

What We Need
and
What We Want

Increase in “Story” Proteins

Multiple Drivers

Locally produced

- Freshness
- Carbon footprint
- Support local sustainable agriculture

Health, Environment & Production Concerns

- Organic, Low fat, Grass fed, Non-GMO
- Animal Welfare, humanely raised, free-range
- No added hormones and/or No antibiotics

Status symbol (Luxury vs. Necessity)

- Restaurants
- Backyard chefs



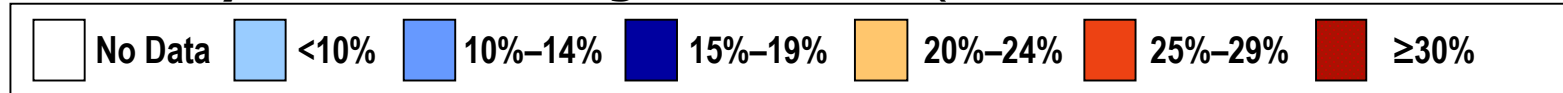
Research shows that as you get older your sense of value changes, **Time & Health** become important forms of currency.

In the U.S., 10,000 baby boomers turn 65 every day. Over the next few decades, many will move into nursing homes. As they do, they'll redefine what senior living looks like.

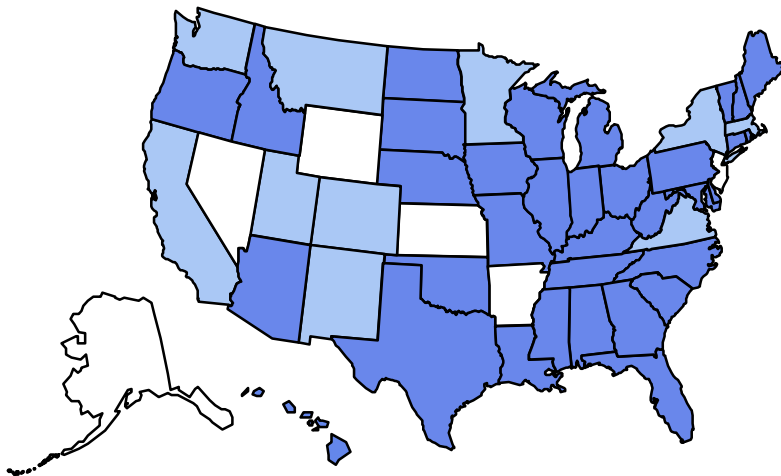
Nutritional & Health

80% of U.S. and European consumers claim to be health conscious. However, the incidence of diabetes and obesity is on the rise at an alarming rate.

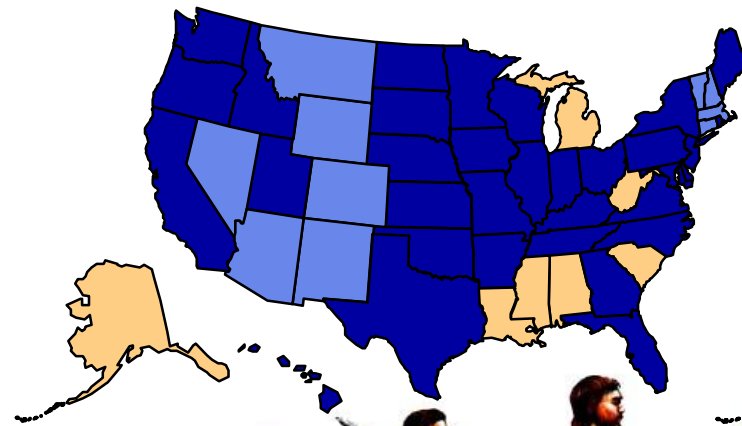
Obesity Trends* Among U.S. Adults (Source: Center for Disease Control)



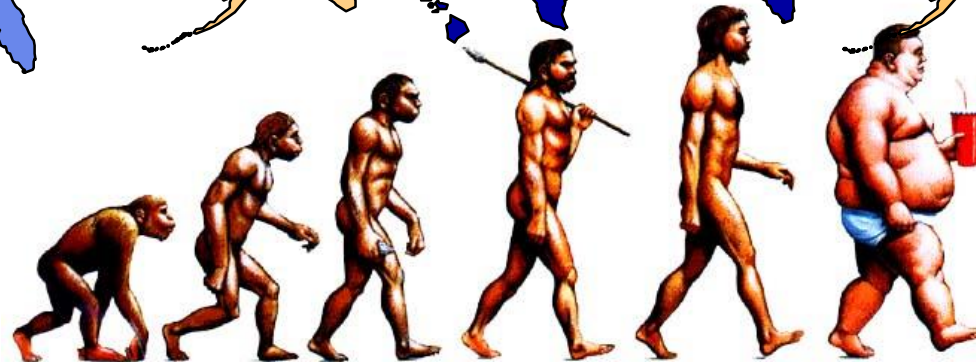
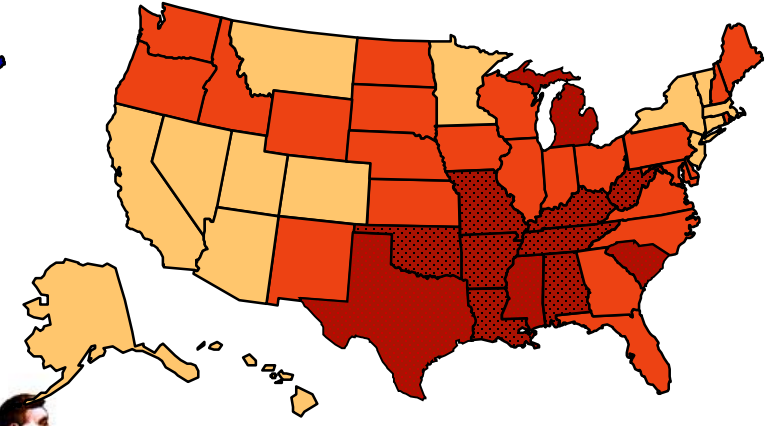
1990



1998



2010

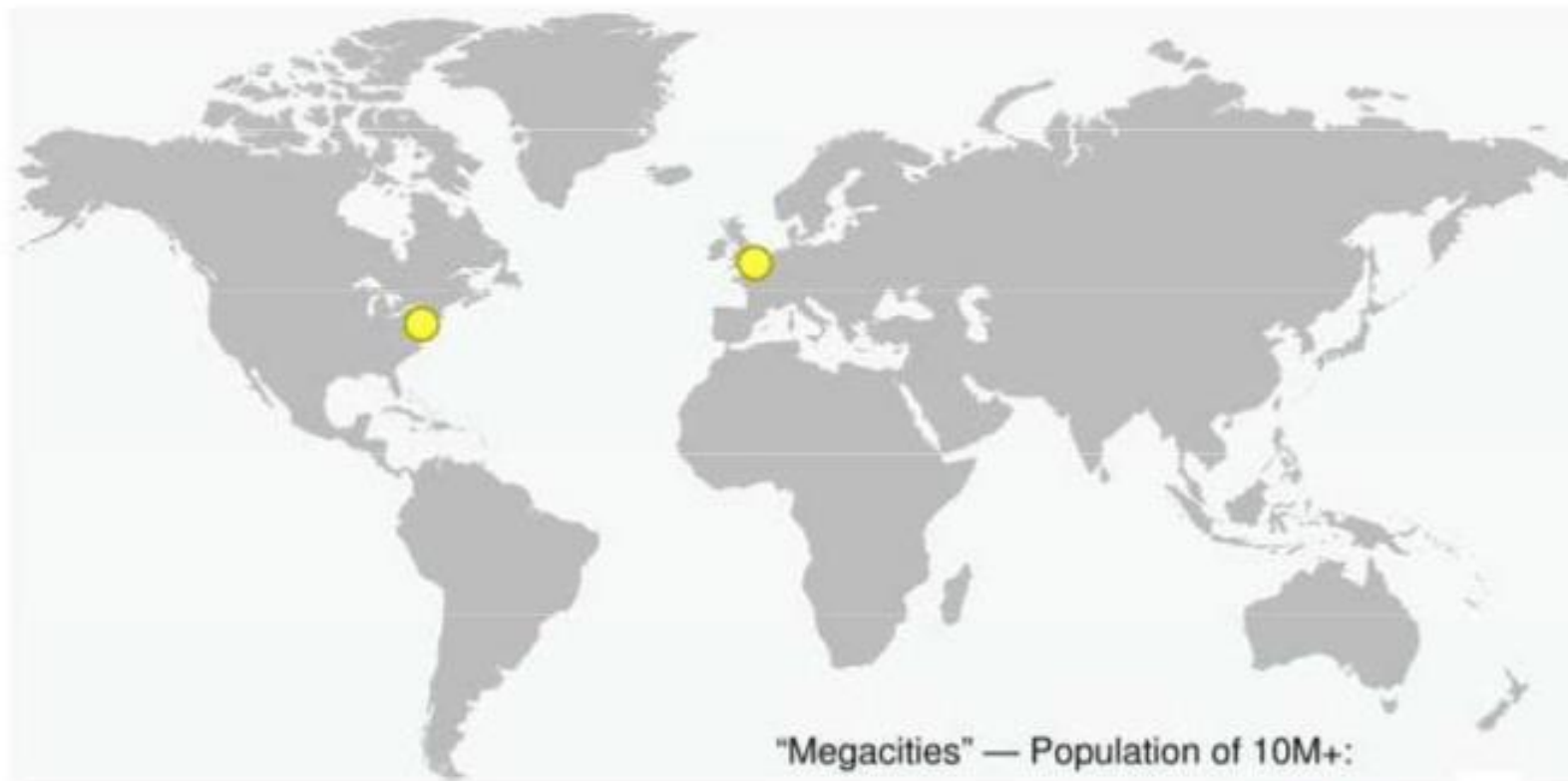


2015 CDC data shows 50% of the states in the $\geq 30\%$ category!!!

What is driving global markets?

1950 - World population \approx 2.5 billion

2 Megacities in the World in 1950



It took from the beginning of time to 1950 put the first 2.5 billion on earth.

What is driving global markets?

2010 - World population \approx 6.8 billion

18 Megacities in the World



What is driving global markets?

2050 - World population predicted to exceed 10 billion

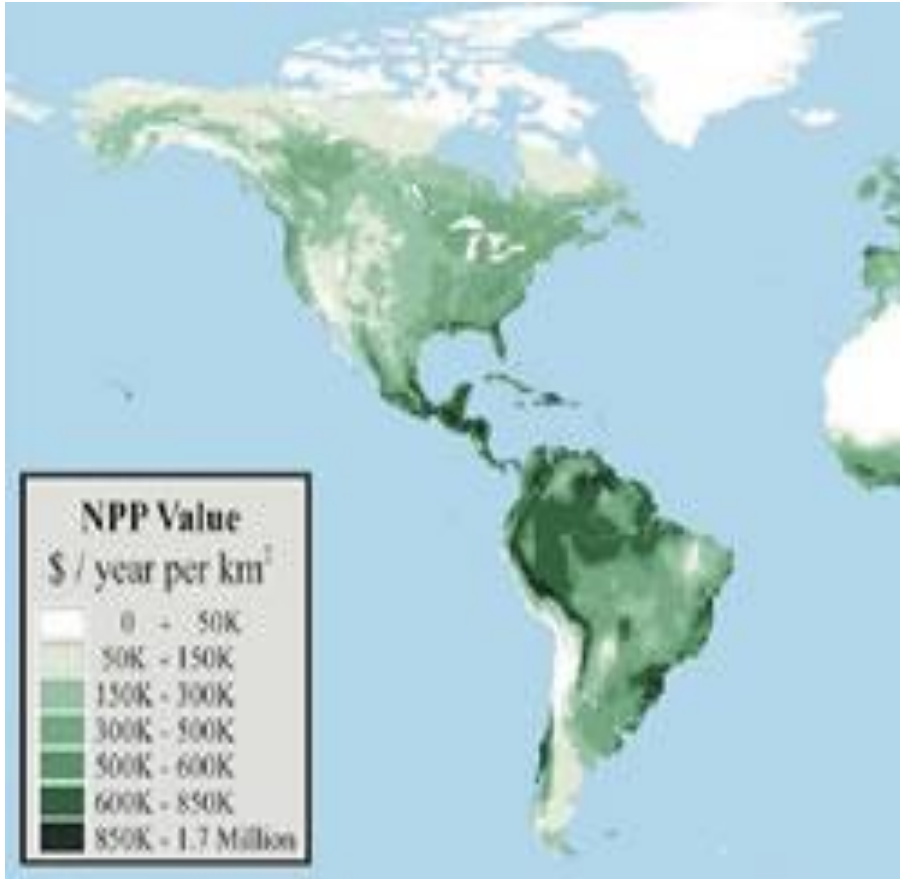
Over 400 Megacities in the World by 2050



- We will increase by 2.5 billion in the next 40 years
- Caloric and protein needs could increase by 40%

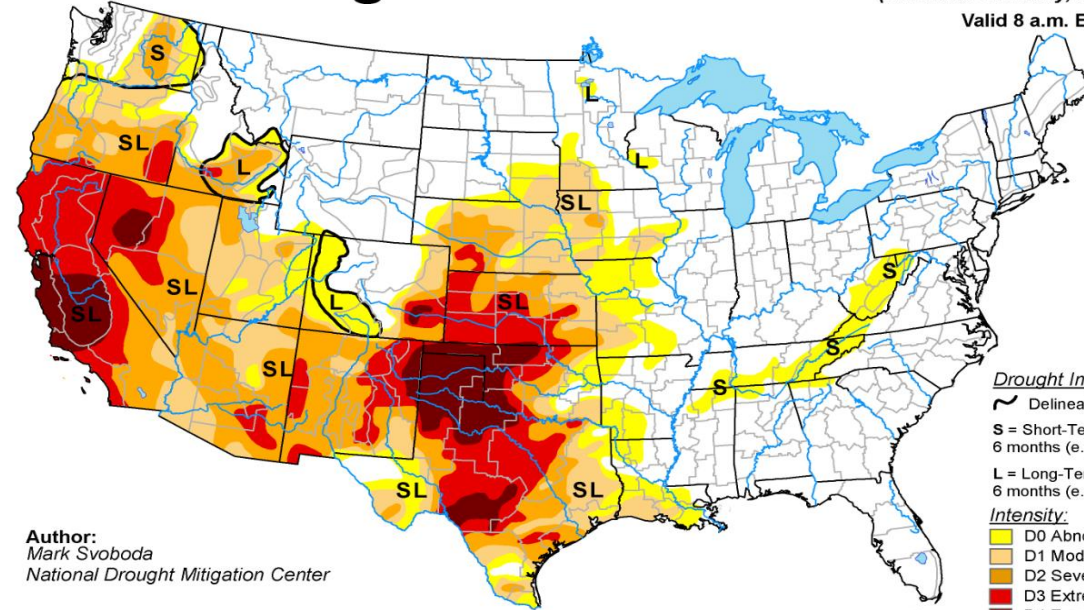
We are in a global marketplace; resources matter.

Global Photosynthesis Potential (aka – Net Primary Productivity)



U.S. Drought Monitor

May 6, 2014
(Released Thursday, May. 8, 2014)
Valid 8 a.m. EDT



Author:
Mark Svoboda
National Drought Mitigation Center

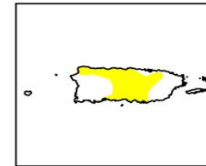
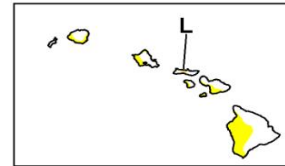
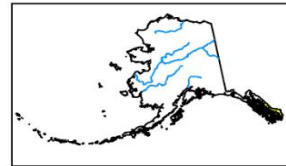
Drought Impact Types:

- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

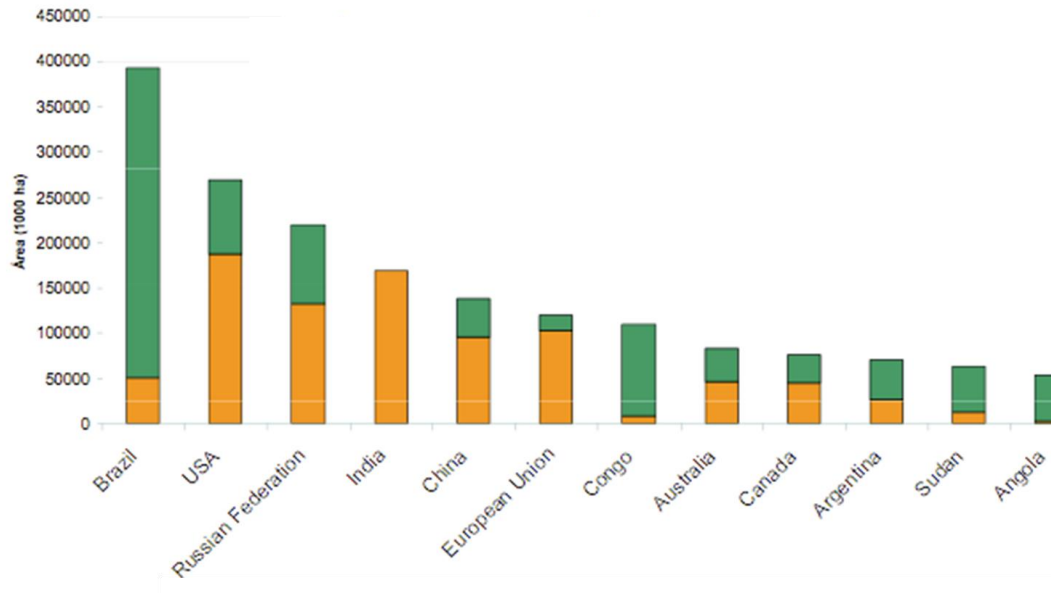
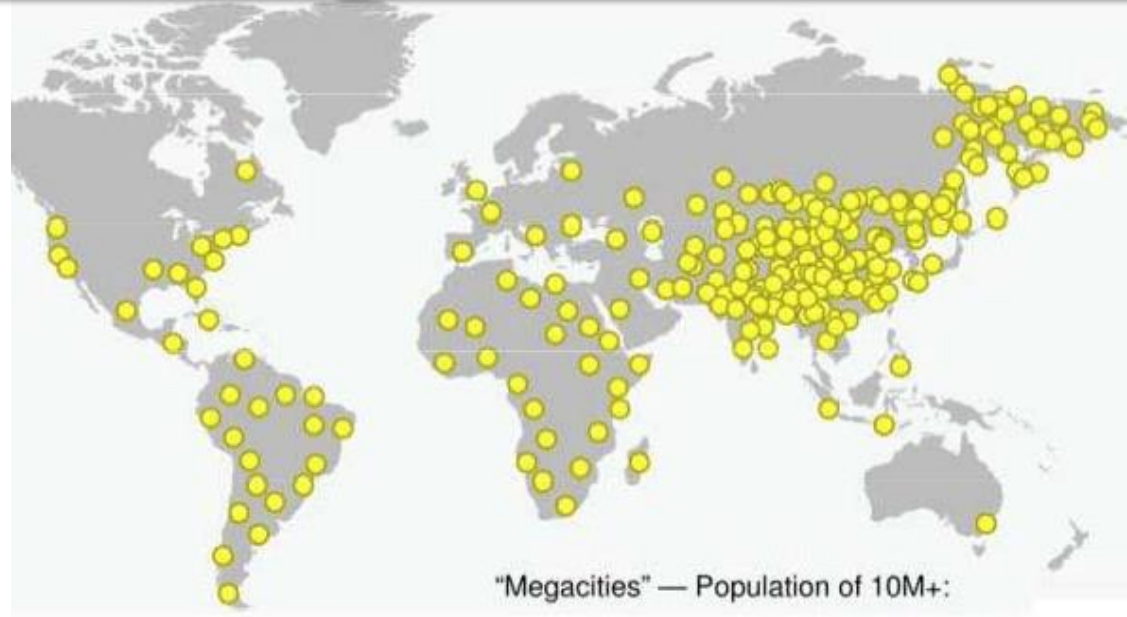
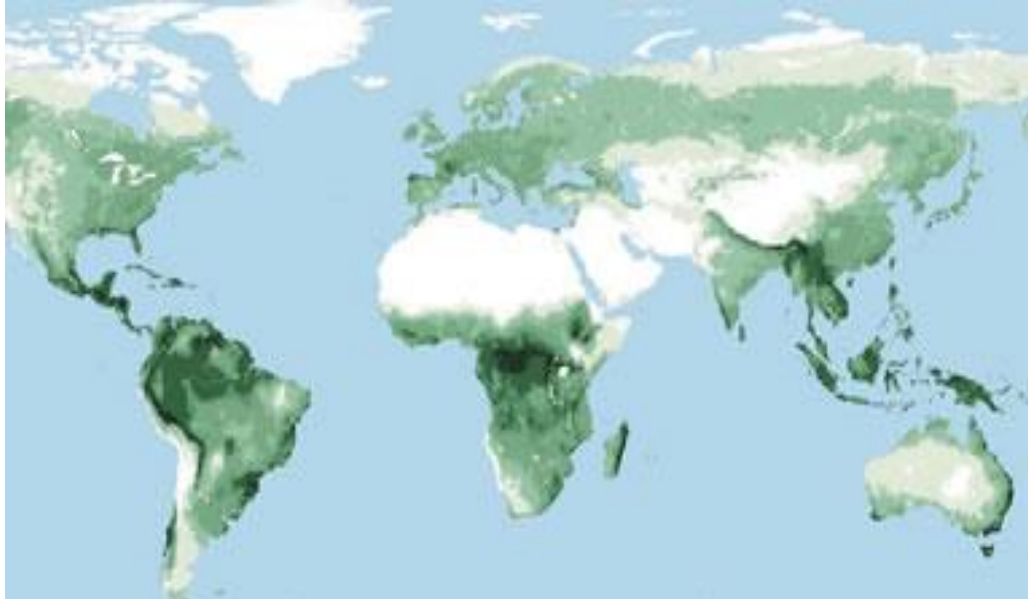


<http://droughtmonitor.unl.edu/>

Water Quality & Abundance will play a major role in our future.



These Maps Tell a Story



Who will our customers be and why?

What will the balance within our domestic and international customers look like?

- “Haves” (those seeking quality), and the
- “Have Nots” (those seeking quantity)

What's in your mirror?



Biosecurity?

Animal Welfare?

Traceability?

Food Security?

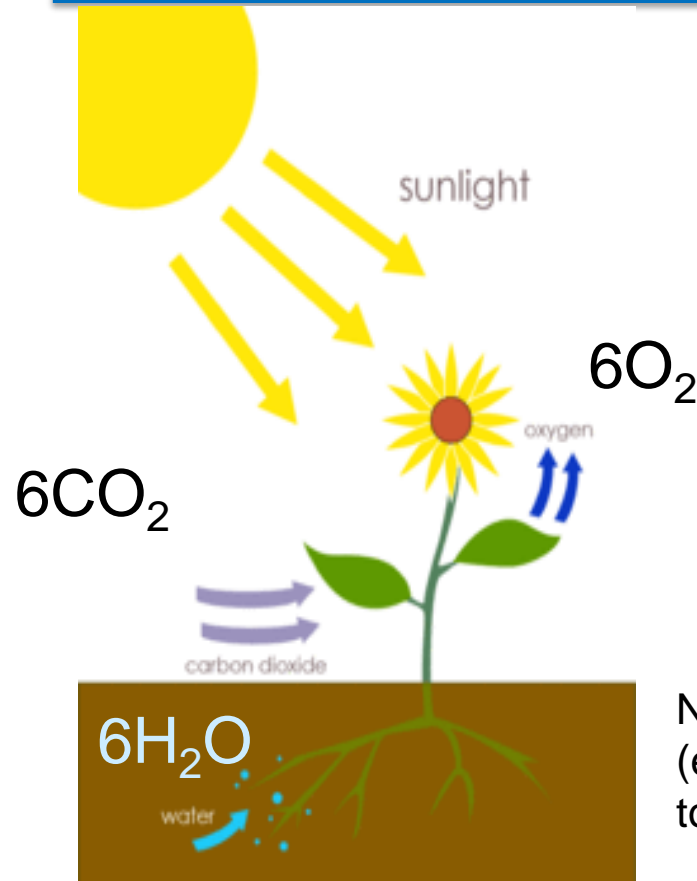
Sustainability?

Succession Planning?

How will we meet the protein needs of the future?

~~Plants vs. Animals~~

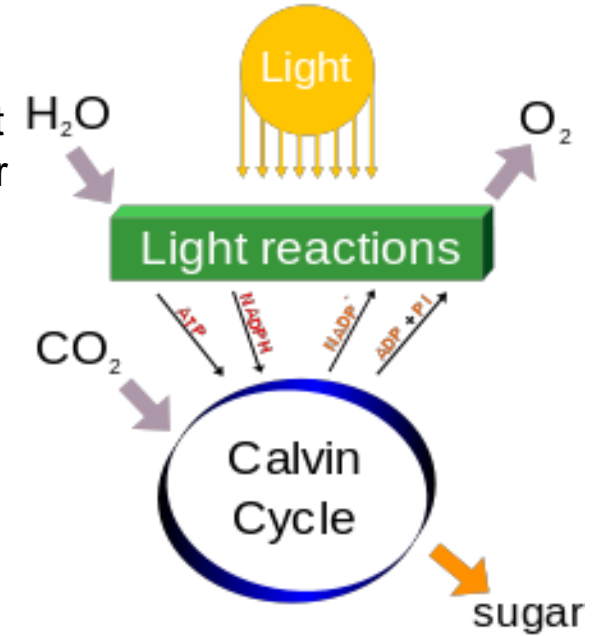
Plants & Animals



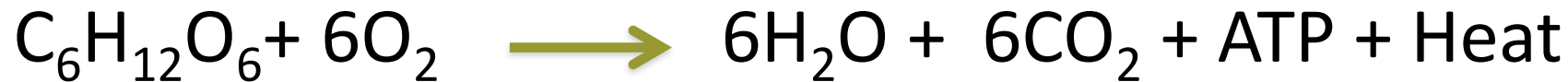
Nutrients from the soil (elements: N, P, K, etc.) to support plant growth.

Photosynthesis changes sunlight into chemical energy, splits water to liberate O₂, and fixes CO₂ into sugar.

96% of Your Body
 Oxygen (65%)
 Carbon (18%)
 Hydrogen (10%)
 Nitrogen (3%)



Aerobic Metabolism

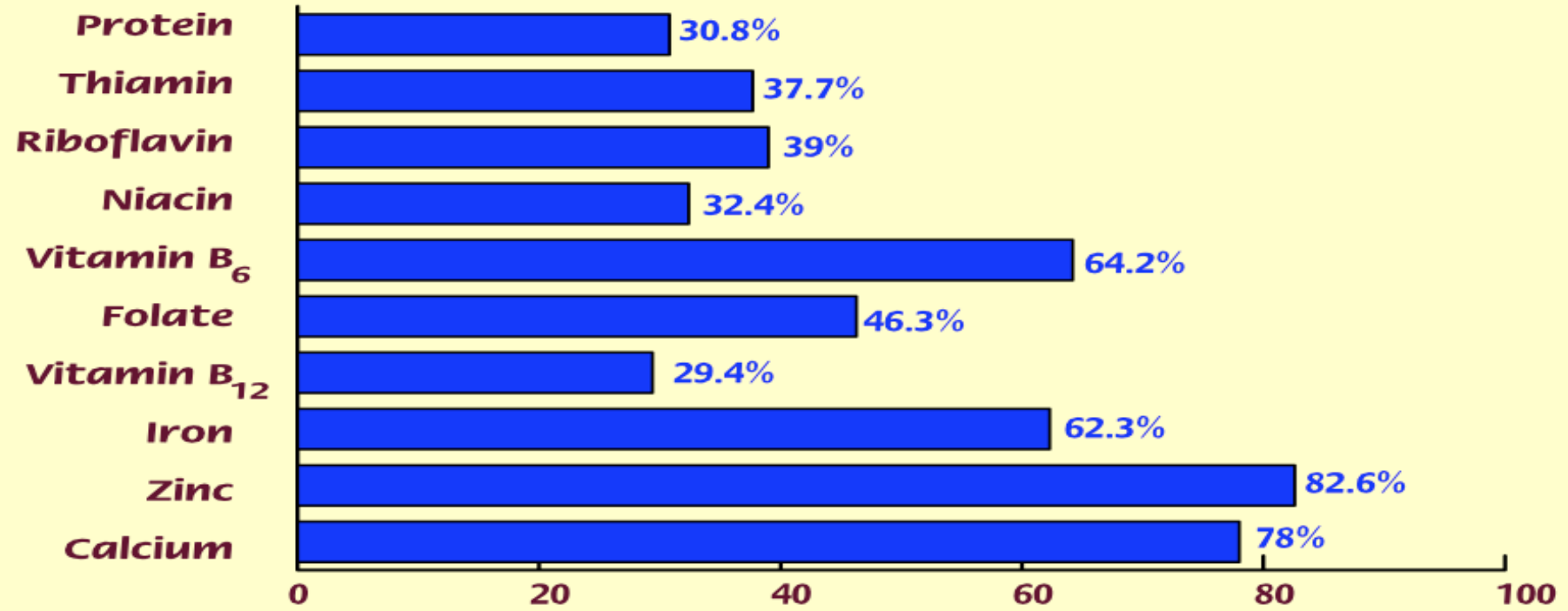


- **Nutrient cycling**

- **Upcycling**

Women's Nutrient Intake

Percent of Women Over 20 NOT Meeting Recommended Dietary Allowances (RDAs)



Analysis of CSFII 1994-96, Final Report prepared by Bermudez Consultenos International

Nutrition & Healthy Eating

Percent of Women Over 20 NOT Meeting Recommended Dietary Allowances (RDAs)

• Protein	30.8%
• B-vitamins:	
- Thiamin	37.7%
- Riboflavin	39.0%
- Niacin	32.4%
- Vitamin B ₆	64.2%
- Folate	46.3%
- Vitamin B ₁₂	29.4%
• Iron	62.3%
• Zinc	82.6%
• Calcium	78.0%

Analysis of CSFII 1994-96, Final Report prepared by Bermudez Consultenos International

Meat has a clean label.

Meat is a healthy and nutritious product.

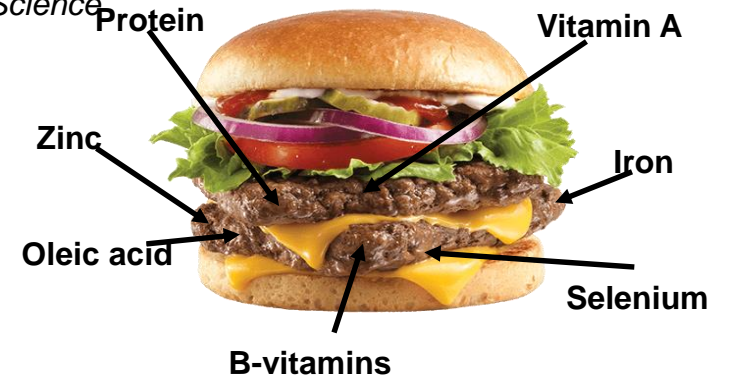
Upcycling – a natural, process of making indigestible nutrients available to the human body.

Benefits of meat in the diet

- Excellent source of protein
- Excellent source of B-vitamins
- Provides micronutrients with high bioavailability:
 - Iron (heme-iron)
 - Folic acid (methyl donor)
 - Vitamin A
 - Selenium (antioxidant via GPx)
 - Zinc (healing and immune system)

Any more nutrients and you'd need a prescription!
Take 3 to 4 times a week.

Biesalski, H.K., 2005. *Meat Science* 70:509-524



Beef Export News

USMCA – Canada and Mexico

US – Japan Trade Agreement: CPTPP

Comprehensive and Progressive Trans-Pacific Partnership

- Reduced tariffs and duties to competitive levels with others

US – EU Agreement:

- Greater quota levels associated with high quality beef

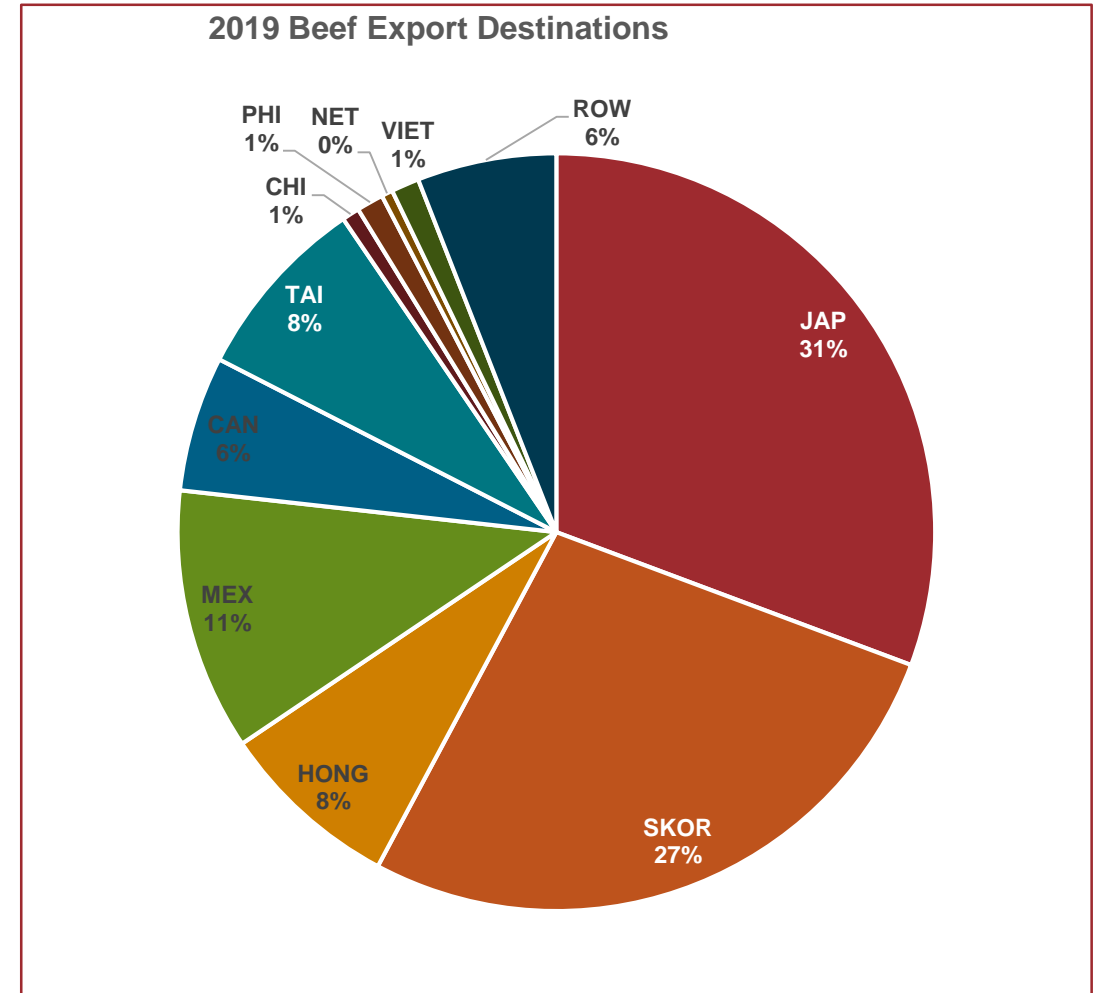
Year	US Volume	All Other Eligible Countries
2020	18,500 MT	26,500 MT
2021	23,000 MT	22,000 MT
2022	25,400 MT	19,600 MT
2023	27,800 MT	17,200 MT
2024	30,200 MT	14,800 MT
2025	32,600 MT	12,400 MT
2026	35,000 MT	10,000 MT

US – China Phase One Agreement

- Remove age restrictions
- Reduced traceability requirements
- Allow use of implants
- Backlog of US processing plants being approved
- Conducting review on acceptance of ractopamine

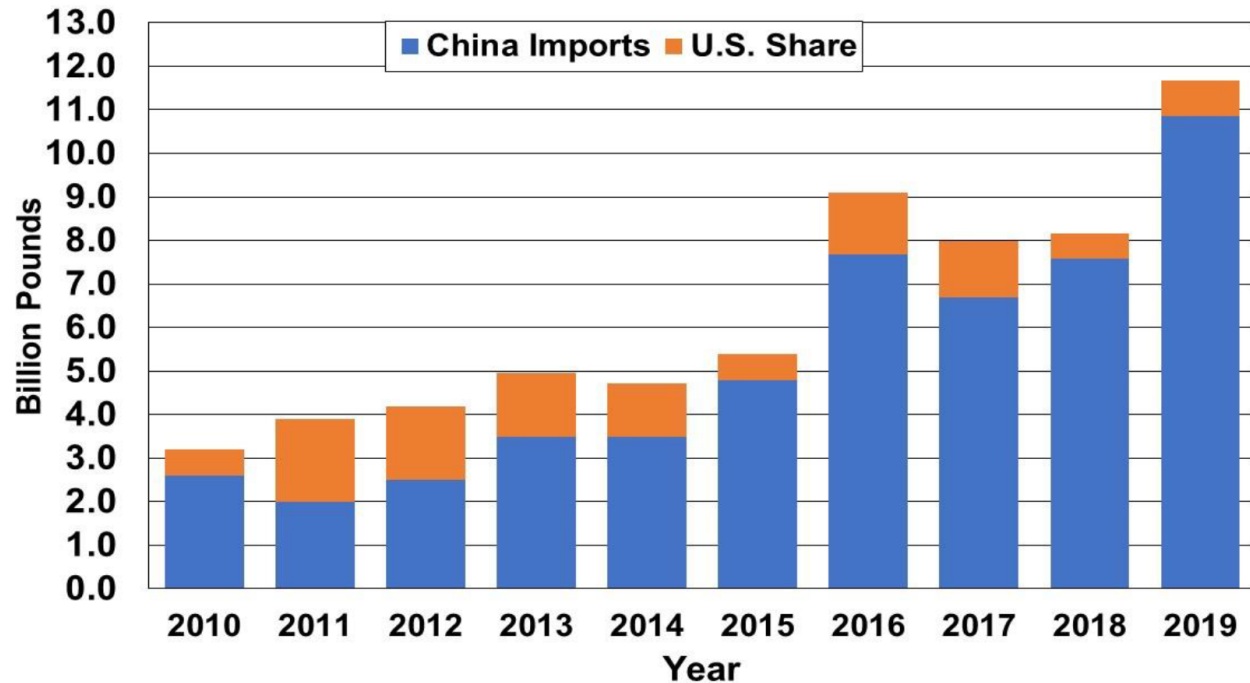
Revised KORUS Agreement (South Korea)

- Previous agreement made US pork duty-free & reduced duty on US beef from 40% to 21.3%.
- Under new agreement duty on beef will continue to be reduced each year until eliminated by 2026.



Export News

U.S. Share of China Protein Imports -Beef, Pork, and Broiler-



Source: GTA, CattleFax

Source: Kevin Good – CattleFax, VP of Industry Relations & Analysis, Beef Industry Forum, NCBA, February 4, 2020

CattleFax | THE DECIDING FACTOR

U.S. is not the only shop in town

In the last 5 years, Brazil, Argentina, Uruguay increased beef exports by 67%

Brazil's Beef Export

- 2018 – 1.643 Million tonnes
- 2019 – 1.828 Million tonnes (+11%)
- 2020 – 2.067 Million tonnes (+13%)
- **Note:** If Beijing lowers or removes a 24% import levy on S.A. beef, these numbers could be even greater.

S.A. Beef Processors Authorized to sell to China

- Between August and December 2019:
 - ✓ Brazil had 22 additional plants approved (**37 total**), &
 - ✓ Argentina had 8 additional plants approved (**41 total**).

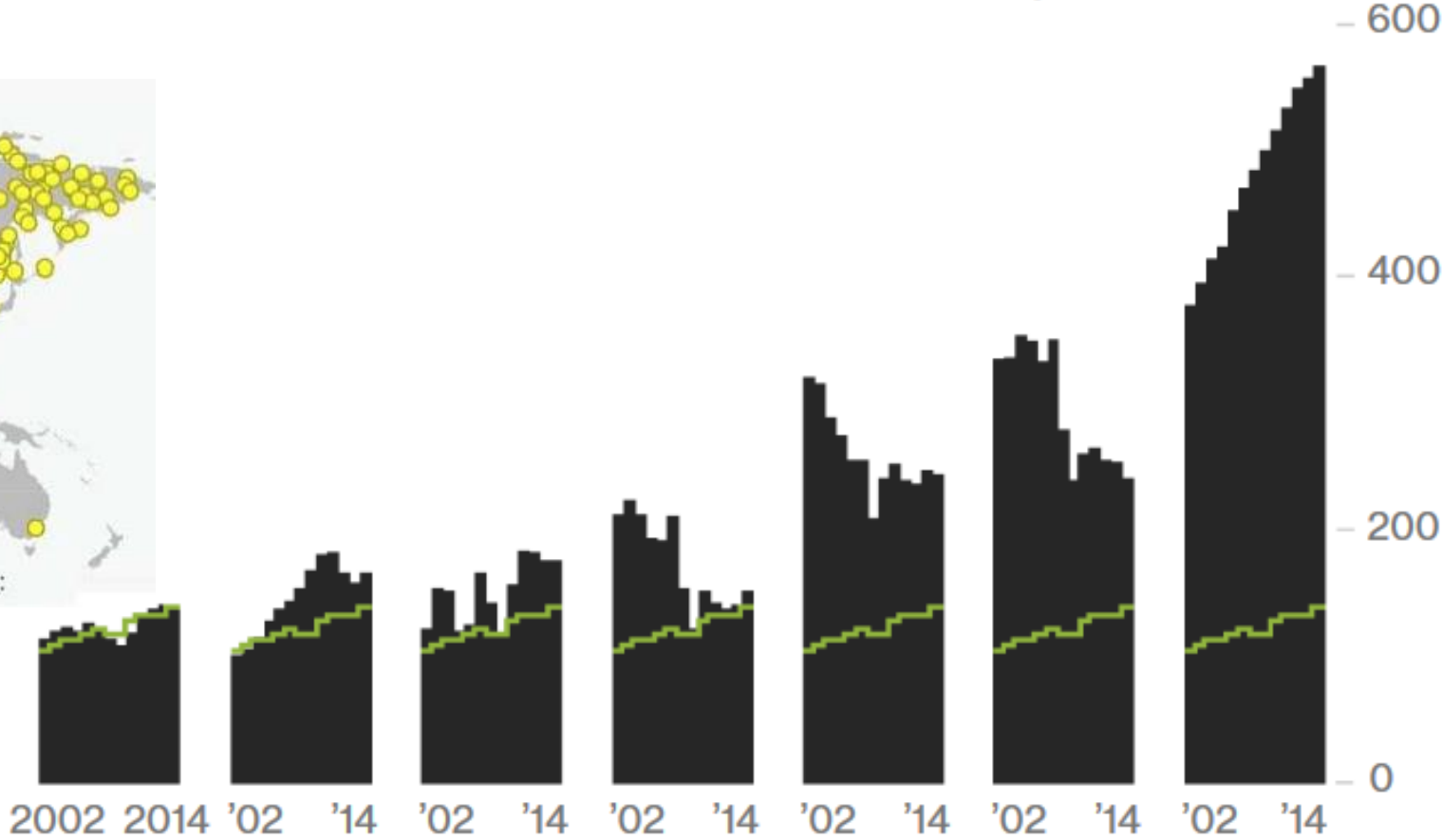
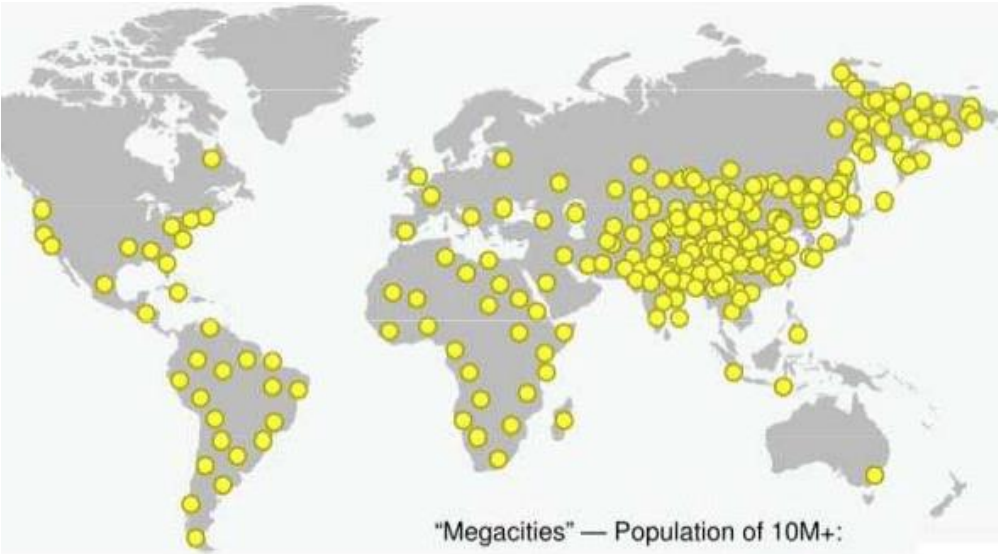
JBS S.A. recently signed an agreement with WH Group in China to supply fresh beef, pork, and poultry (\$713 MM annually).

Food Security/Insecurity

China's Fertilizer Consumption

■ Fertilizer consumption (kilograms per hectare of arable land) — World average

U.S. India Brazil France U.K. Japan China



Source: The World Bank Group

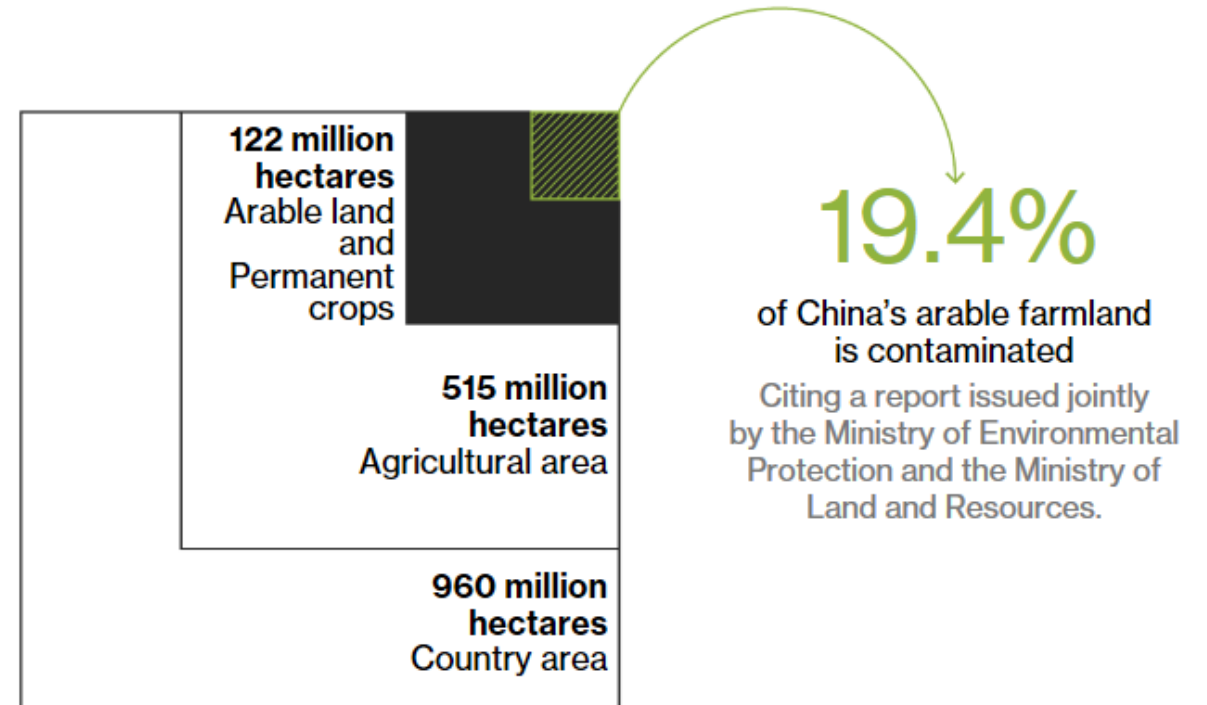
Food Security/Insecurity

How can China produce enough safe food for its growing population if they all start eating like Americans?

They can't.

It takes about 1 acre to feed the average U.S. consumer; China only has about 0.2 acres of arable land per citizen, including fields degraded by pollution.

China's Pollution Problem



Source: Food and Agriculture Organization of the United Nations

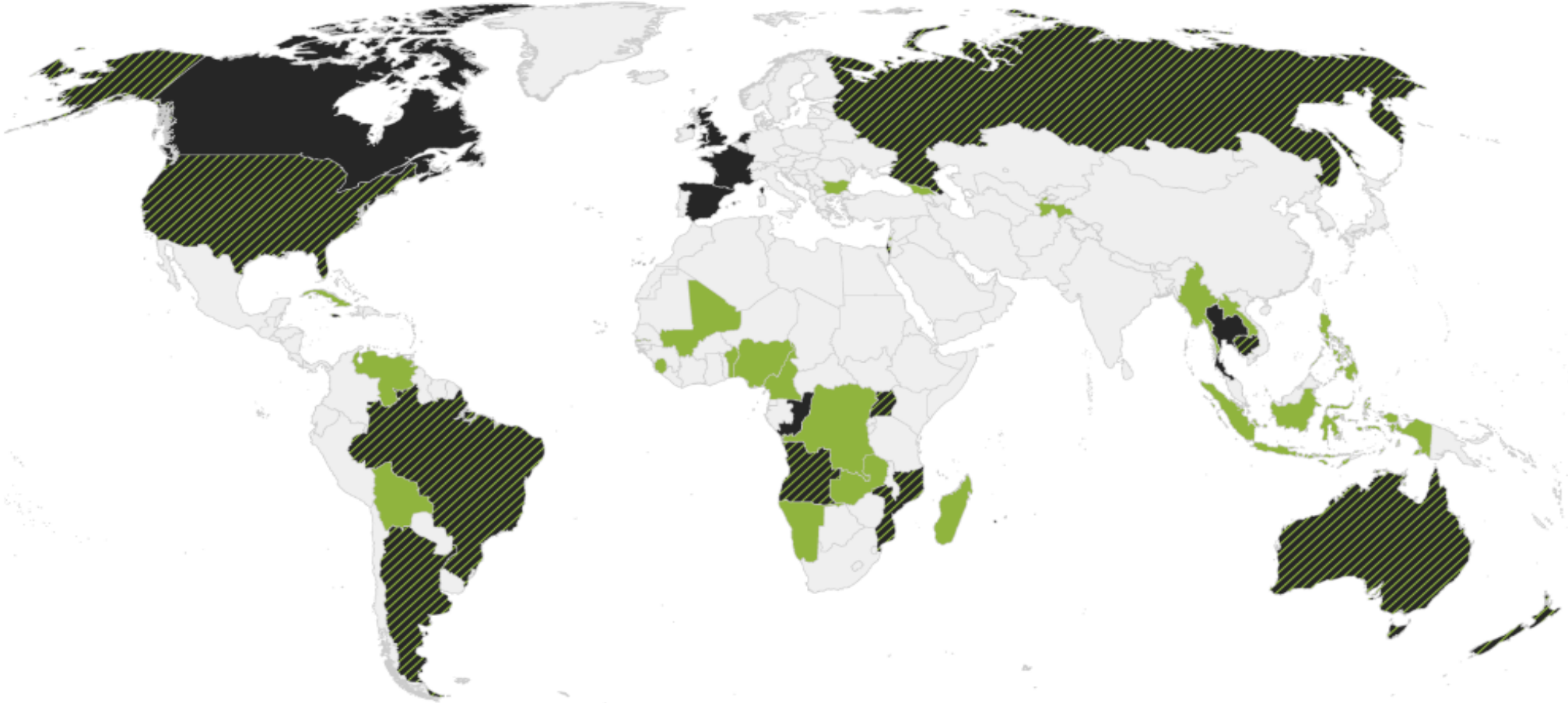
China's government has increasingly shifted its focus to reforming agriculture, and its approach divides into four parts: market controls; improving farm efficiency; curbing land loss; and imports.

Source: <https://www.bloomberg.com/graphics/2017-feeding-china/>

Food Security/Insecurity

China's Global Food Print

- Food investments
- Land acquisition
- Food investments and land acquisition



Note: Land investments are since 2006, agriculture since 2005.
Source: The Heritage Foundation, GRAIN.org

WH Group's 2013 purchase of Virginia-based Smithfield was part of a \$52 billion overseas spending spree by Chinese food companies since 2005 as China's population became wary of home-produced food. This WH Group factory in Zhengzhou, China, makes American-style pork products from imported Smithfield meat.

Sam Geall,
Research Fellow focusing on China's
environment and agriculture
U.K.'s University of Sussex

“Chinese people are much more aware of food-safety problems today than a decade ago. They pay more attention to where their food is coming from, and they are often willing to pay more for safety.”



Sustainability

New climate plan: 100% clean energy act

U.S. House of Rep. Clean Future Act – produce no more pollution than we can remove by 2050

Colorado – May 2019 passed a law mandating:

- 50% cut in climate pollution by 2030, and
- 90% cut by 2050

Illinois – Clean Energy Jobs Act will grow the renewable electricity supply to:

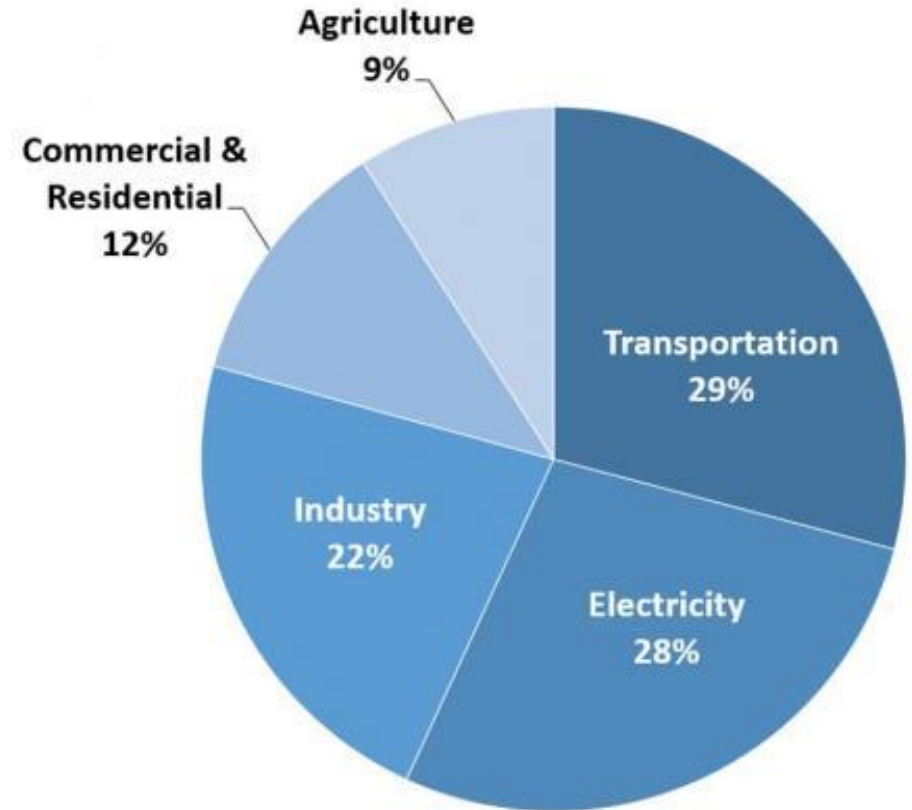
- 25% by 2025,
- 46% by 2030, and
- 100% by 2050

California – Mandated all public buses be electric by 2029

90% of Global trade moves by ship.

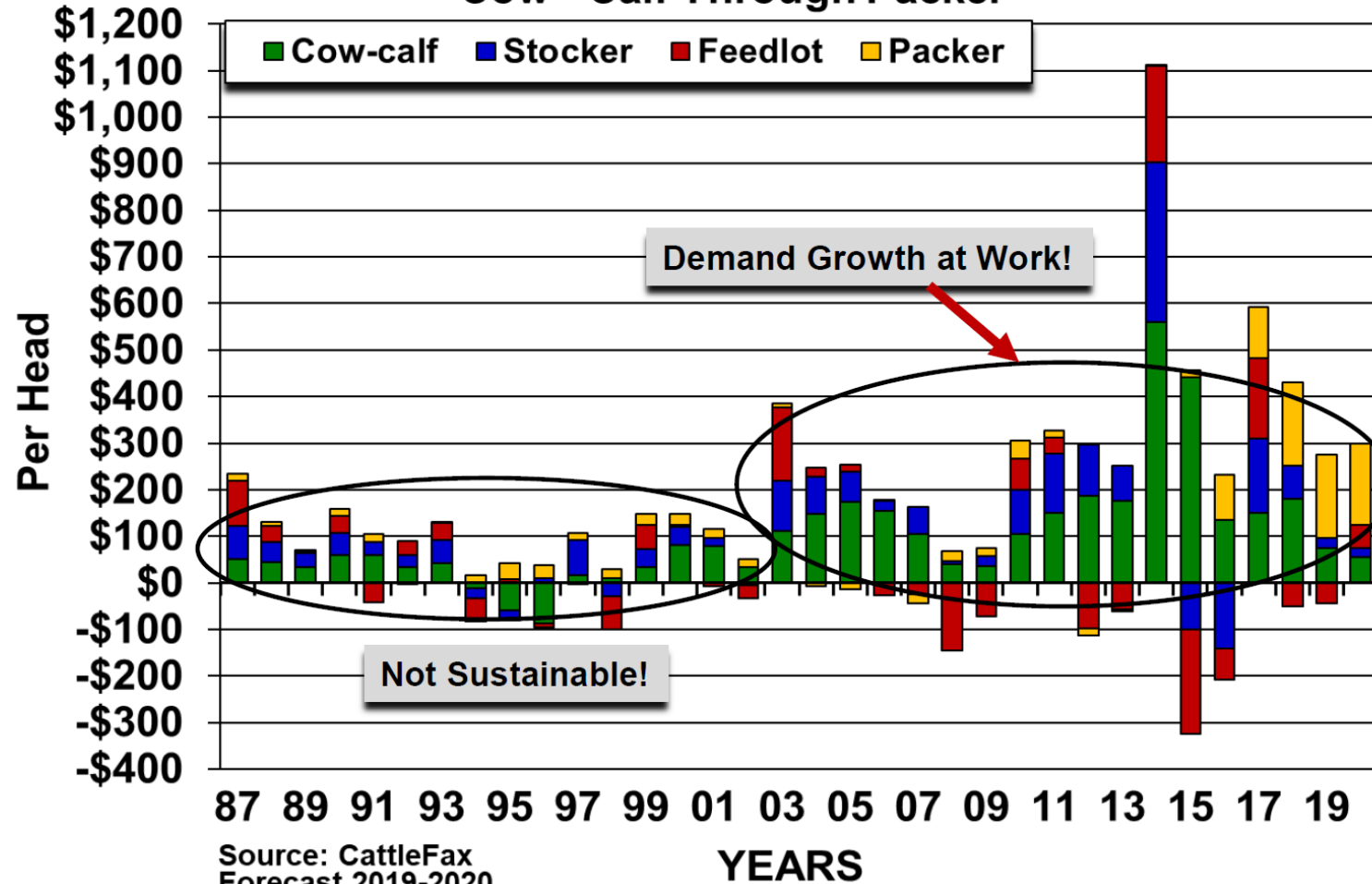
- If shipping were a country, it would be the 6th largest emitter of greenhouse gasses.
- With increased trade, the emissions from international ship traffic was predicted to more than double by 2050.
- International Maritime Organization agreed to cut global shipping emissions in half by 2050.

Sources of Greenhouse Gas Emissions in 2017



Sustainability

Industry Profitability Cow - Calf Through Packer



Randy Blach, CEO CattleFax

- War on fat
- Consumer demand
- Sustainability
- Healthy / Nutritious
- GHG emissions
- Animal Welfare
- Antibiotics

Again I ask – “What’s in your mirror?”

What/who are the two enemies I face every day in my role?

What was that definition of insanity?

Transparency is the currency of trust.

You can help shape the “story” that will be told about animal proteins in the future?

- Plant Base Proteins
- Biosecurity
- Animal Welfare
- Traceability/Transparency
- Biosecurity
- Food Security
- Sustainability



Change is inevitable, progress is not!

We have a moral obligation to pursue the production of a safe and abundant food supply and to mitigate negative impacts on our communities and environment.

Our consumer's needs & desires will change, our markets will change, and therefore, agriculture must change, including:

- how we think about it,
- how we execute it, and
- how we educate people about it.

