

Industry Change: Sustainable Meat Alternatives

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Thesis

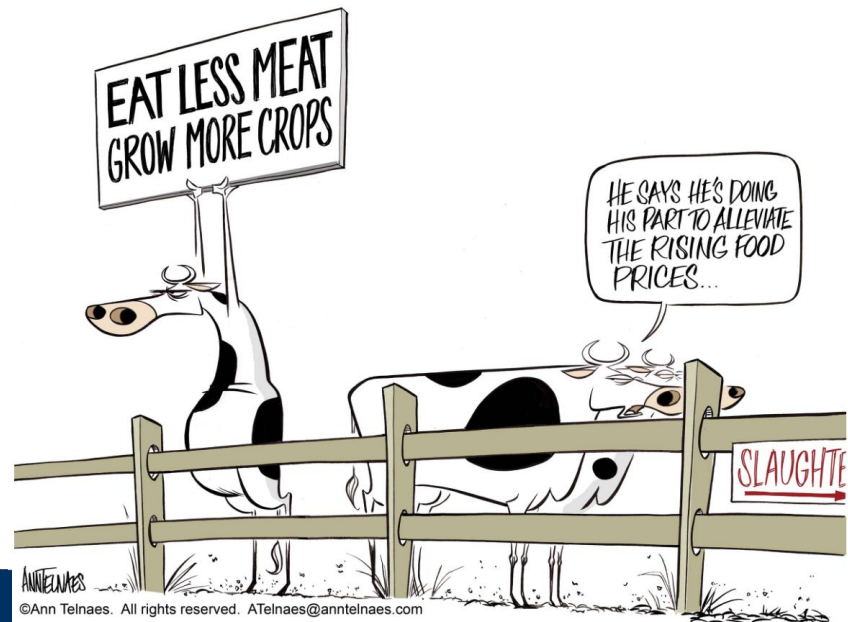
- Meat production is unsustainable at current and projected rates of consumption due to high resource intensity and destructive cost
- This opens a large market for nutritious protein alternatives which can provide comparable taste, texture, and nutrition density



MADE FROM PLANTS!

THE IMPOSSIBLE CHEESEBURGER

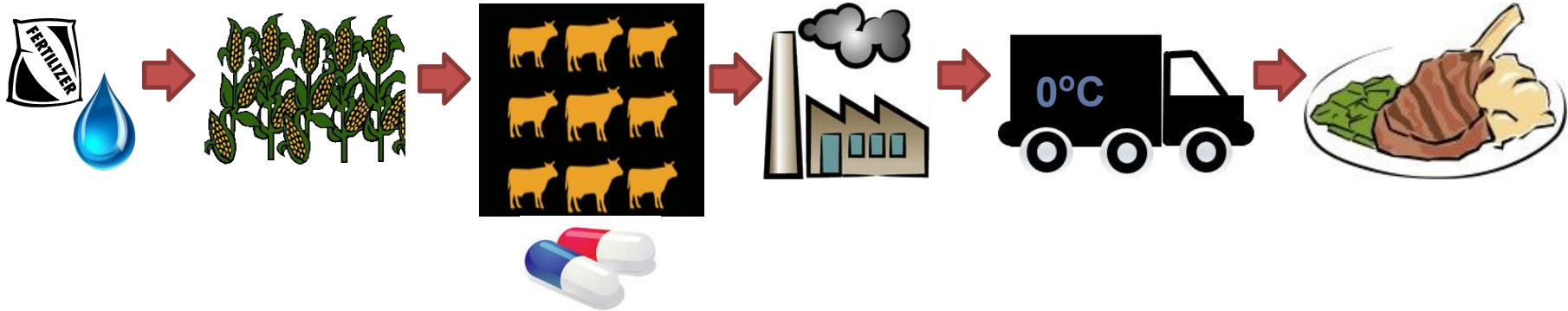
We love meat. We love cheese. And for thousands of years we have relied on animals to make them. Impossible Foods has found a better way. We use plants to make the best meats and cheeses you'll ever eat.



Presentation Summary

- 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



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

Livestock generates **~8%** of GHG emissions

Consumes **36%** of the world's crop calories:

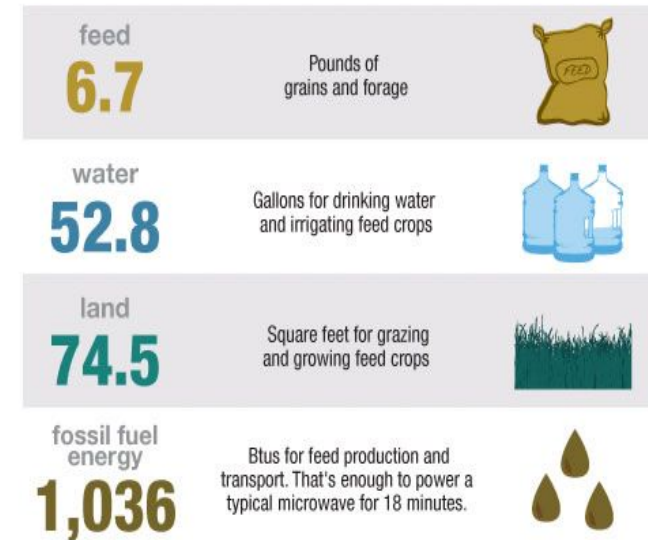
- 1 cal beef requires 11 plant-derived cal
- 1 cal poultry requires 4 cal

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

What It Takes To Make A Quarter-Pound Hamburger



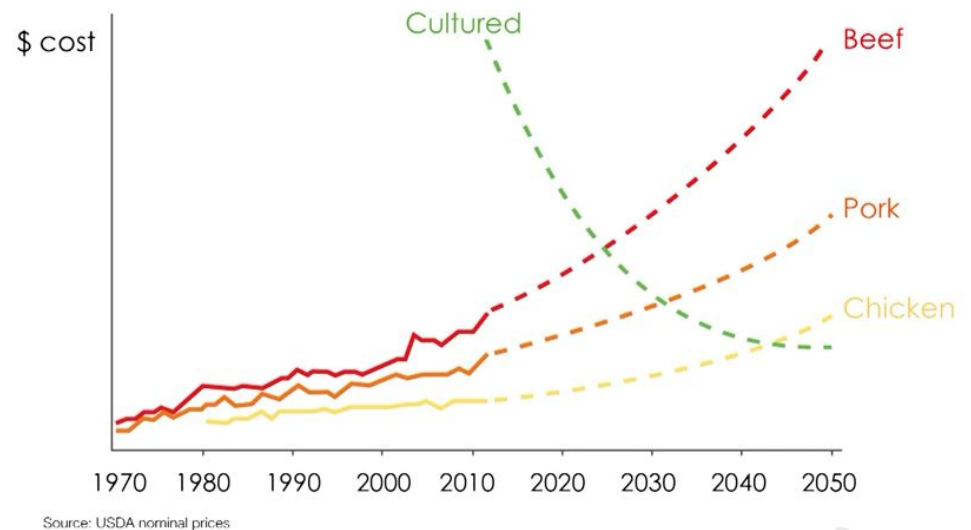
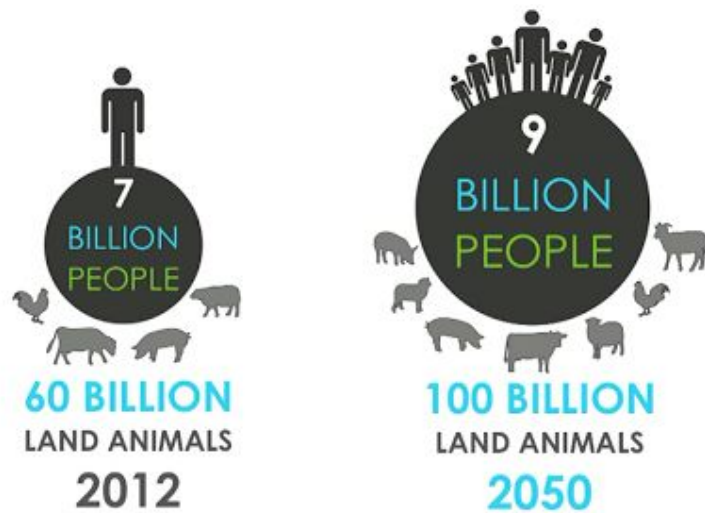
Source: J.L. Capper, *Journal of Animal Science*, July, 2011.

Credit: Producers: Eliza Barclay, Jessica Stoller-Conrad; Designer: Kevin Uhrmacher/NPR

This is Unsustainable

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

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



Market for Meat

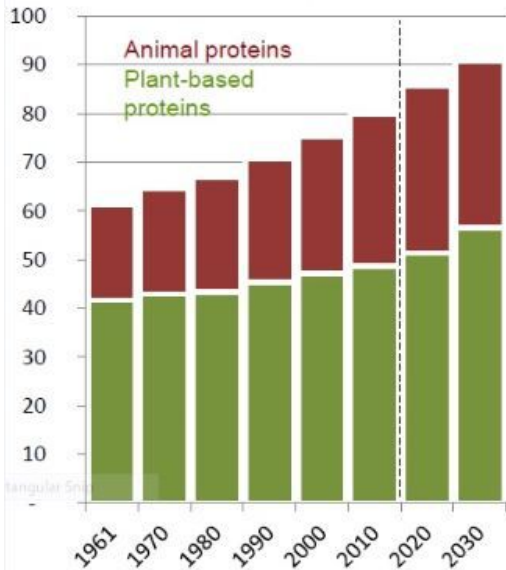
<u>US 2014 Meat and Poultry Sales = \$212B</u>	Target ~\$10-20B (assuming 5 to 10% conversion)
<u>US 2014 Ripple Effects = \$864B</u>	Additional downstream markets

- 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



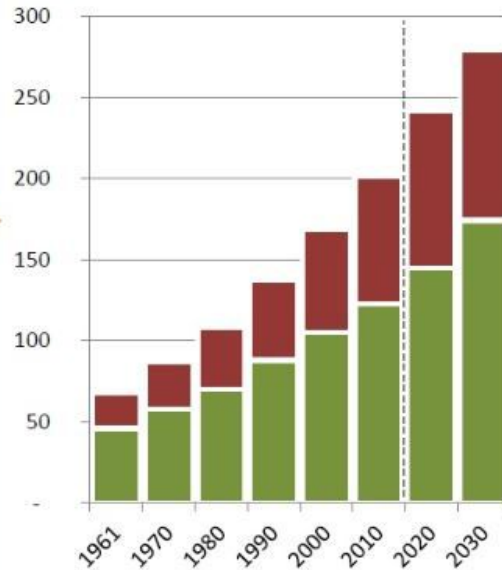
Daily worldwide demand for plant-based and animal proteins (in g/person/day)



Source: BIPE based on FAO data



Annual worldwide demand for plant-based and animal proteins (in millions of tonnes/year)



Source: BIPE based on FAO data

◆ [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

Soy/Plant based



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

Others:

Impossible Foods
FoodsKraft(Boca)
Kellogg(Worthington) Pulmone
(Wildwood)



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

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

- 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

- 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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