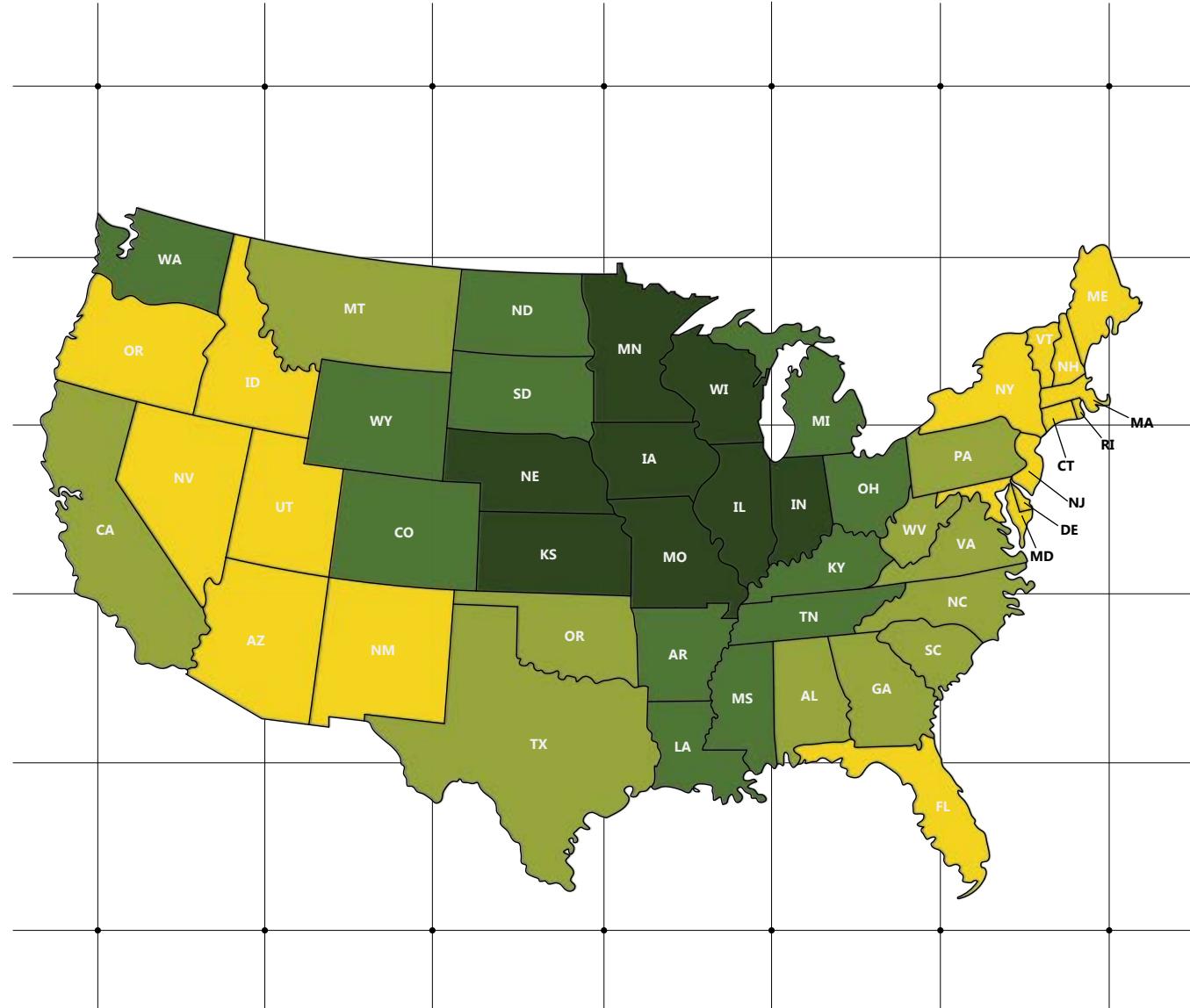
2045

2070

UNITED STATES CORN BELT:

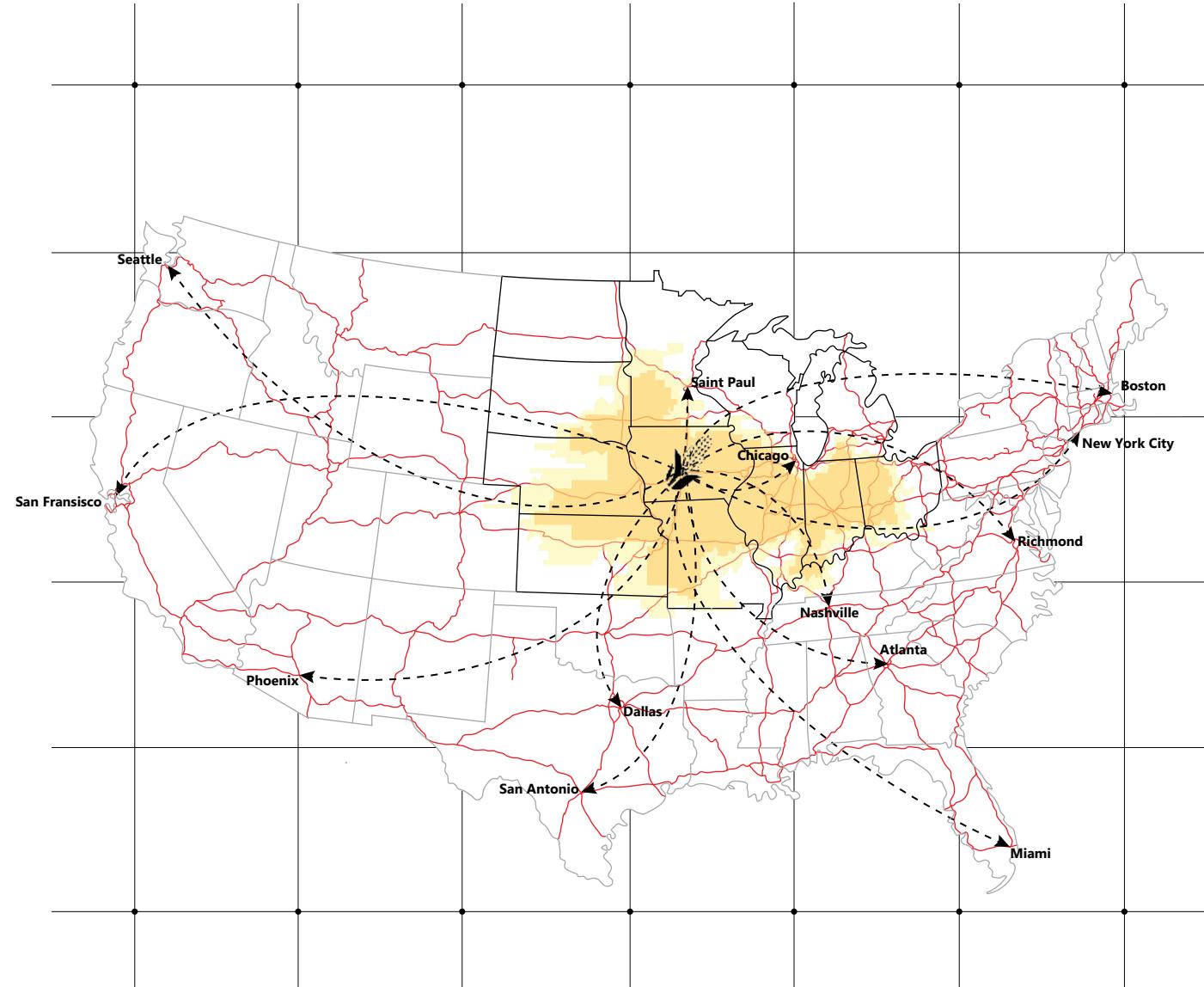
LARGEST CORN PRODUCERS BY STATE

- 2.5 BILLION - 1 MILLION
- 1 MILLION - 500 THOUSAND
- 500 THOUSAND - 100 THOUSAND
- 100 THOUSAND - 0

**UNITED STATES CORN BELT:**

LARGEST CITY CONSUMERS

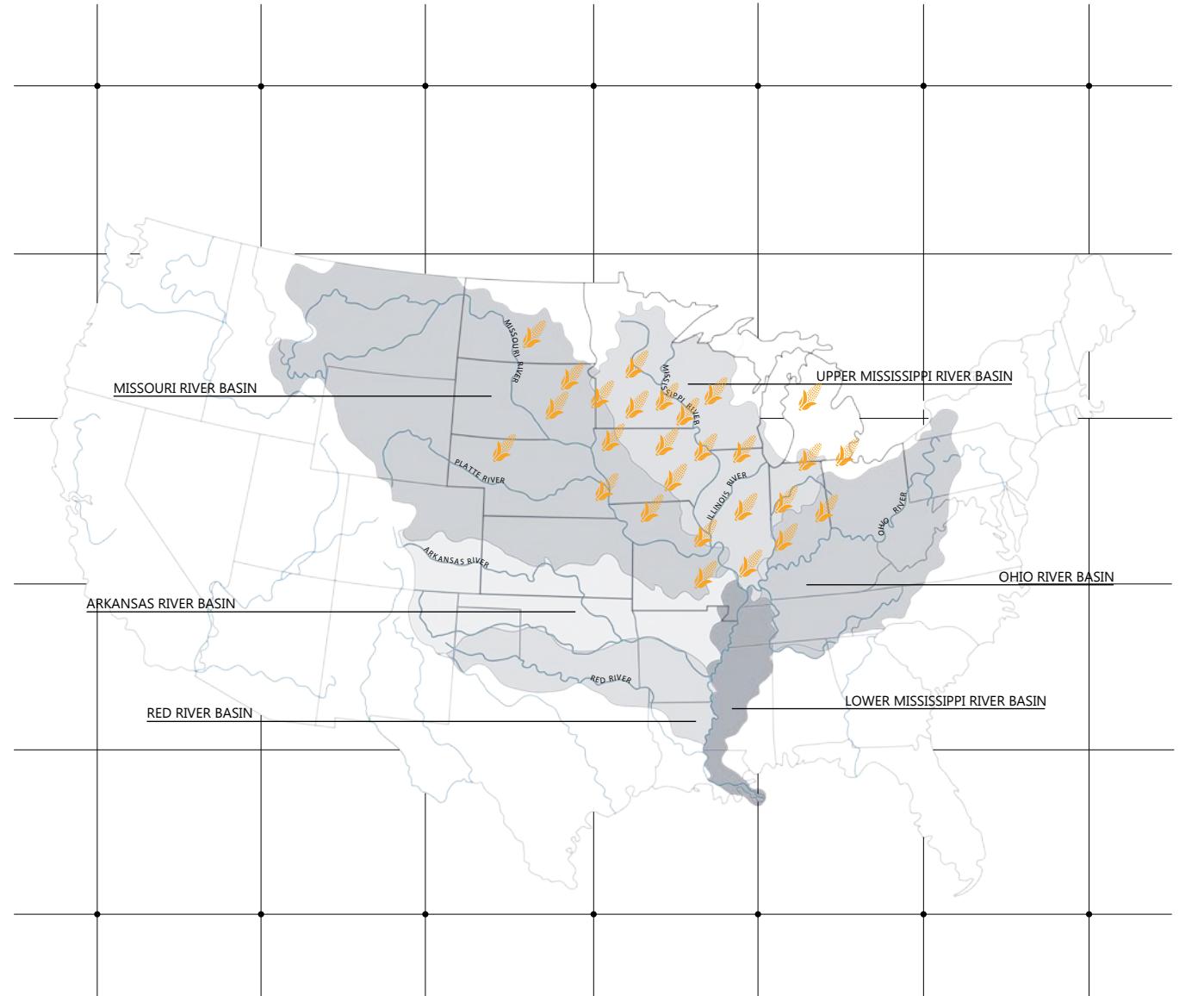
- MAJOR INTERSTATE HIGHWAY
- DENSE PRODUCTION
- PARALLEL DENSE PRODUCTION



The **American Corn Belt** is a particular region of the Midwestern United States that has dominated the corn production market since the 1850's and continues to today. The corn belt is not defined by definite boundaries, but instead is characterized by **level land, fertile soil, and high organic soil concentration**. The American corn belt often includes Iowa, Illinois, Indiana, Michigan, Ohio, Nebraska, Kansas, Minnesota, Ohio, and Missouri.

UNITED STATES CORN BELT:

RIVER BASIN ADJACENCY



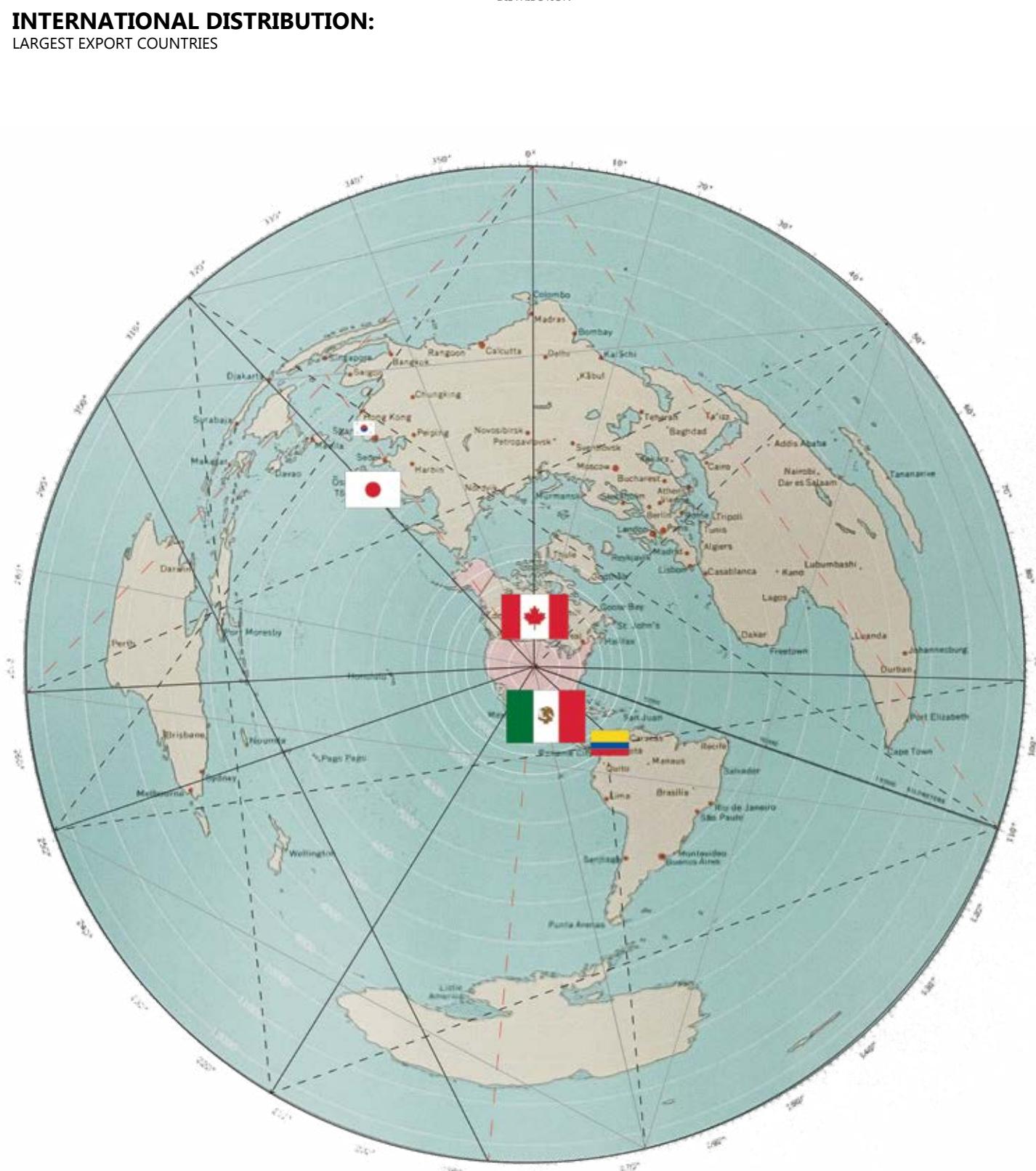
Most of America's corn farms are adjacent to **river basins** and flood zones, allowing a **plethora** of water to be accessible to the farmer and their crop. On average, corn takes **20"** to **30"** of water per plant to grow **successfully** and produce the **maximum yield of fruit**. The parallel of corn crop to water source is key due to the **myriad of water** it takes of the average corn plant to grow successfully.



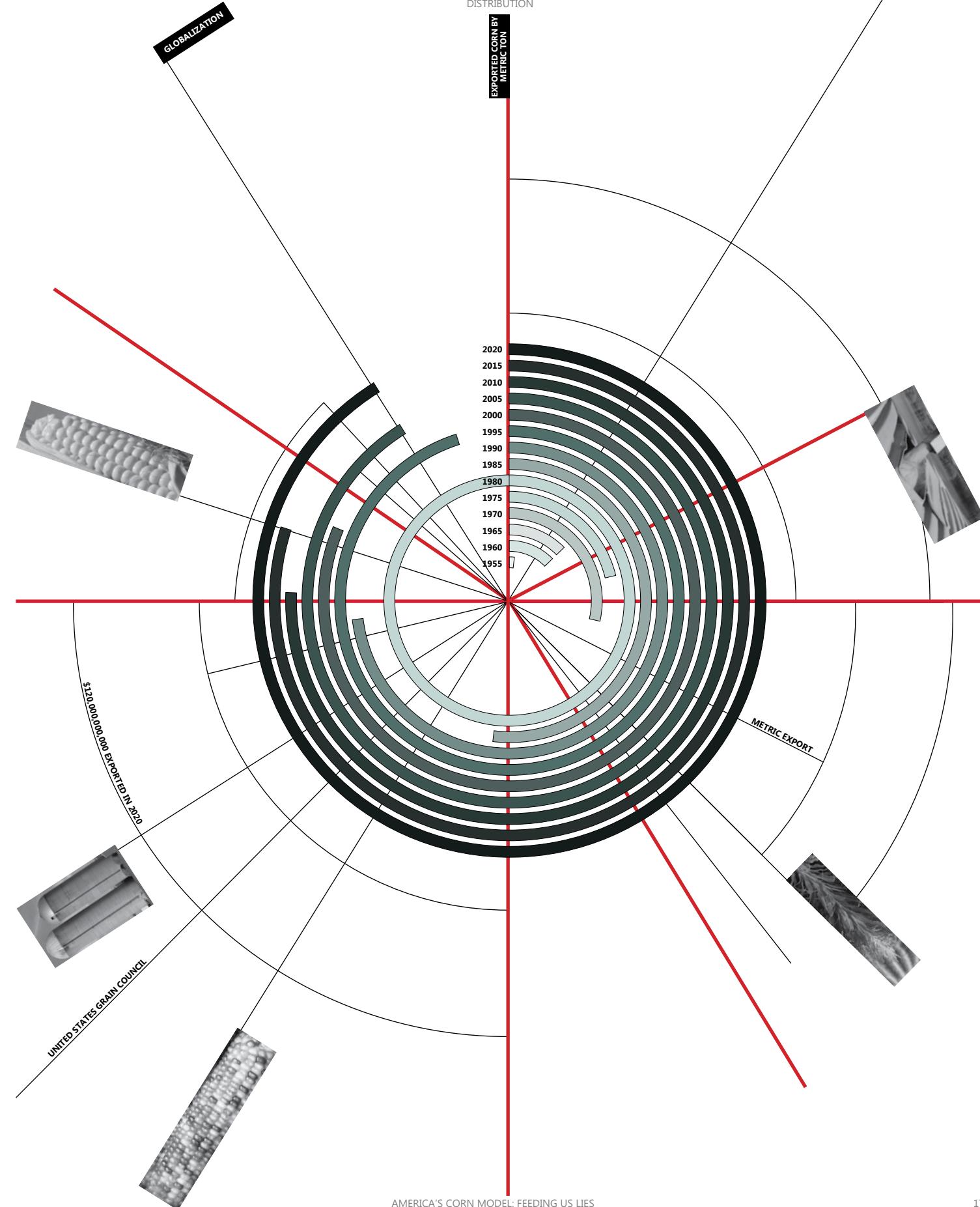
INTERNATIONAL DISTRIBUTION:

LARGEST EXPORT COUNTRIES

DISTRIBUTION



DISTRIBUTION



The **American Corn Belt** began major distribution practices after World War Two, where concentration towards mass farming and production was pushed by economic sources and subsidy efforts. By 1950, the United States partnered with the **World Trade Organization** to supply European countries and Asiatic countries with corn and other various corn-based products.

Net farm income across the United States Corn Belt has been at an all-time high for the last five years, and is continuing to rise in both production and sales to other countries. As for 2019's average profit, there has been **two billion dollar increase for 2020** across American Corn Belt net profits. To the left are the amounts (**per metric ton**) of corn traded internationally from the United States of America.



PRODUCTION

CORN PRODUCTION:

1876 - 1880 COUNTY AVERAGE

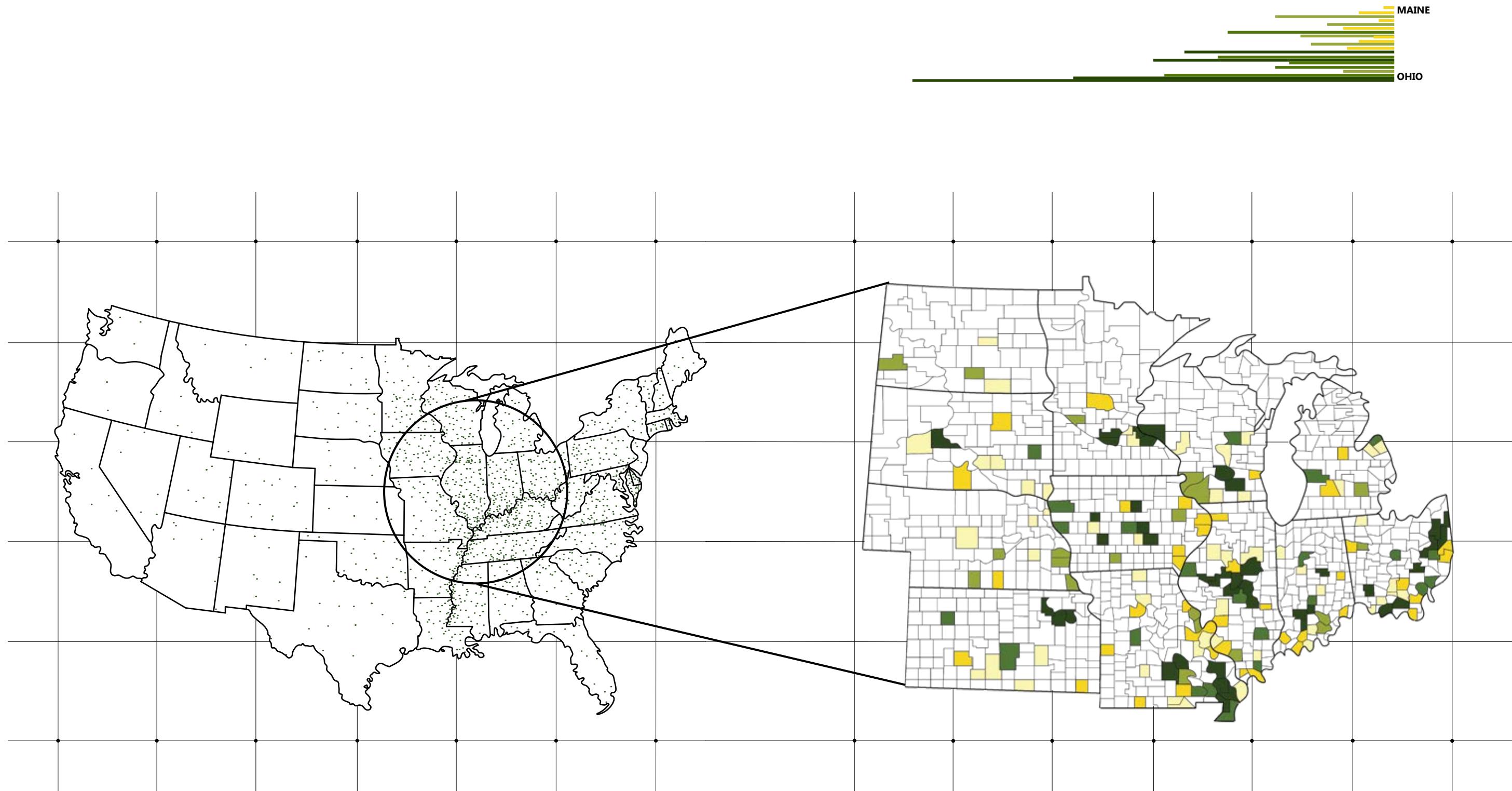
- 20 MILLION + BUSHELS
- 20 MILLION - 15 MILLION BUSHELS
- 15 MILLION - 10 MILLION BUSHELS
- 10 MILLION - 5 MILLION BUSHELS
- 5 MILLION - 0 BUSHELS

PRODUCTION

FARMLAND DENSITY:

1876 - 1880 & 2015 - 2019 COUNTY AVERAGE

Derived from each state and their **production average** from 1876 to 1880 and 2015 - 2019, each line represents state **production per bushel** of corn in relation to other state's averages. In addition to bushel count, each line takes into account the **amount of acres allotted** for corn production within the **state's boundaries**.

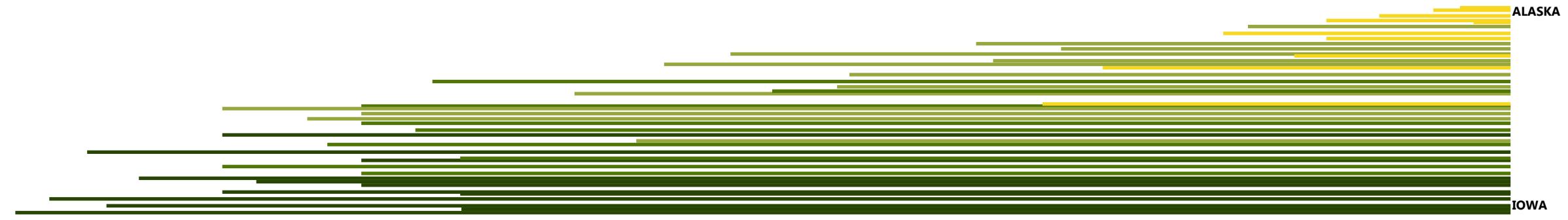


CORN PRODUCTION:

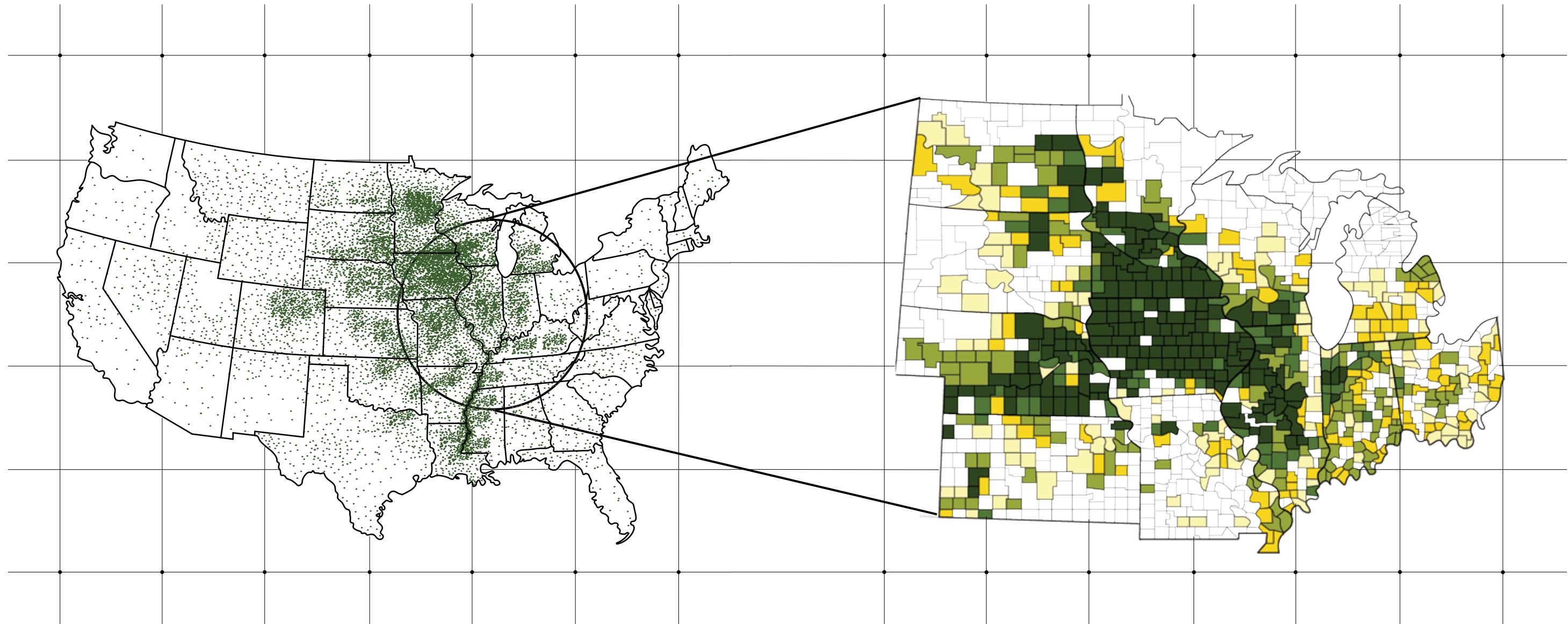
2015 - 2019 COUNTY AVERAGE

- 20 MILLION + BUSHELS
- 20 MILLION - 15 MILLION BUSHELS
- 15 MILLION - 10 MILLION BUSHELS
- 10 MILLION - 5 MILLION BUSHELS
- 5 MILLION - 0 BUSHELS

PRODUCTION



PRODUCTION



MASS MARKET TAKEOVER:

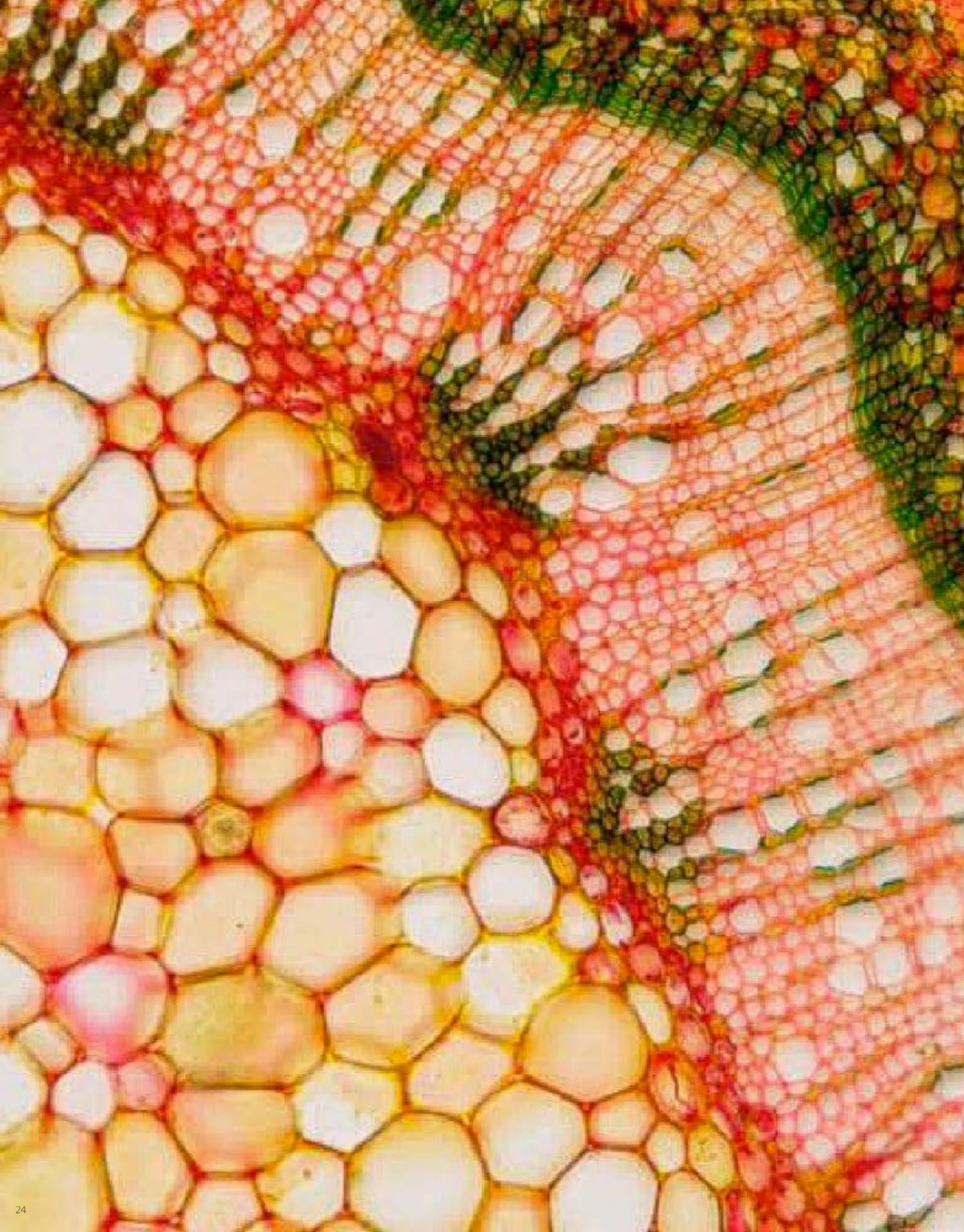
BIG CORN BUSINESS V SMALL CORN BUSINESS

FAMILY OWNED CORN FARM

CORPORATELY OWNED CORN FARM

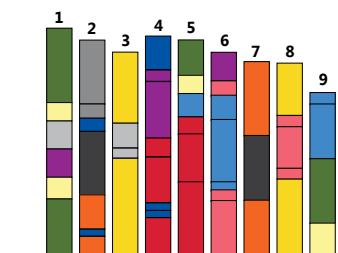
Today's corn market is **heavily dominated** by **large companies**, most of which do not even step foot onto the land they are growing food on. The redirection of focus from **investors and subsidizers** from big business models to **small, family run** corn business models is necessary for the American corn market to **shrink**. As for the rate the American corn belt is headed today, by 2070, major **corporations** will dominate nearly 90 percent of the land amassed for corn crop growth, nearly **eradicating** smaller, family run businesses.



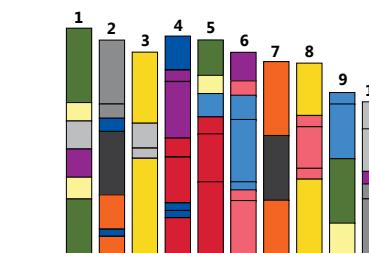


ZEA MAYS CHROMOSOME ARRAY:

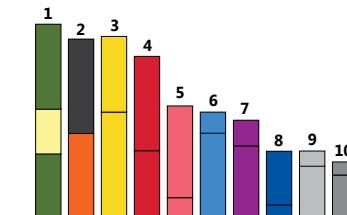
HOW THE CORN WE LOVE TODAY BECAME



CURRENT MAIZE GENOME

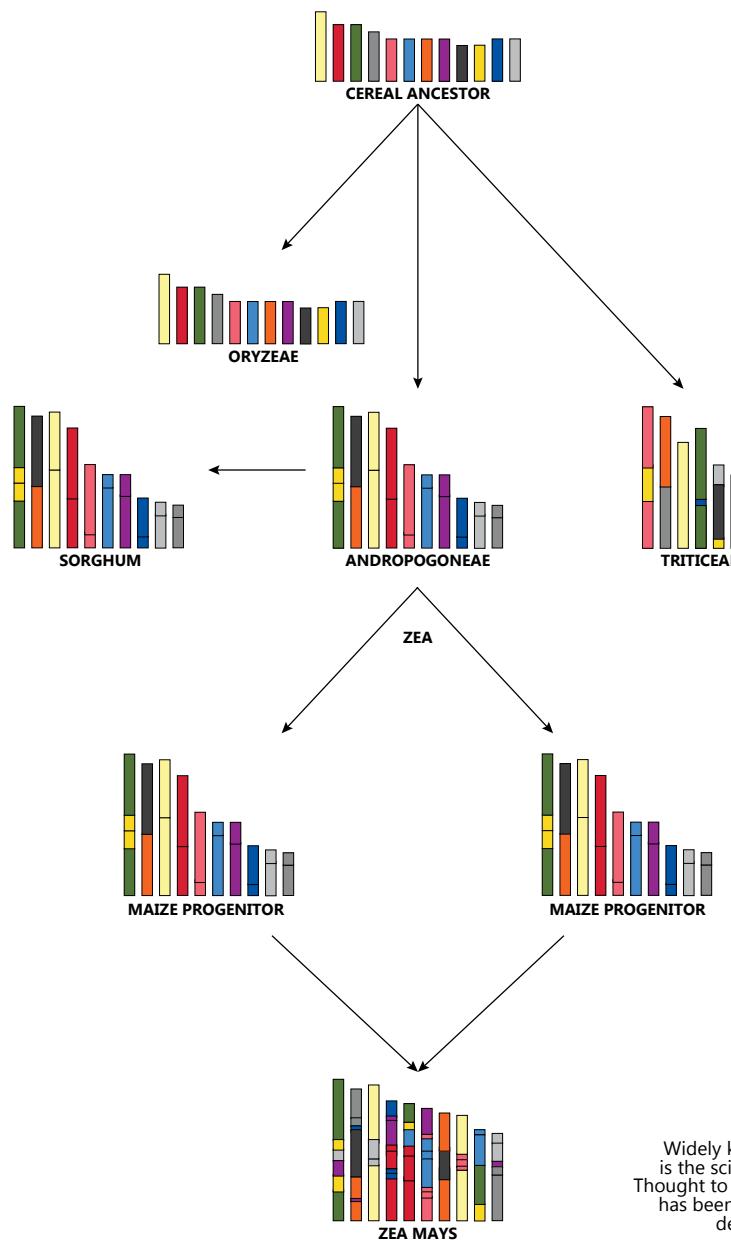


CHROMOSOME RECONSTRUCTION



MAIZE PROGENITOR GENOME

PRODUCTION

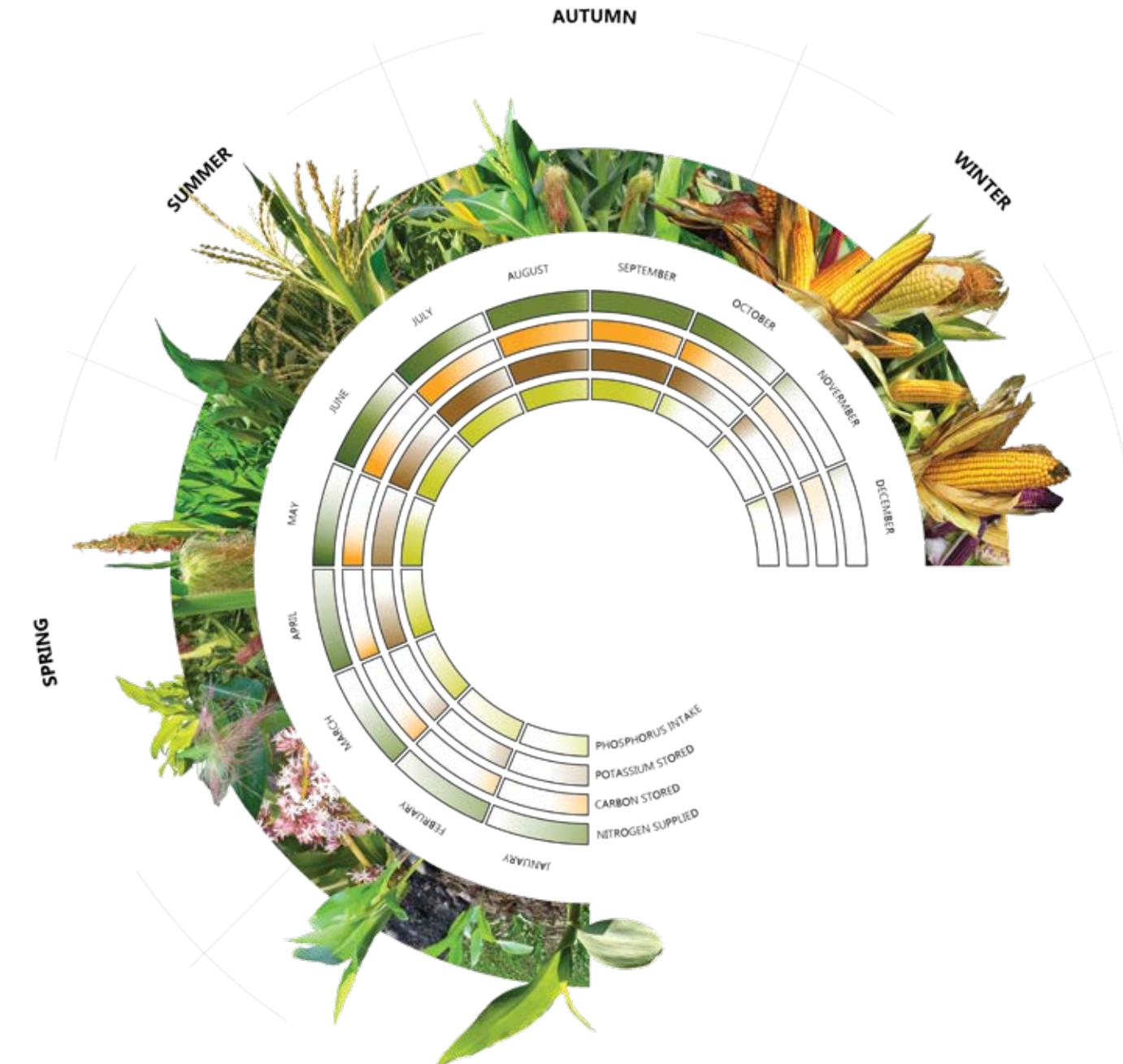


Widely known and grown throughout the world, ***Zea Mays*** is the scientific name for **maize**, or corn in western cultures. Thought to originate in the **Tehuacan Valley** of Mexico, maize has been genetically altered countless times to produce the desired result of what we consume today, **sweet** and **abundant** yellow cobs of **edible fruit**.

PUMPING GMO'S INTO OUR CROP:

TURNING AWAY FORM BIG BUSINESS

Soil samples of large scale farms that use extraneous amounts of **nitrogen-based fertilizers** have been analyzed, pointing out that the **nitrogen** and **phosphorus** dense soils leak into other ecosystems, effecting other **crops**, **animals**, and **peoples**. Regulated levels of **nitrogen**, **carbon**, **phosphorus**, and even **potassium** are crucial to corn crop development and growth, but **moderation** of these elements is key within the soil.



C

onsumption of American grown corn is at an all time national high in 2020. Average Americans do not see the extraneous amount of corn product they are consuming on a daily basis. Michael Pollan in *The Omnivore's Dilemma* states that nearly one third of products in the American supermarket are comprised of corn products. Whether that be in primary products like corn flours and cereals, secondary products like carbonated and sweetened drinks, or even tertiary products like meats and seafood, corn is in many of the items we consume today. Additional to edible consumption, the production of ethanol in gasoline is also blindly regarded as a major asset of corn and its byproducts. By filling up our cars and traveling via autonomous transportation, the American public is blind to the fact the corn market is prevalent even on the street.



Fueling America: In 2019, 1,601,000,000 gallons of ethanol were produced from American Corn Belt production line.
-U.S. Department of Agriculture

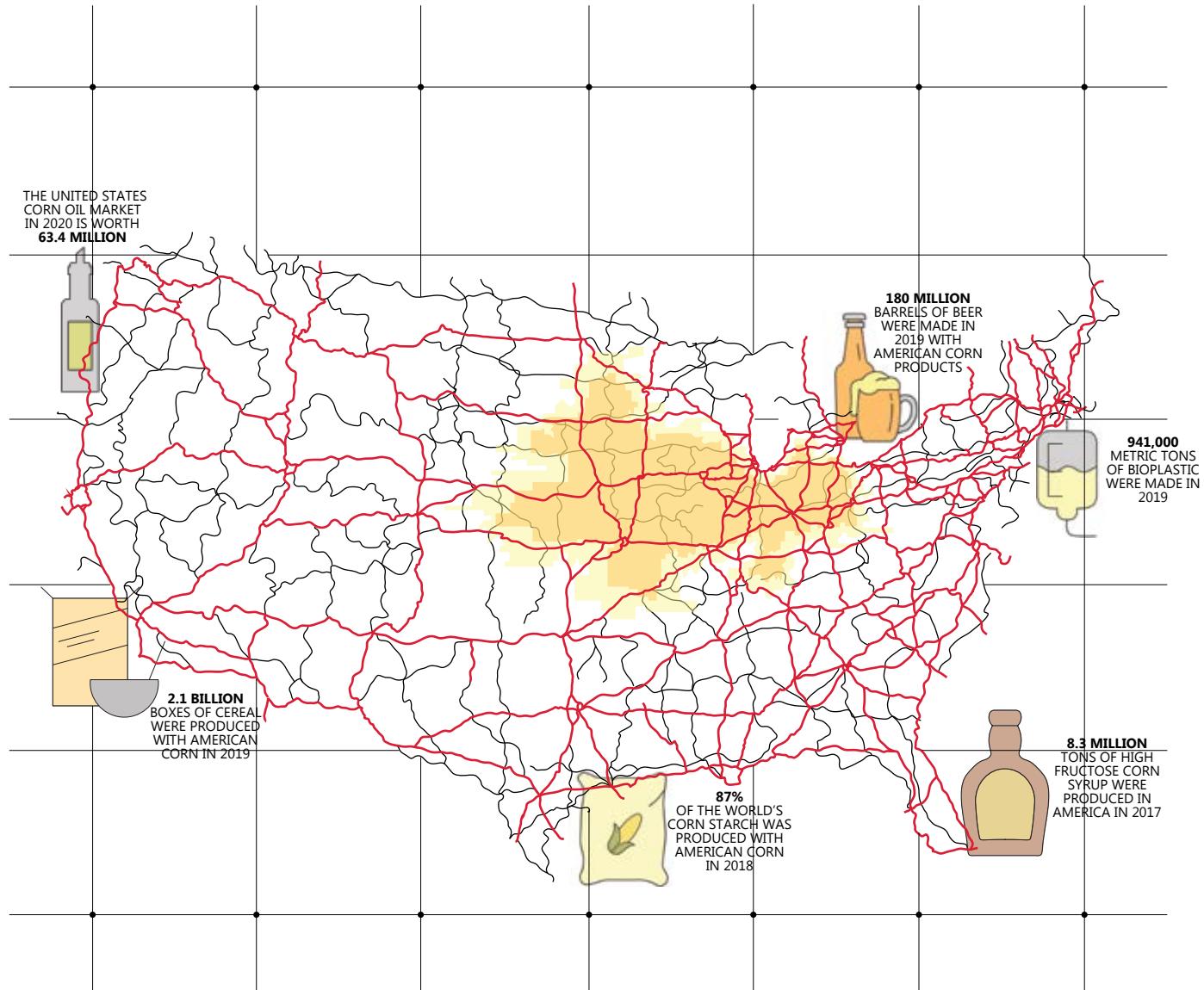
CORN CONSUMPTION:

WHERE IS CORN IN OUR DAILY LIVES?

MAJOR INTERSTATE HIGHWAY

MINOR INTERSTATE HIGHWAY

The American corn belt contributes to many corn-based foods and ingredients the average American consumes on a daily basis.

**HAS HIGH FRACTOSE CORN SYRUP MADE AMERICA FAT?****BREAKING NEWS**

**HELP!
I'M
GOING
TO BE
OBESE
WHEN I
GROW
UP!**

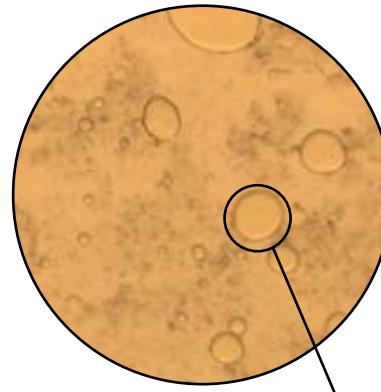


BIOLOGICAL BREAKDOWN:

WHAT OUR FOODS REALLY LOOK LIKE CLOSEUP

SAMPLE NO. 75001

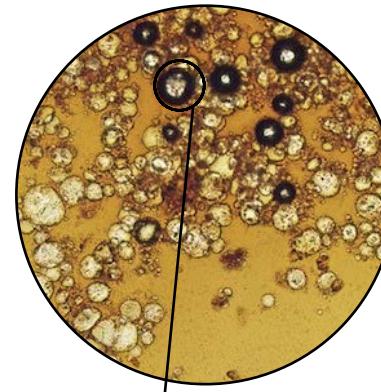
SPRITE

**CAFFEINE**

High blood pressure, anxiety, dehydration, and even central nervous system damage can be caused by unrestrained consumption of caffeine

SAMPLE NO. 01894

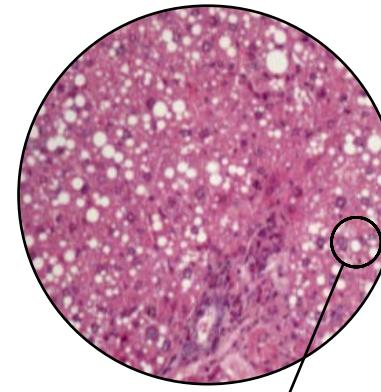
COCA COLA

**HIGH FRUCTOSE CORN SYRUP**

Excessive intake of HFCS can cause type 2 diabetes, increasing risk of liver cancers or even premature death

SAMPLE NO. 39541

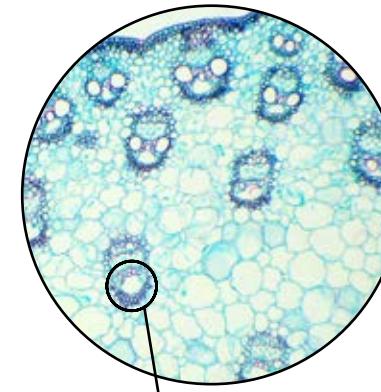
PEPSI

**REFINED SALTS**

High blood pressure, heart failure, heart attack, kidney failure, osteoporosis, and even likelihood of stroke are more likely with the consumption of refined salt

SAMPLE NO. 62018

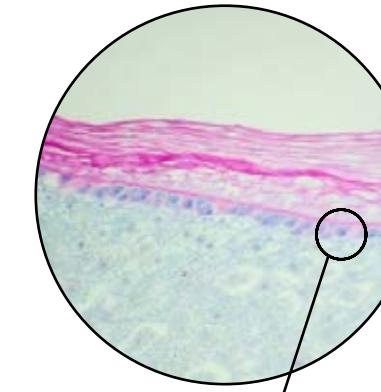
CHEERIOS

**REFINED CARBOHYDRATES**

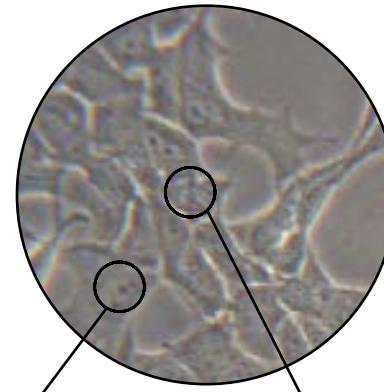
Leading risks like type two diabetes and obesity are caused by the nutrients being removed from most refine cereal carbohydrates

SAMPLE NO. 91700

HONEY BUNCHES OF OATS

**SAMPLE NO. 38994**

APPLE JACKS

**CORN OIL**

Heavy consumption of corn oils can lead to toxicity of the liver, lungs, and kidneys. Additionally, there are a high concentration of omega-6 fats and polyunsaturated fats leading to a higher risk of cancers

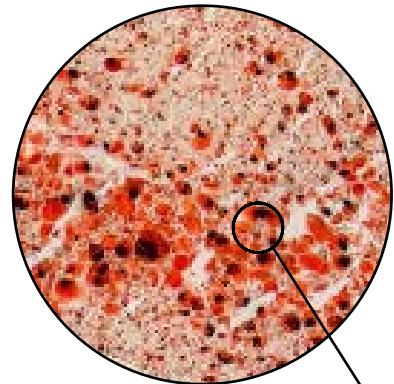
PROCESSED CORN SUGARS

Inflammation and obesity can be linked to hydrogenated corn oils, effecting the way we function daily

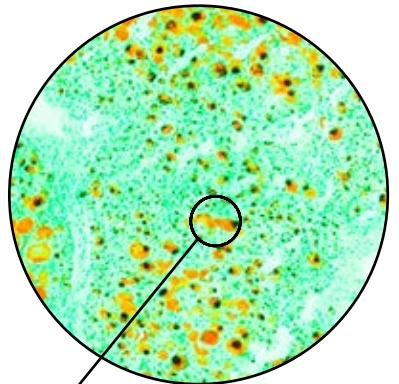


SAMPLE NO. 81409

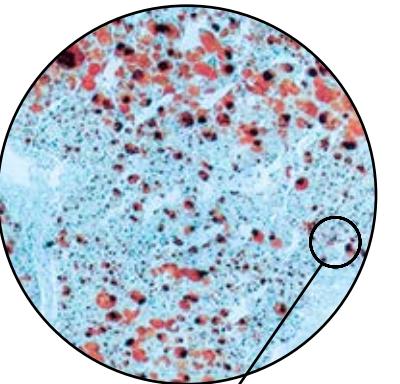
MICHELOB ULTRA BEER

**SAMPLE NO. 01573**

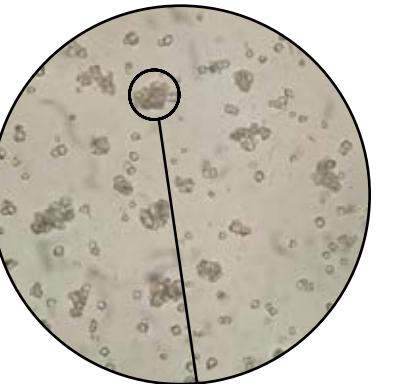
MOONSHINE

**SAMPLE NO. 71003**

EVER-CLEAR

**SAMPLE NO. 00672**

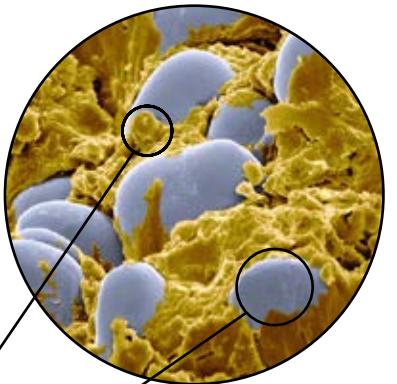
KARO SYRUP

**SAMPLE NO. 45107**

HIGH FRUCTOSE CORN SYRUP

**SAMPLE NO. 60051**

MOLASSES

**GENETICALLY MODIFIED MALT**

Causing obesity, heart health risks, and eventual cases of premature death, genetically modified malt is a detriment to heart health in large consumptions.

METHANOL

Heavy in formaldehyde and formic acid, methanol can cause adverse effects like drowsiness, headache, confusion, and the inability to coordinate muscle movement.

ETHANOL

With a concentration of 92.5% ethanol, ever-clear can cause heart health risks, liver disease, and digestive problems. Mouth, liver, and colon cancer are also cancers associated with ethanol consumption.

FRUCTOSE

Dangerous levels of fructose sugars are in HFCS, leading to health issues including obesity, increased heart rate, and more.

DEXTOSE

Shortness of breath, dehydration of the skin, and low blood magnesium and phosphate are all risks of consuming too much dextrose in corn-based syrups.

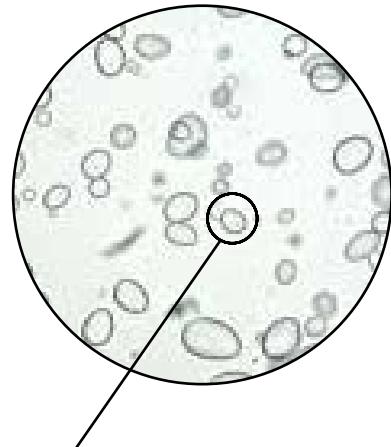
CLOSTRIDIUM BOTULINUM

Harmful bacteria found in karo syrup often known to cause botulism, Clostridium Botulinum can cause dental harm and health effects.



SAMPLE NO. 80295

CORN STARCH

**ENZYME CROSS-CONTAMINATION**

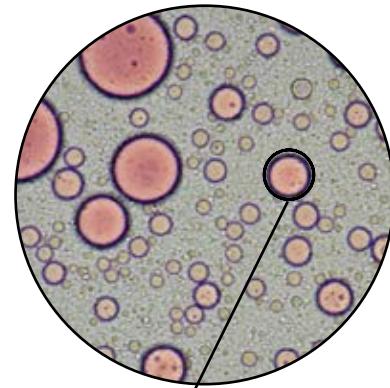
Altered physically and chemically, corn starch is high in carbohydrates and calories, bad for health.

SAMPLE NO. 90014

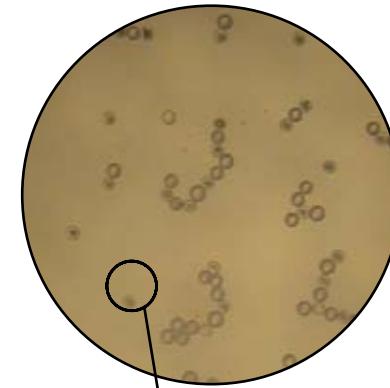
CORN TORTILLA

**SAMPLE NO. 41091**

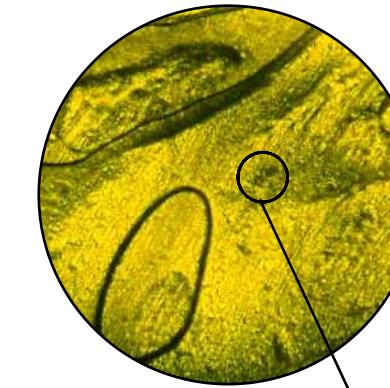
CORN FLOUR

**SAMPLE NO. 57104**

CRISCO CORN OIL

**SAMPLE NO. 92798**

MAZOLA CORN OIL

**SAMPLE NO. 01507**

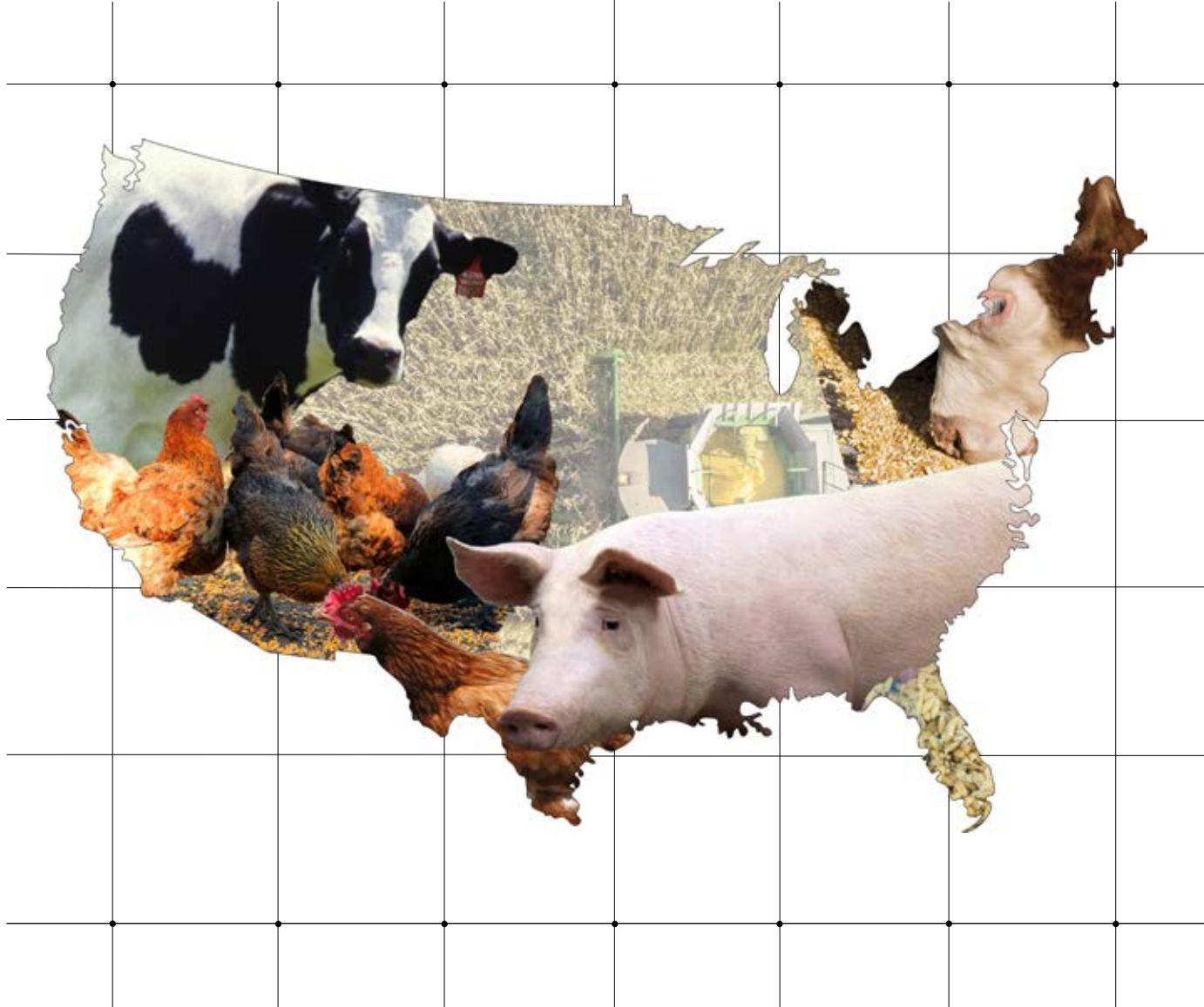
WESSON CORN OIL



U.S. FEED USAGE:

WHAT WE EAT HAS TO EAT, TOO

In 2019, the United States produced 13,016,000,000 bushels of corn, with **39%** of the crop going straight to the **cattle feed market**. With the **poultry** feed business consuming **28%** of the corn allotted for feed within the united states (over 1.17 Billion bushels), poultry is the largest animal consumer of corn-based product. Second to poultry is the **beef** industry, consuming over **1.12 billion bushels** of corn feed. (27%) Next are the **dairy cow** and **pork/swine** feed usages, consuming **19%** and **24%** of the corn feed set aside for animal consumption. The **remaining 2%** of the feed market goes to **other animal feed** within the United States.



LIVESTOCK DIET:

WE'RE NOT ONLY HURTING OURSELVES

CONSUMPTION



CONSUMPTION



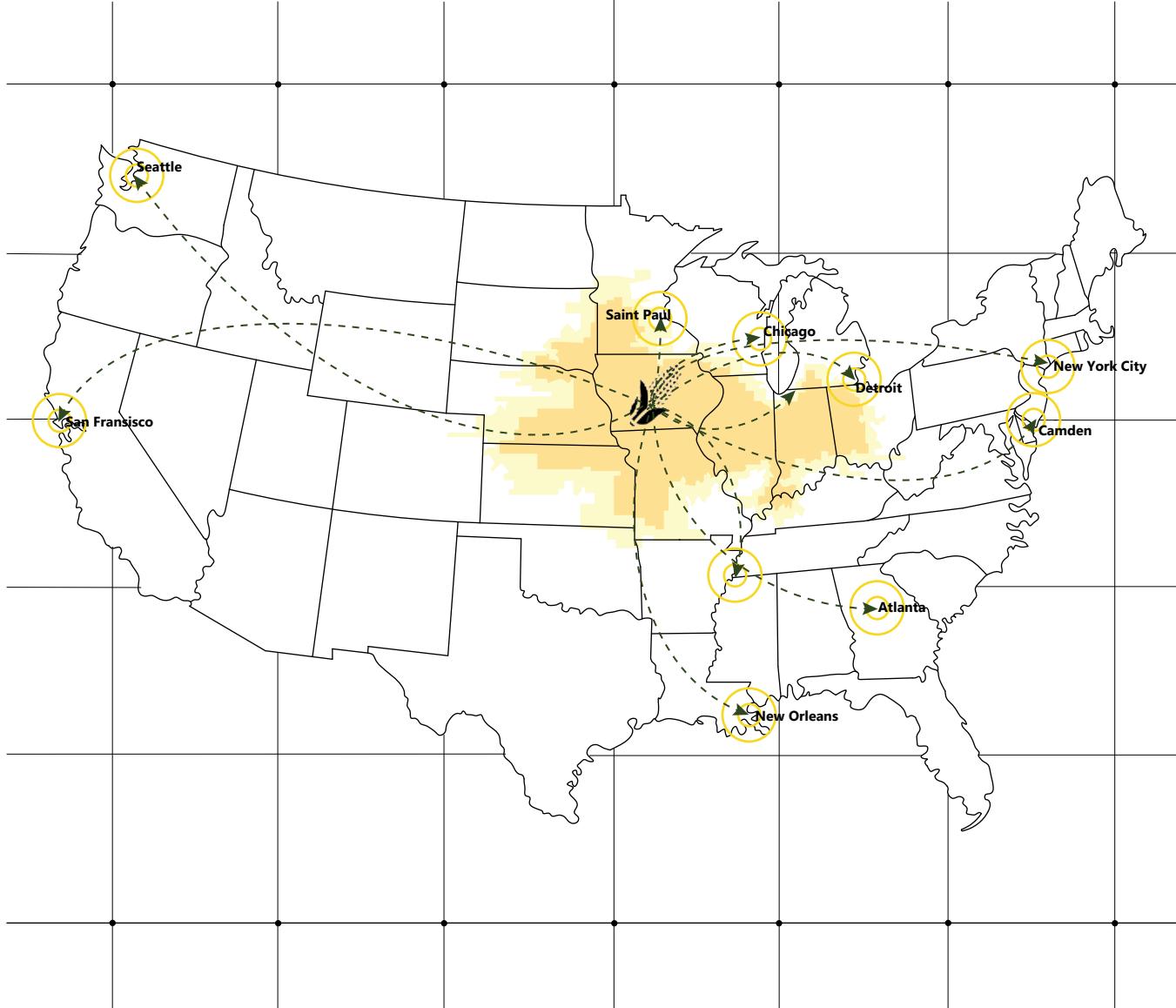
Wasteful practices in America's Corn Belt produce result in an excess of 42 billion dollars of excess corn crop a year that just sits. Corn sits in silos, crop bags, on driveways, and even runways. The crisis of the corn belt producing more and more waste per year is a detriment to the corn crop business and marketing strategy, allowing there to be a plethora of waste each year. Additional to the corn crop that is misrepresented and is not used when fresh, the national stover (or corn plant remains) production of corn plants keeps rising with the mass planting practices American farmers are forced to adhere to. These mass planting methods result in rising corn crop leftover, leaving a bigger footprint on the farms and millions of acres that are specialized to grow corn.



AMERICAN FOOD DESERTS:

PEOPLE ARE STARVING! SO LET'S FEED THEM!

By diverting the excess amounts of corn to feed the **homeless populations** within our own country, or even exporting to more countries than already mentioned, the leftover crop can be **utilized** when **freshly harvested**.
Food deserts within more rural places do not allow individuals and families the same opportunities people may be availed to in larger metropolitan areas, and with corn **redistribution** and **reallocation** in the time of **waste** and **overproduction**, it is beneficiary to those who are not given the opportunity to **equal grocery and nutrition opportunities**.



DIVERSION OF CORN CROP:

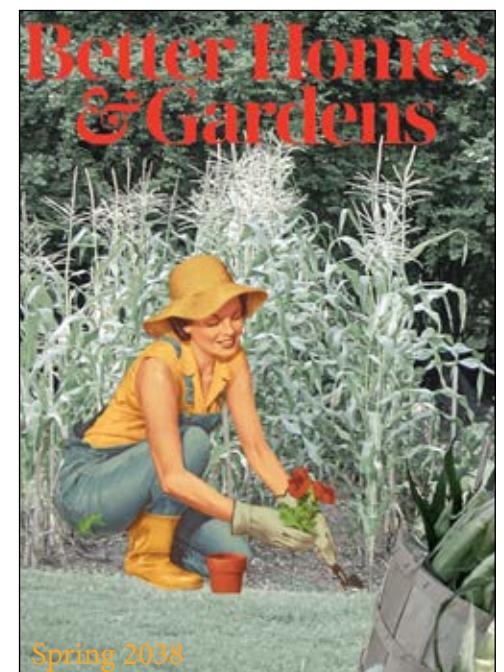
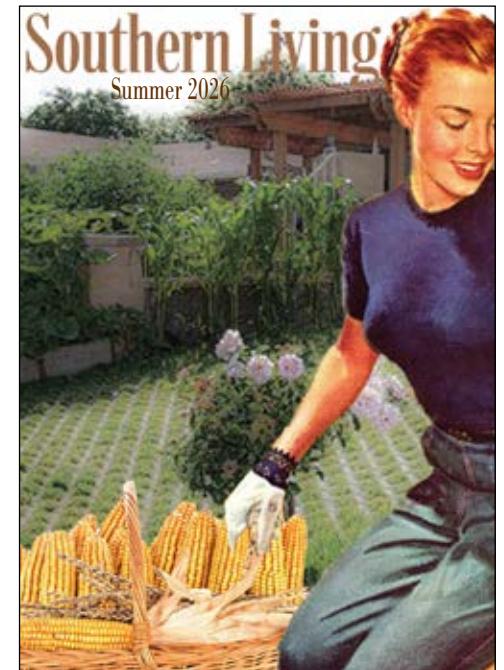
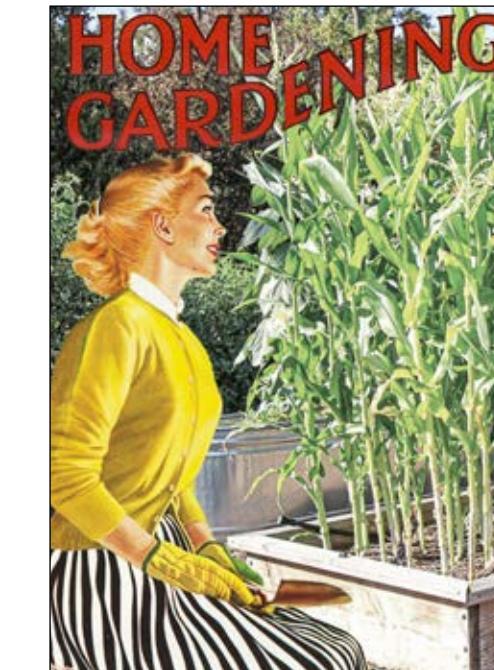
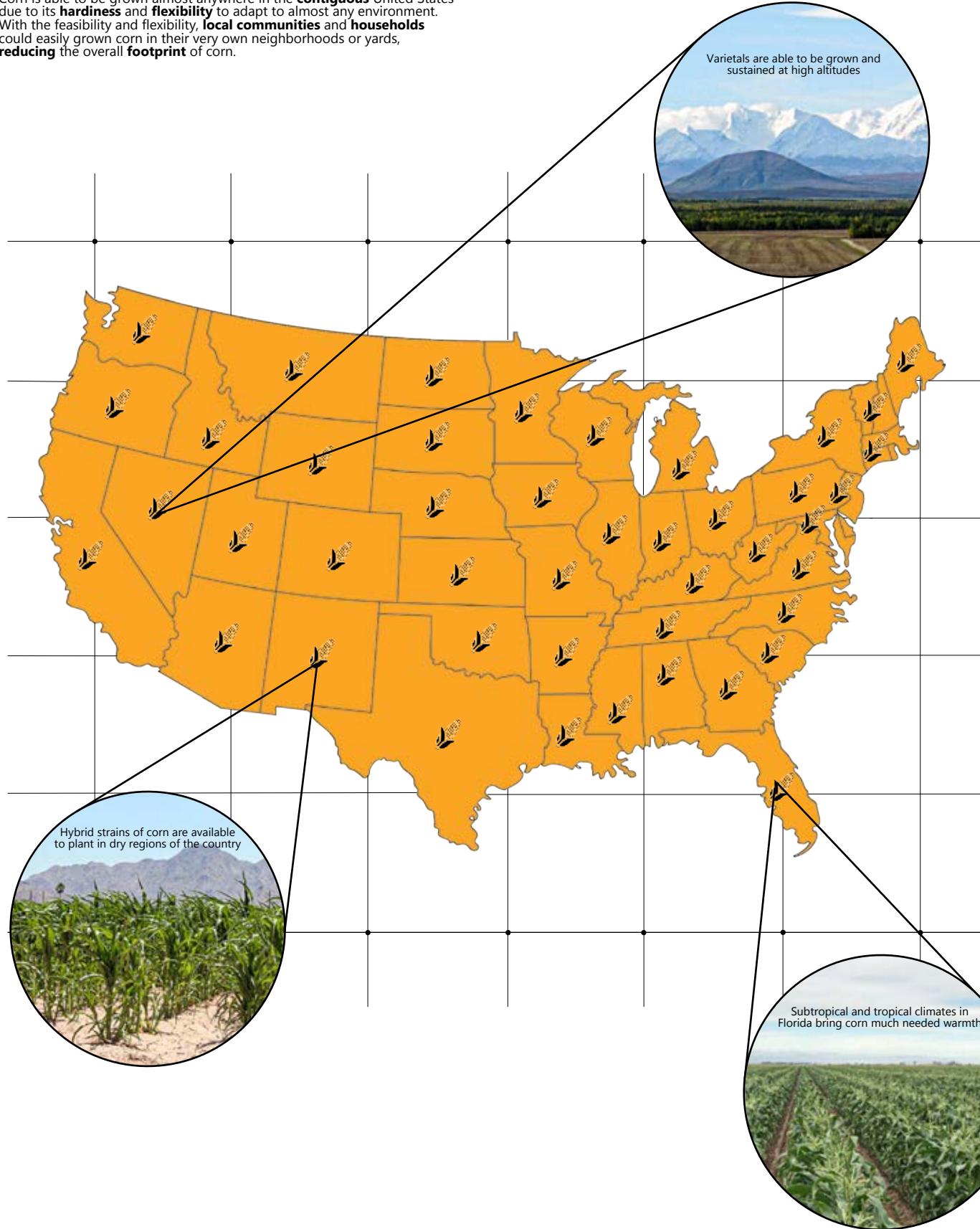
REALLOCATING OUR EXCESS TO PEOPLE IN NEED



HOPE FOR THE FUTURE OF CORN:

WHERE WILL CORN GROW IN THE CONTIGUOUS UNITED STATES?

Corn is able to be grown almost anywhere in the **contiguous** United States due to its **hardiness** and **flexibility** to adapt to almost any environment. With the feasibility and flexibility, **local communities** and **households** could easily grow corn in their very own neighborhoods or yards, **reducing** the overall **footprint** of corn.





Distribution

- <https://www.ilcorn.org/file/154/trade-matters-8-half-by-11web.pdf>
- <https://www.fsa.usda.gov/news-room/efoia/electronic-reading-room/frequently-requested-information/crop-acreage-data/index>
- <https://www.indexmundi.com/agriculture/?country=us&commodity=corn&graph=exports>
- <https://www.columbiatribune.com/news/20190608/rural-divide-fewer-mid-missouri-farmers-are-tending-bigger-farms>
- <https://www.fsa.usda.gov/news-room/efoia/electronic-reading-room/frequently-requested-information/crop-acreage-data/index>
- <https://agcros-usdaars.opendata.arcgis.com/datasets/LNR:us-corn-exports-2013-to-2016-timeline>
- <https://www.pnas.org/content/117/33/20044>
- <http://www.cyberartsweb.org/cpace/cyborg/cyborgfood/corn%20walking.html>
- <http://netnebraska.org/article/news/955642/corn-belt-farming-gives-boost-global-carbon-cycle>
- <https://www.usda.gov/media/blog/2019/07/29/corn-americas-largest-crop-2019>

P roduction

- <https://www.nps.gov/dewa/learn/nature/upload/cmsstgCORN.pdf>
- <http://www.nativetech.org/cornhusk/cornhusk.html>
- <https://cropwatch.unl.edu/documents/Table%20of%20Corn%20Crop%20Water%20Use.pdf>
- <https://www.ers.usda.gov/topics/crops/corn-and-other-feedgrains/feedgrains-sector-at-a-glance/>
- <https://www.iowacorn.org>
- <https://www.columbiatribune.com/news/20190608/rural-divide-fewer-mid-missouri-farmers-are-tending-bigger-farms>
- <https://beef2live.com/story-states-produce-corn-0-107129>
- <https://www.npr.org/sections/thesalt/2019/04/01/708818581/growing-corn-is-a-major-contributor-to-air-pollution-study-finds>
- <https://www.columbiatribune.com/news/20190608/rural-divide-fewer-mid-missouri-farmers-are-tending-bigger-farms>
- <https://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/farm-sector-income-forecast/>
- <https://iopscience.iop.org/article/10.1088/1748-9326/aae9fe/meta>
- <https://citizensclimatelobby.org/corn-convergence-carbon-climate-soil-health/>
- <https://www.theguardian.com/environment/2019/mar/09/american-food-giants-swell-zow-the-family-farms-iowa>
- <http://familyfarmingahap.weebly.com/family-vs-corporate-farming.html>
- <https://www.actionaidusa.org/work/agribusiness-family-farmers/>
- <https://historyrat.wordpress.com/2011/02/05/the-corn-belt-liberty-league-farmers-in-revolt/>

C onsumption

- <https://www.hvfarmscape.org/maps-and-graphics>
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