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Sutardja Center
for Entrepreneurship & Technology
Berkeley Engineering

Industry Change: Sustainable Meat Alternatives

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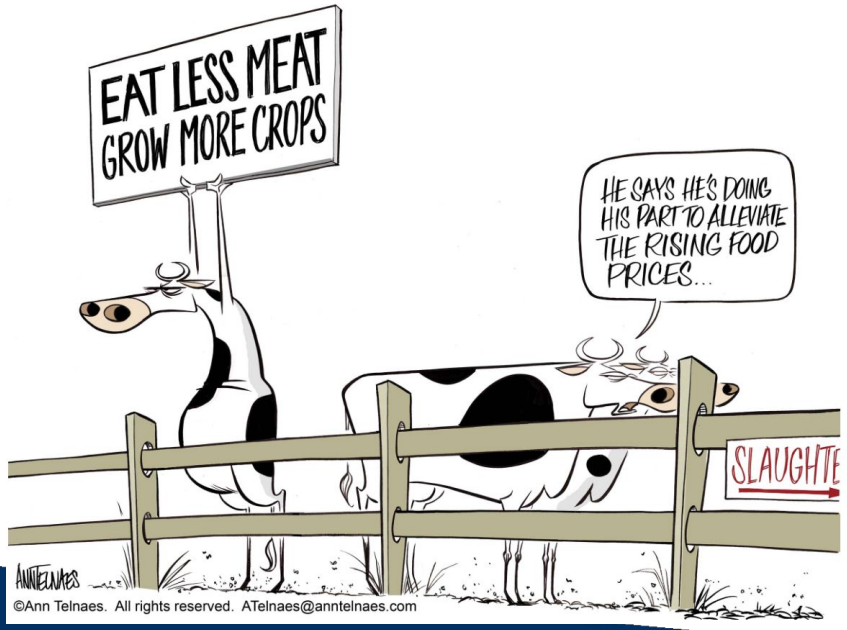
Thesis

- Meat production is unsustainable at current and projected rates of consumption due to high resource intensity and destructive cost
- This opens a large market for nutritious protein alternatives which can provide comparable taste, texture, and nutrition density



Presentation Summary

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- Impacts of industrialized meat production
- Total meat market vs. meat alternatives market
- Current players in meat alternatives space
- Barriers to entry
- Conclusions

Industrialized Meat Production

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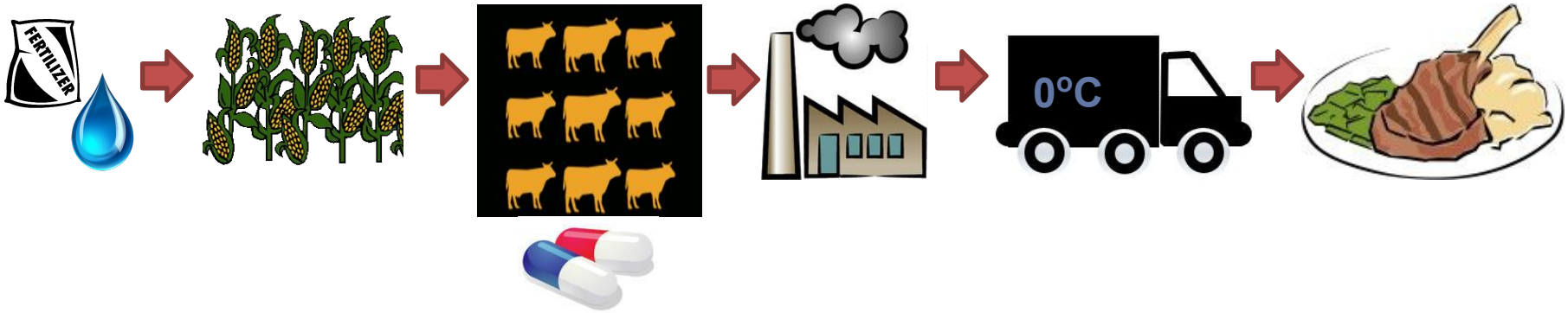

1 hamburger = 660 gallons of water

Conversion Rate:
6 to 20 pounds of corn to 1 pound of Beef

Mono - cropping & GMO trends

Government Subsidies hide true production cost

Reliance on Hormones and Antibiotics for higher yield

Waste from a farm of 2500 dairy cows = Waste from a city of 411000 people

Additional energy, chemicals & preservatives for processing

Pollution and waste

High demand requires global distribution.

Many heads of cattle feed into a single batch of meat

Diseased animals hard to contain and track

Preservatives & Hormones affect Health & Obesity Rates.

The Numbers

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Livestock generates ~8% of GHG emissions

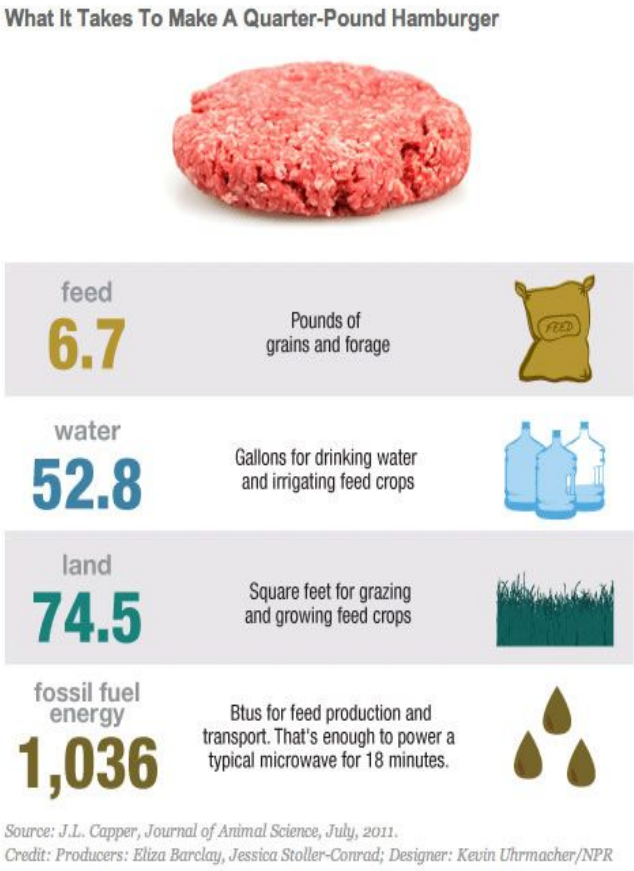
Consumes 36% of the world's crop calories:

- 1 cal beef requires 11 plant-derived cals
- 1 cal poultry requires 4 cals

Antibiotic-resistant bacteria in meat:

- infects 3.6M annually, killing 1000+
- 62% of samples in one FDA study tested positive for resistant Enterococcus

Meat-rich diets generate a 2X-3X higher "foodprint" over vegetarian diets



This is Unsustainable

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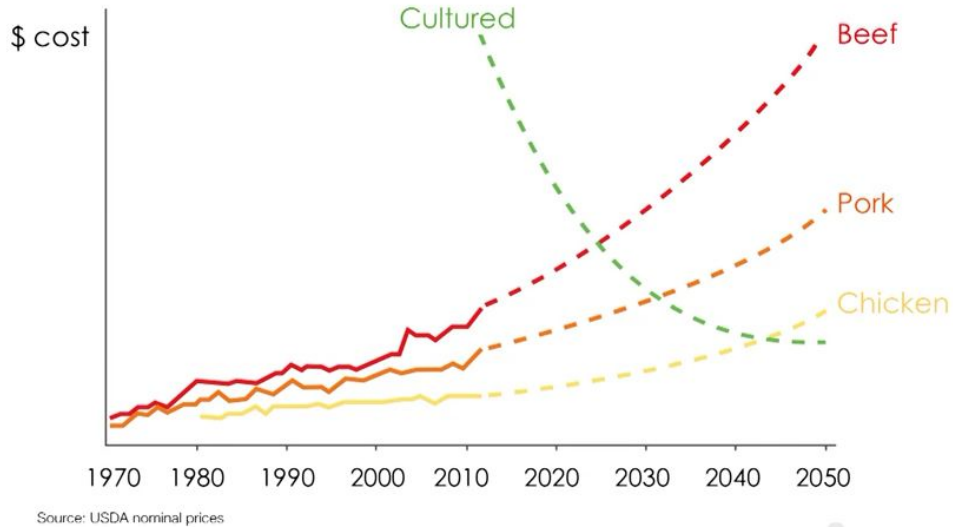
Agriculture uses 37% of land mass, 70% of freshwater.

Extrapolating to 2050, we need 63% of land mass, 118% of freshwater.



Market for Meat

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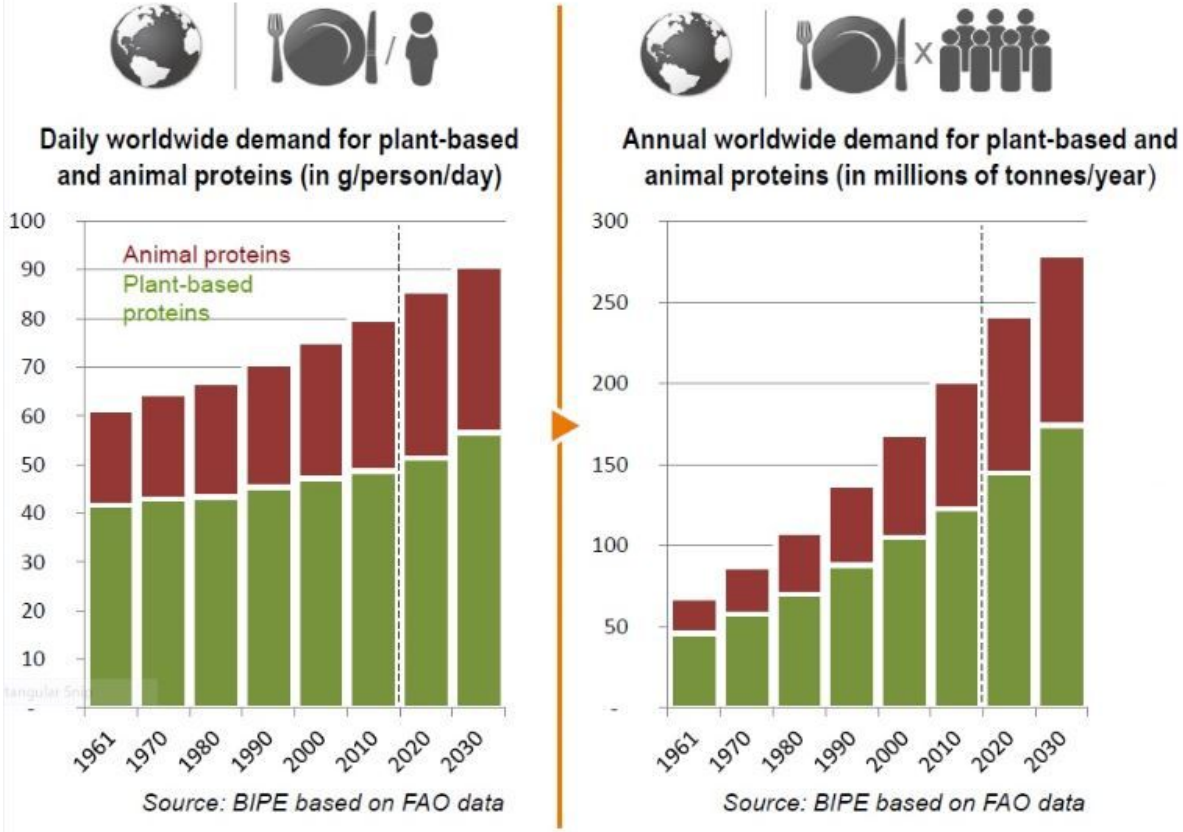
US 2014 Meat and Poultry Sales = $212B	Target ~$10-20B (assuming 5 to 10% conversion)
US 2014 Ripple Effects = $864B	Additional downstream markets

- Given the high levels of government subsidy (e.g. US $22B, OECD $53B) the industry is susceptible to disruption … by both policy changes and individual choice
- Climate driven disruptions (e.g. in feed supply) could lead to a shock that further drives the market for Meat alternatives grew to $553M in 2012, 8% growth from 2010 to 2012
- Bloomberg reports that VC Funds see increasing promise in lab created eco foods

Market for Meat Alternatives



- Estimated $5.17B by 2020 at a CAGR of 6.4% from 2015
- Increasing Consumer demand means that alternatives to meat could claim up to 33% of the world's protein market by 2054

Current Players

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Soy/Plant based

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- Founded in 2003
- Acquired by Pinnacle foods for $155M in Nov, 2014
- Most popular soy based meat alternative brand

- Founded in 2009
- $17M funding in 2 rounds
- Products found in several grocery stores
- Well known food critics have been fooled (Bill Gates blog)

Others:
Impossible Foods
FoodsKraft(Boca)
Kellog(Worthington) Pulmone (Wildwood)

Lab grown meat

- Founded in 2014
- $10M funding in Series A
- Currently focusing on producing lab grown leather and working to produce lab grown meat

Others:

Dr. Mark Post, a professor at Maastricht University, Netherlands produced a five-ounce hamburger using lab grown meat
How it works (video)

Barriers to Entry

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- Culture of meat eating and ingrained habits
- Taste and texture of meat – hard to replace
- Understanding chemical composition of meat alternatives
  - FDA regulations compliance
  - Known & unknown health impact
- Political roadblocks by meat industry lobbyists

Conclusions

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- Industrialized meat production is unsustainable with growing population demands
- Over time it is natural for a conversion from meat towards sustainably produced alternatives
- Meat alternatives are viable, sustainable and profitable

Q&A

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