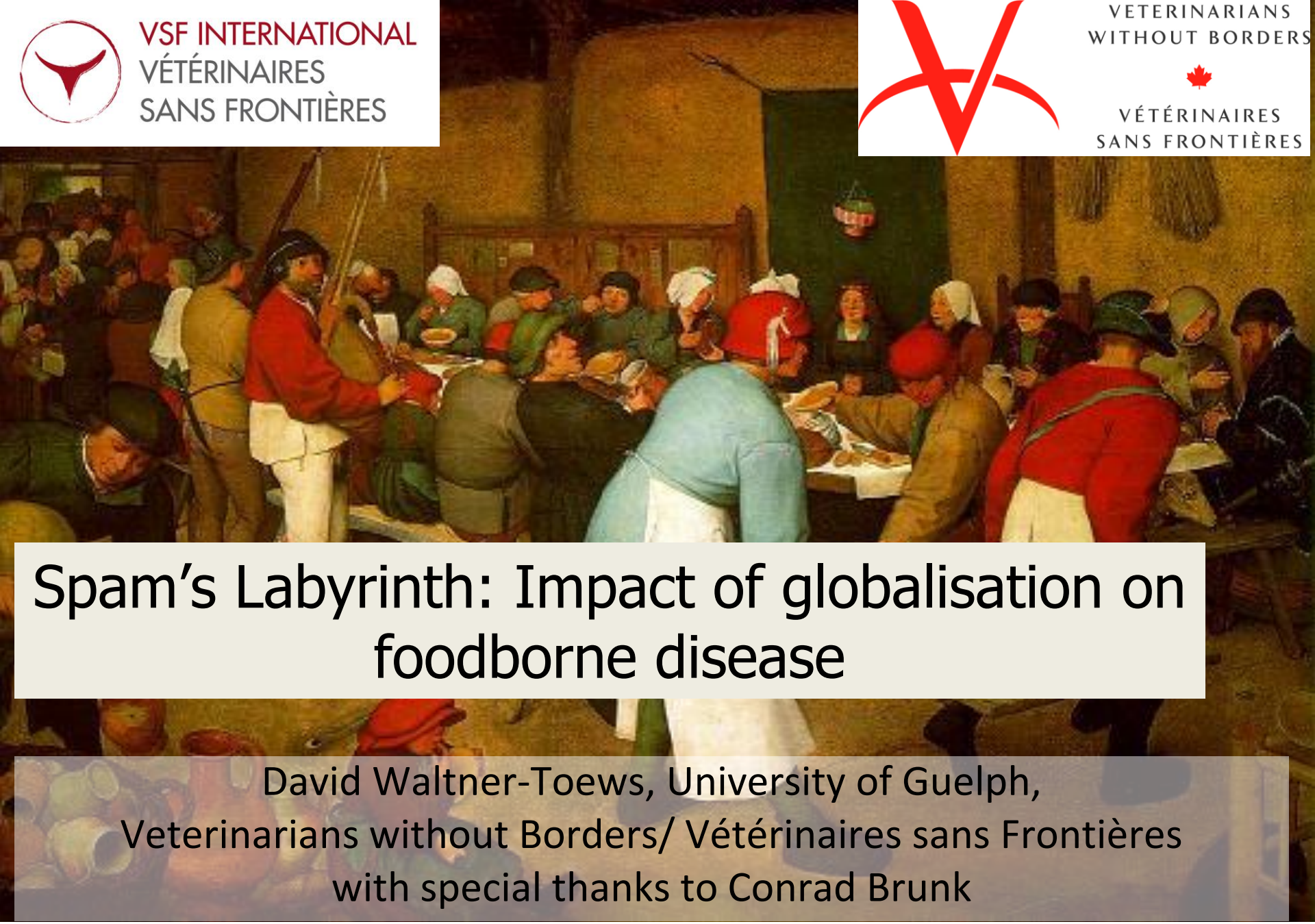

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Spam's Labyrinth: Impact of globalisation on foodborne disease

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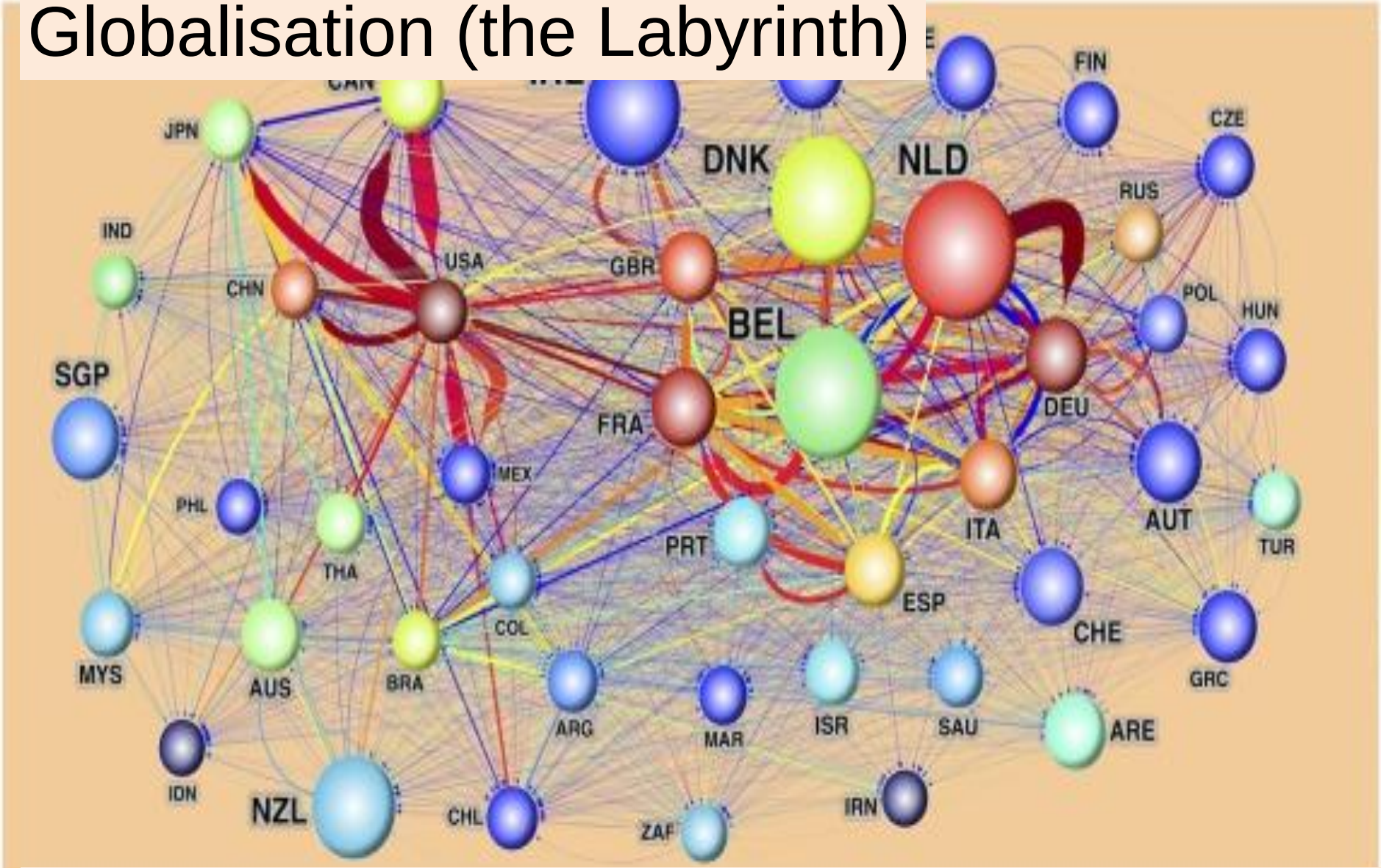
Veterinarians without Borders/ Vétérinaires sans Frontières
with special thanks to Conrad Brunk

Definitions

- Pan's Labyrinth (Guilermos del Toro, 2006)
  - a poorly understood, darkly-mysterious underworld that lies just below the surface of everyday life. If our food system creates misery elsewhere in the world, that misery will come through the labyrinth, land on our plates, enter our bodies, and become who we are.

- Spam (Hormel Foods Corporation, 1937) – canned meat
  - 1937 A marketing solution (pork shoulder) in search of a food problem.
  - 1941-45 A meal solution for soldiers in World War II.
  - **Affordability, accessibility & extended shelf life make it a stand-in for any modern, globally distributed, generic food.**
  - Also – unwanted emails mailed indiscriminately. Phishing. Monty Python skit

Globalisation (the Labyrinth)



Ercsey-Ravasz M, Toroczkai Z, Lakner Z, Baranyi J (2012) Complexity of the International Agro-Food Trade Network and Its Impact on Food Safety. PLoS ONE 7(5): e37810. doi:10.1371/journal.pone.0037810

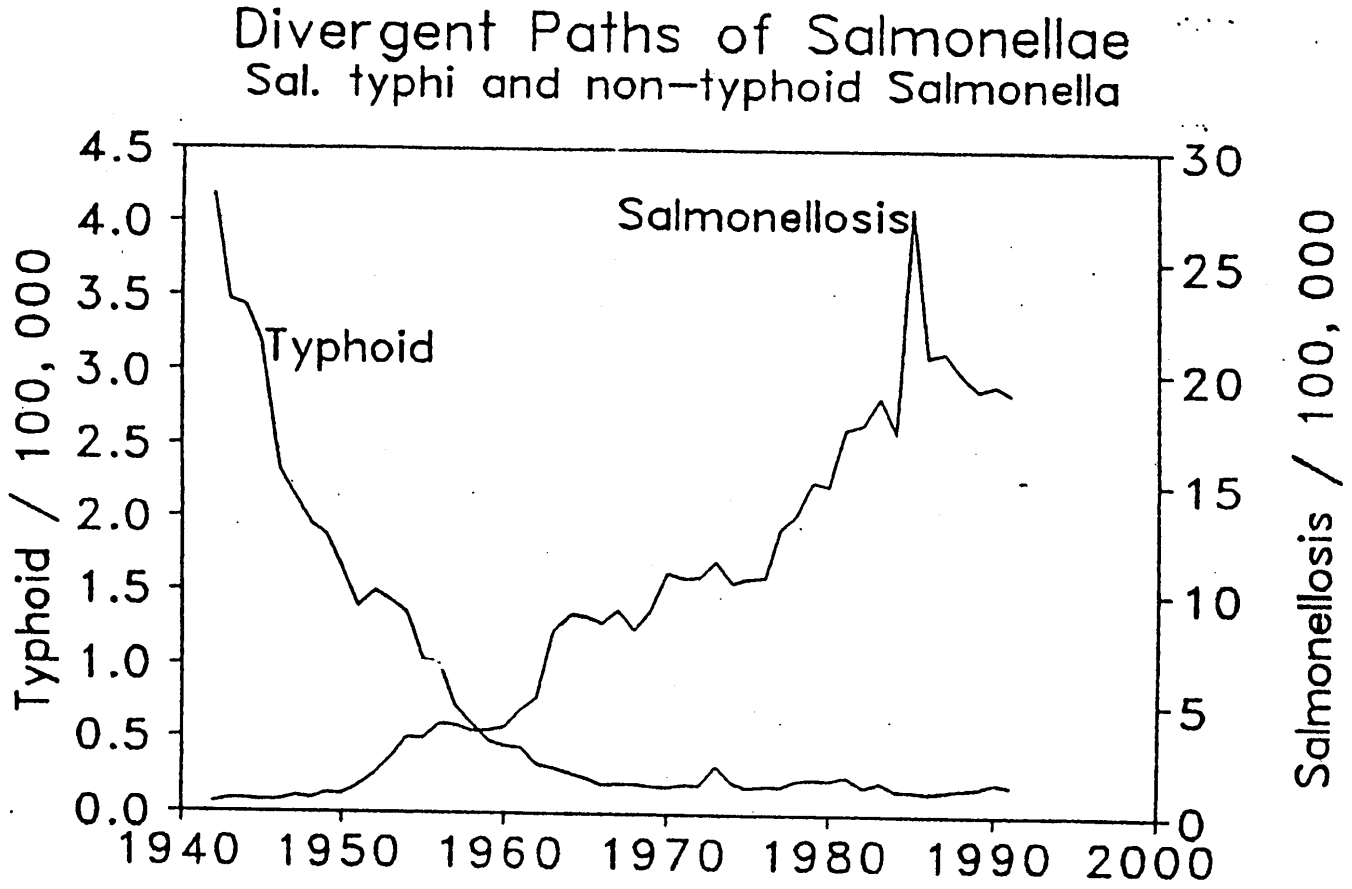
Is there an Impact?

- The Usual Suspects
  - Case Studies: anomalies or doors to labyrinth?
  - Population Attributable Fraction: wild guesses
  - Temporal trends (before and after)
  - Risk Analysis recontextualized
- Complex Systems: Heuristic
- Beyond complex systems: science in the muddled middle

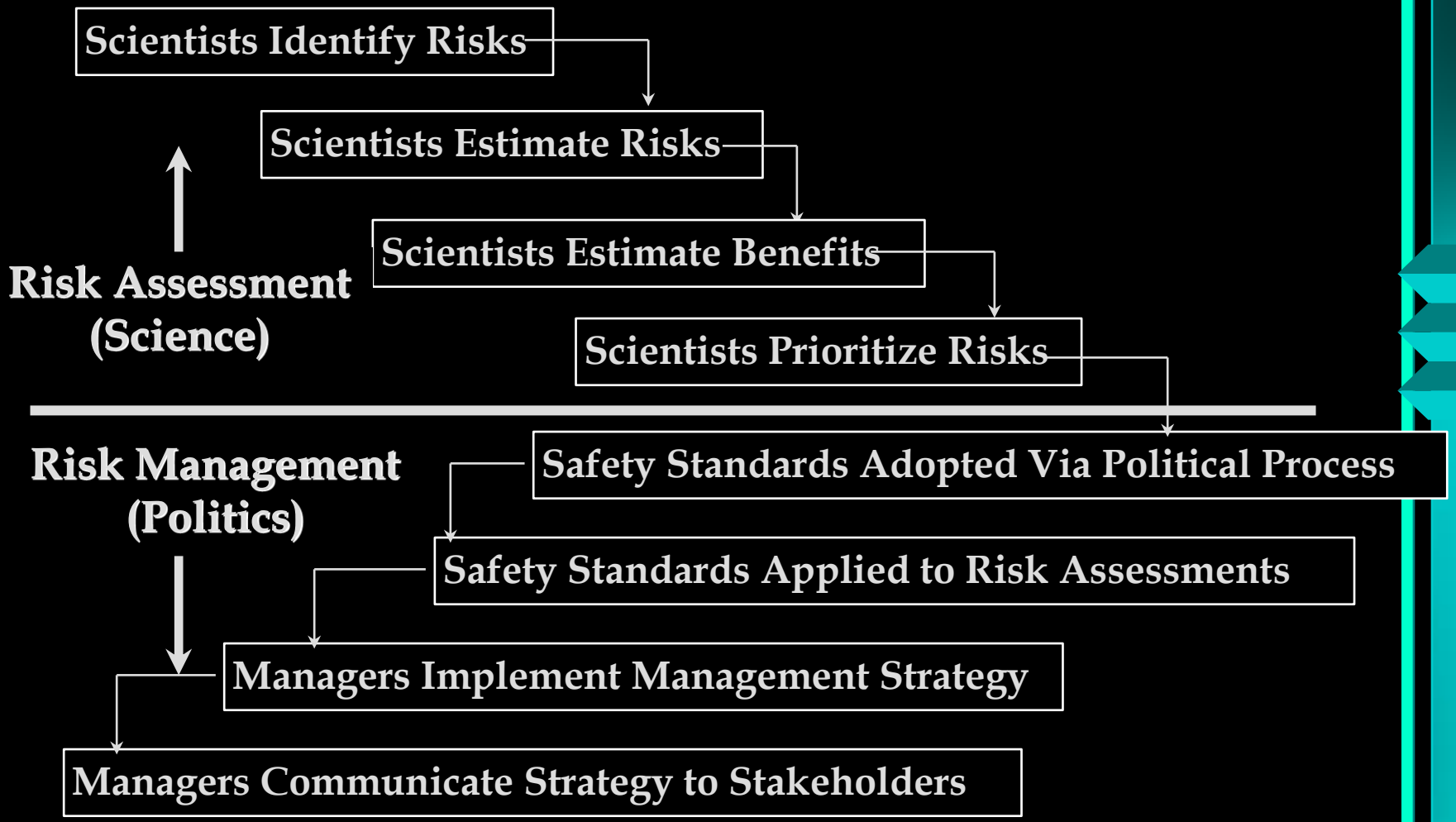
Lessons from Case Studies

- In a rapidly changing social & ecological context, outbreaks are (will always be) expected surprises.
- Not volume of trade that matters but specific foods and ingredients – trace-backs are problematic.
- Endemic diseases in producing country can be addressed by improving social, economic & ecological conditions - **but almost never are**.
- Distribution networks can be addressed **by distributed knowledge & local democracy, but are usually addressed by centralizing power & control**

Temporal trends: before (circa 1980s) and after Globalisation. Correlation? Labyrinthine causes?



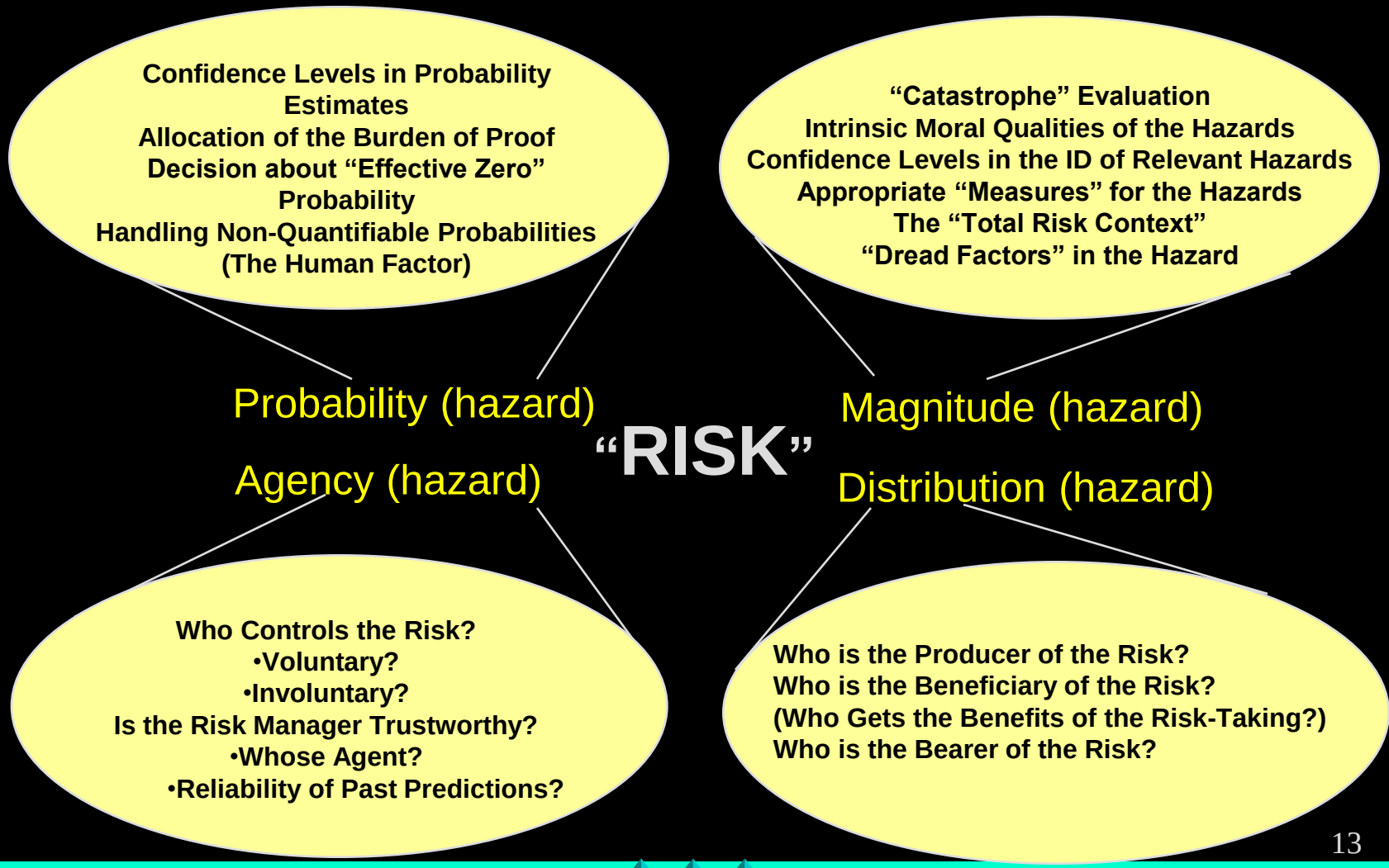
The 1980s Model of Risk Analysis



Risk Analysis and Globalisation

- Even when narrowly focused on risk assessment, the science is entangled with value judgments: selection of species to study, relevant outcomes to measure, relative weight given to Type I and Type II errors, and extrapolation across species.
- When risk-based approaches are applied to longer time frames and globally heterogeneous, rapidly changing political and agricultural landscapes, the problems multiply exponentially.

A Non-Linear Conception of Risk



Does globalization have an impact on FB Diseases? Maybe.

But how we respond will almost certainly heavily impact on them.

Globalisation and foodborne diseases as complex health Issues

A STATE: "... of complete physical, mental and social well-being and not merely the absence of disease or infirmity" WHO Constitution, 1948

Health is Three F's:

A Way of Living: "modus vivendi enabling imperfect [people] to achieve a rewarding and not too painful existence while they cope with an imperfect world" Rene Dubos

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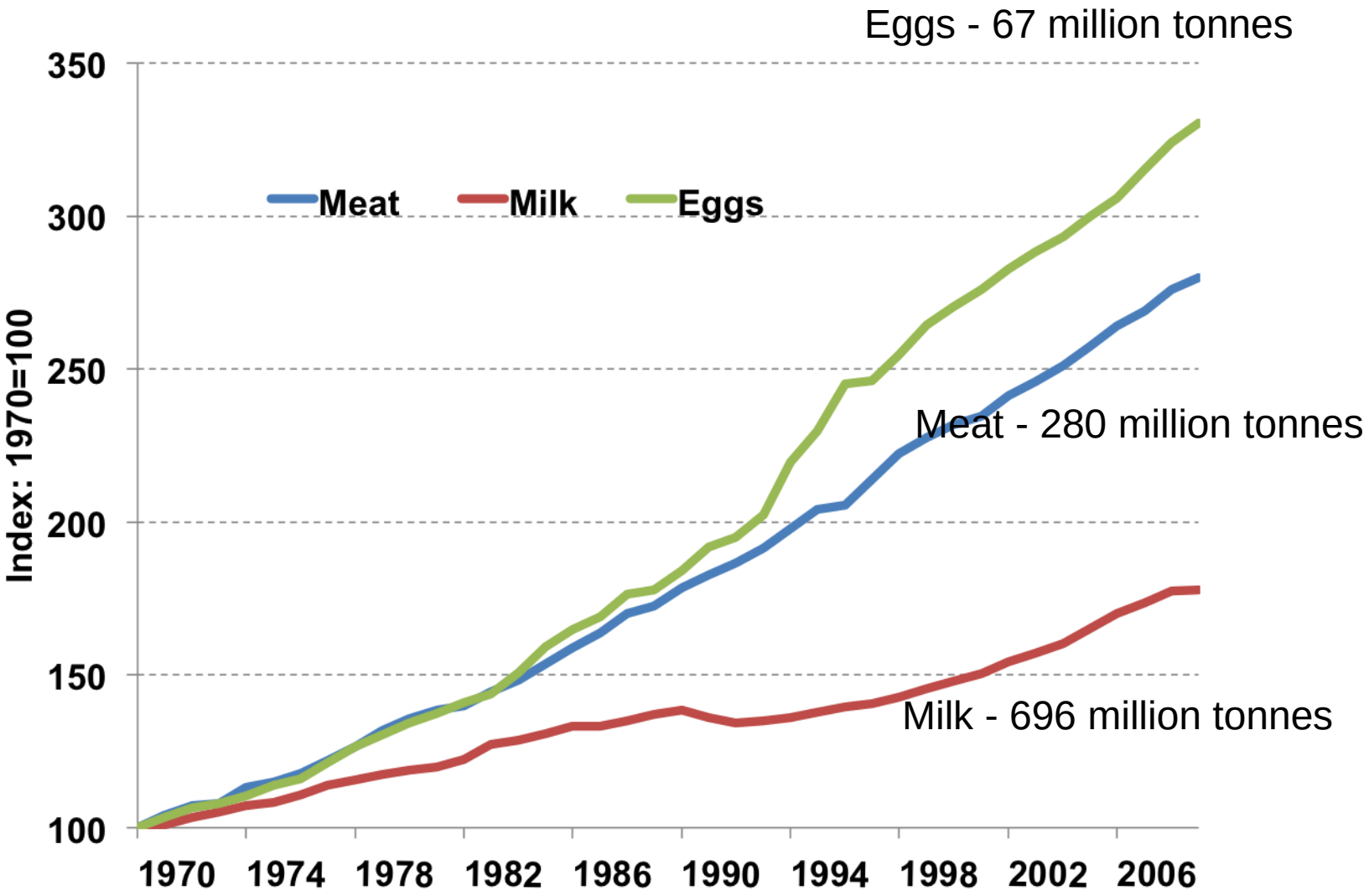
F1 - Food: Success!



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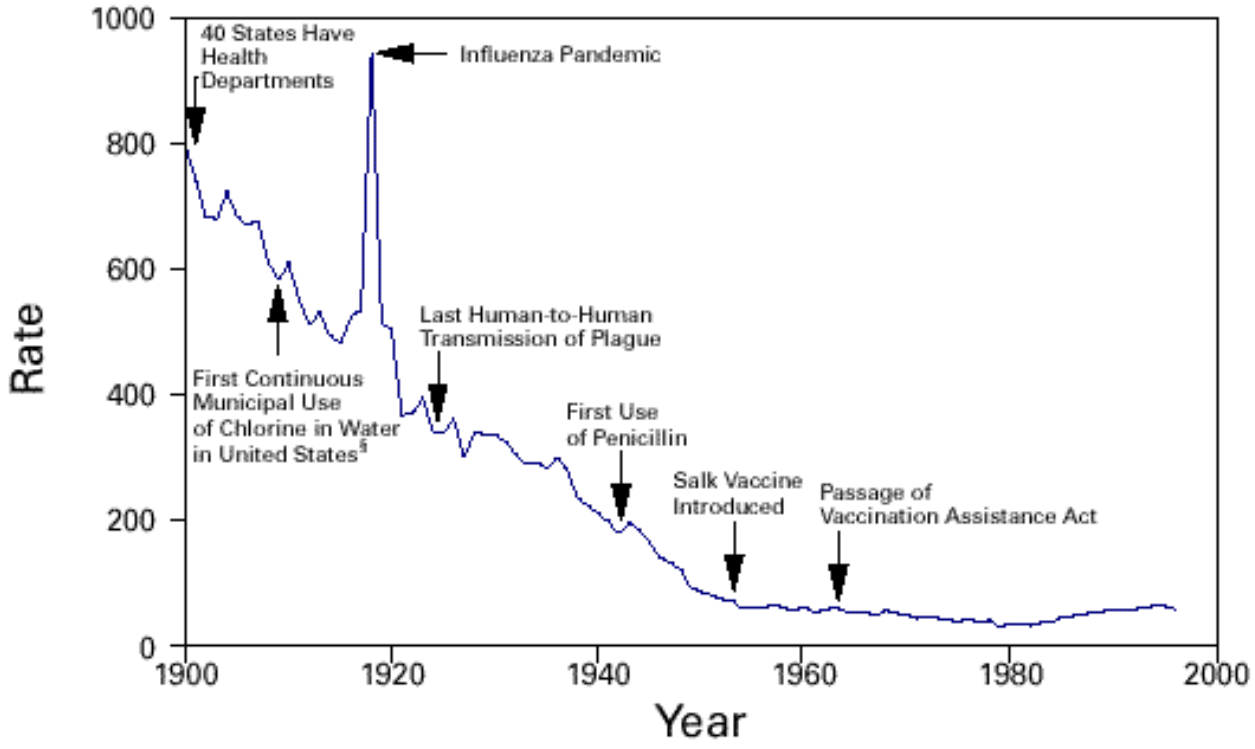
F2 - Freedom from Disease: Success!

FIGURE 1. Crude death rate* for infectious diseases — United States, 1900–1996†



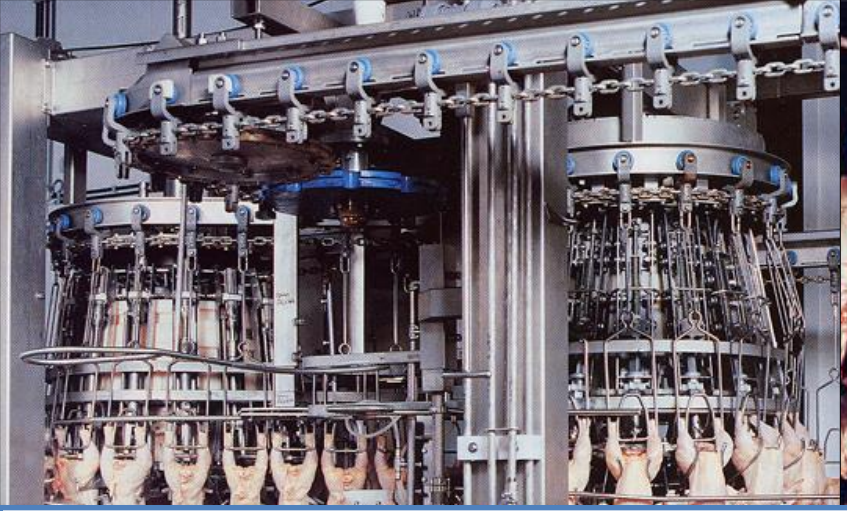
*Per 100,000 population per year.
†Adapted from Armstrong GL, Conn LA, Pinner RW. Trends in infectious disease mortality in the United States during the 20th century. JAMA 1999:281;61–6.
§American Water Works Association. Water chlorination principles and practices: AWWA manual M20. Denver, Colorado: American Water Works Association, 1973.

How did "we" achieve our "desired" outcome?

Once upon a time (circa 1600):

If God keeps me, I will make sure that no peasant in my realm will lack the means to have a chicken in the pot on Sunday!

Henry IV of France



Efficiency: technological changes

Processing is highly automated, efficient and targeted to a specific client. For instance:

KFC requires a 1.7 kg water-chilled chicken.

Swiss Chalet requires exactly 2.4 kg of air-chilled chicken

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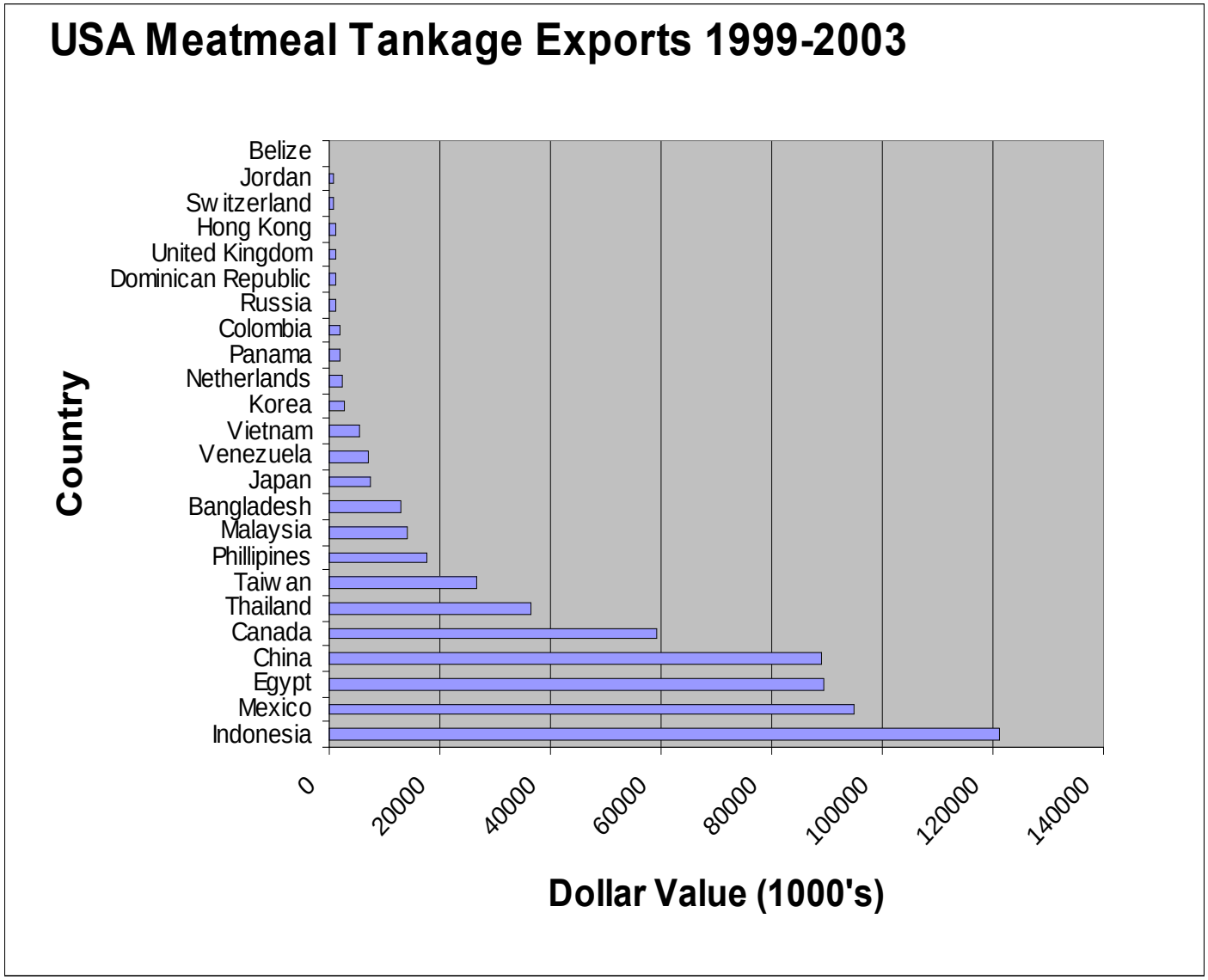
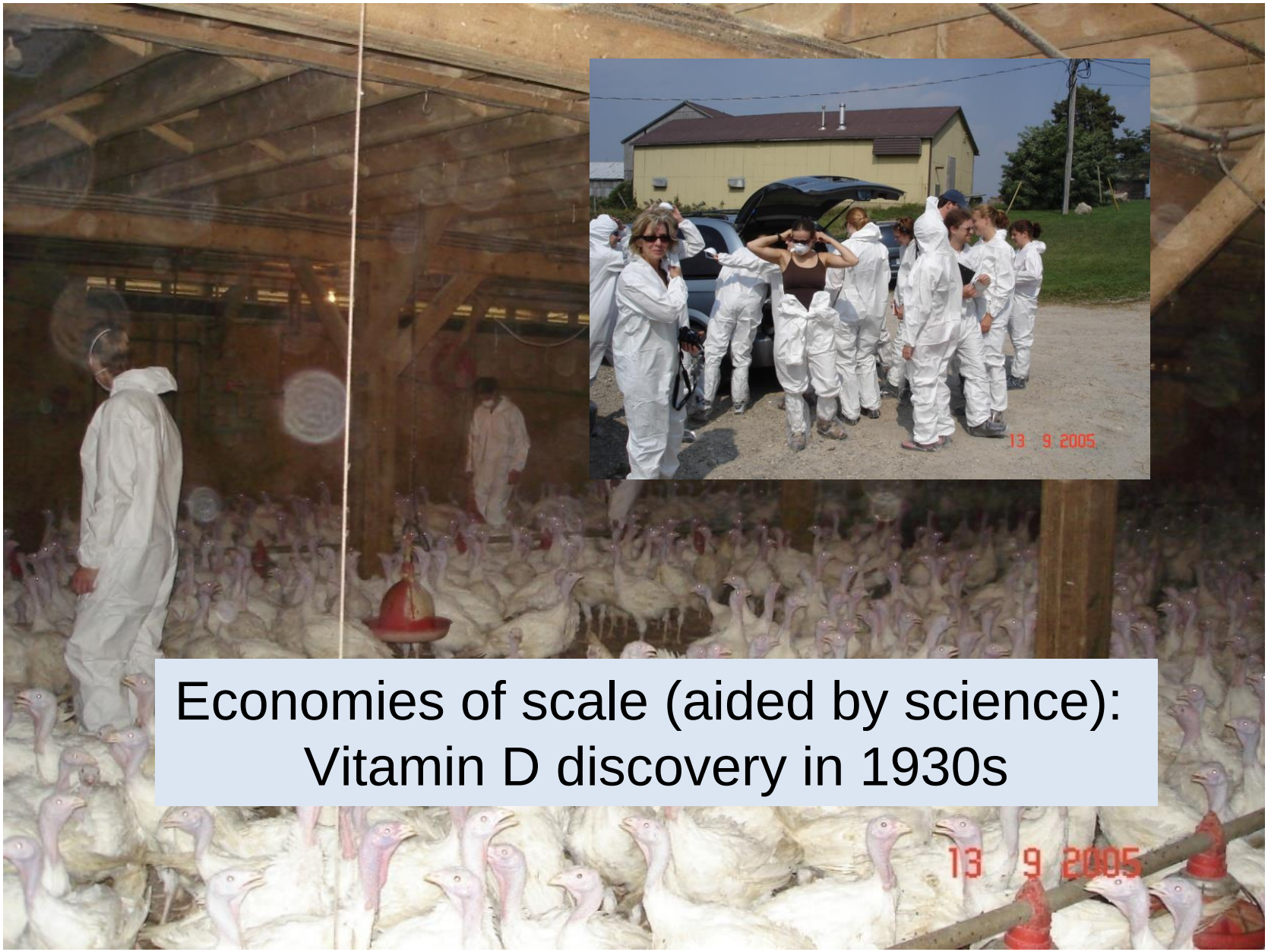
Efficiency: Intensive Recycling





Economies of scale (aided by science):
Vitamin D discovery in 1930s

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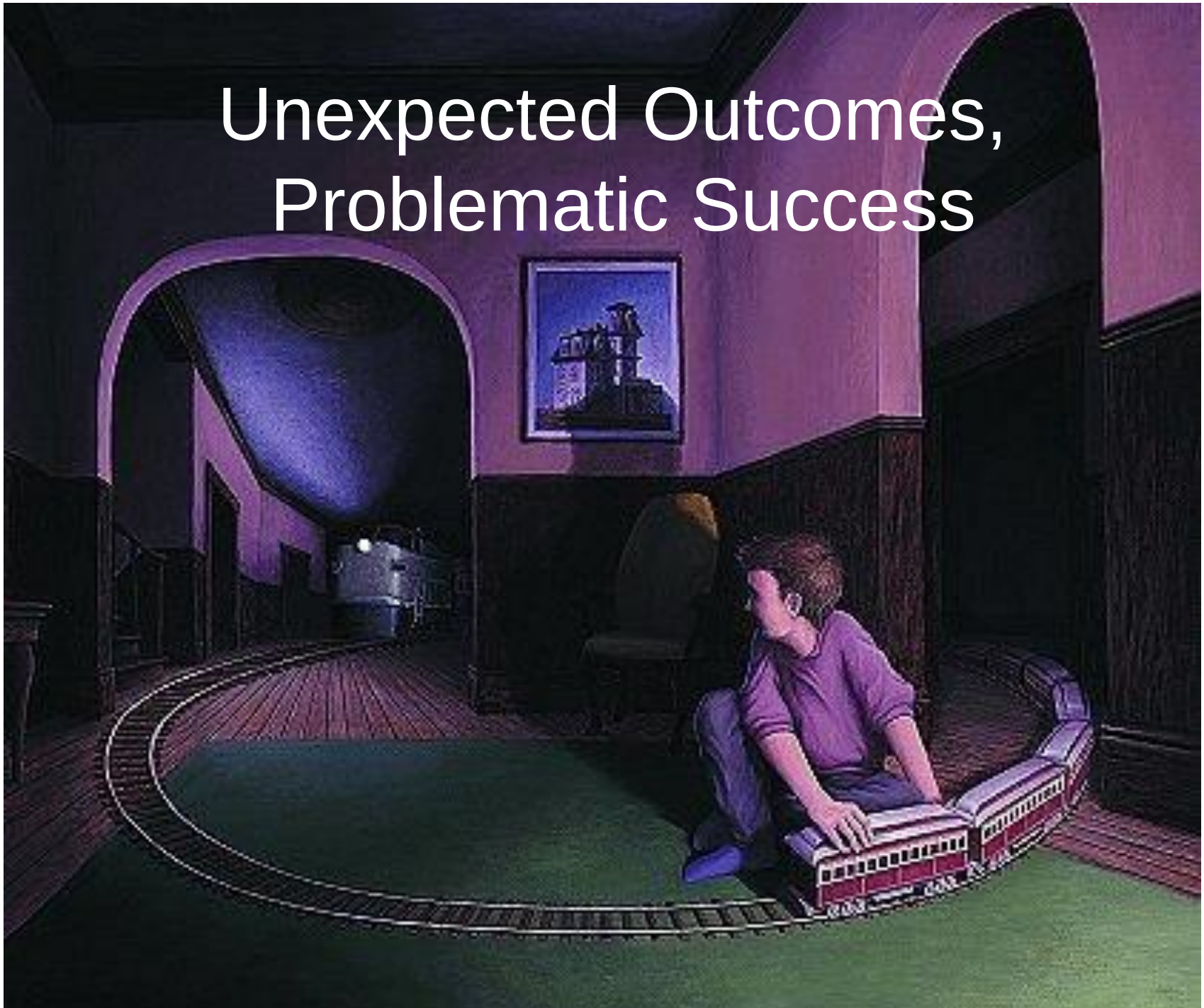
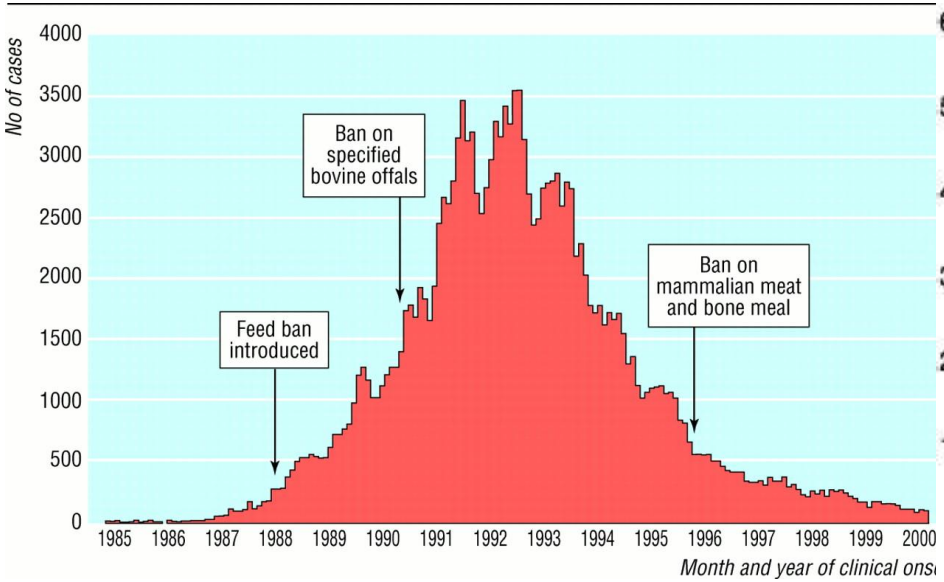
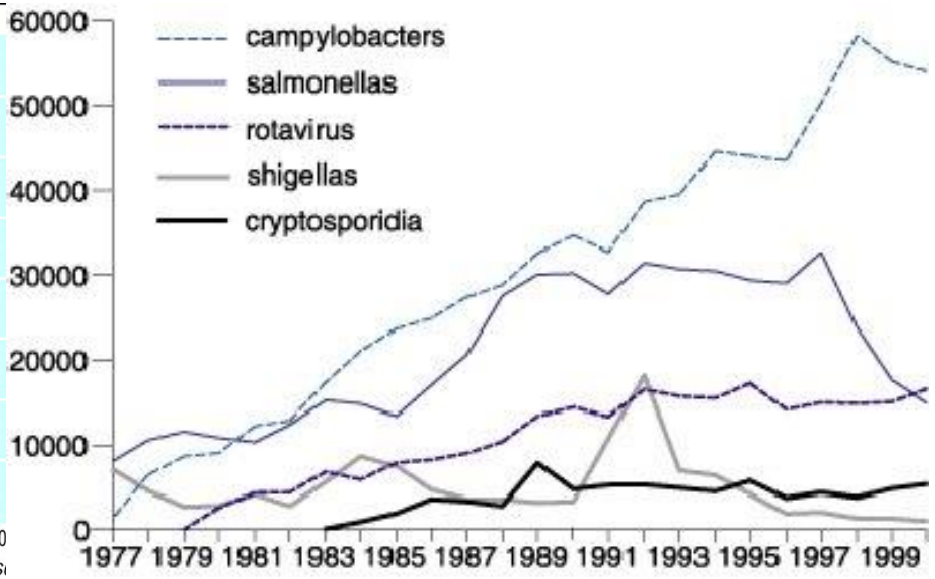
Social Changes

Unexpected Outcomes, Problematic Success



Efficient recycling and distribution of pathogens





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World Excrement Production

1961 – about 8.5 billion tonnes ---2013 about 14 billion tonnes.

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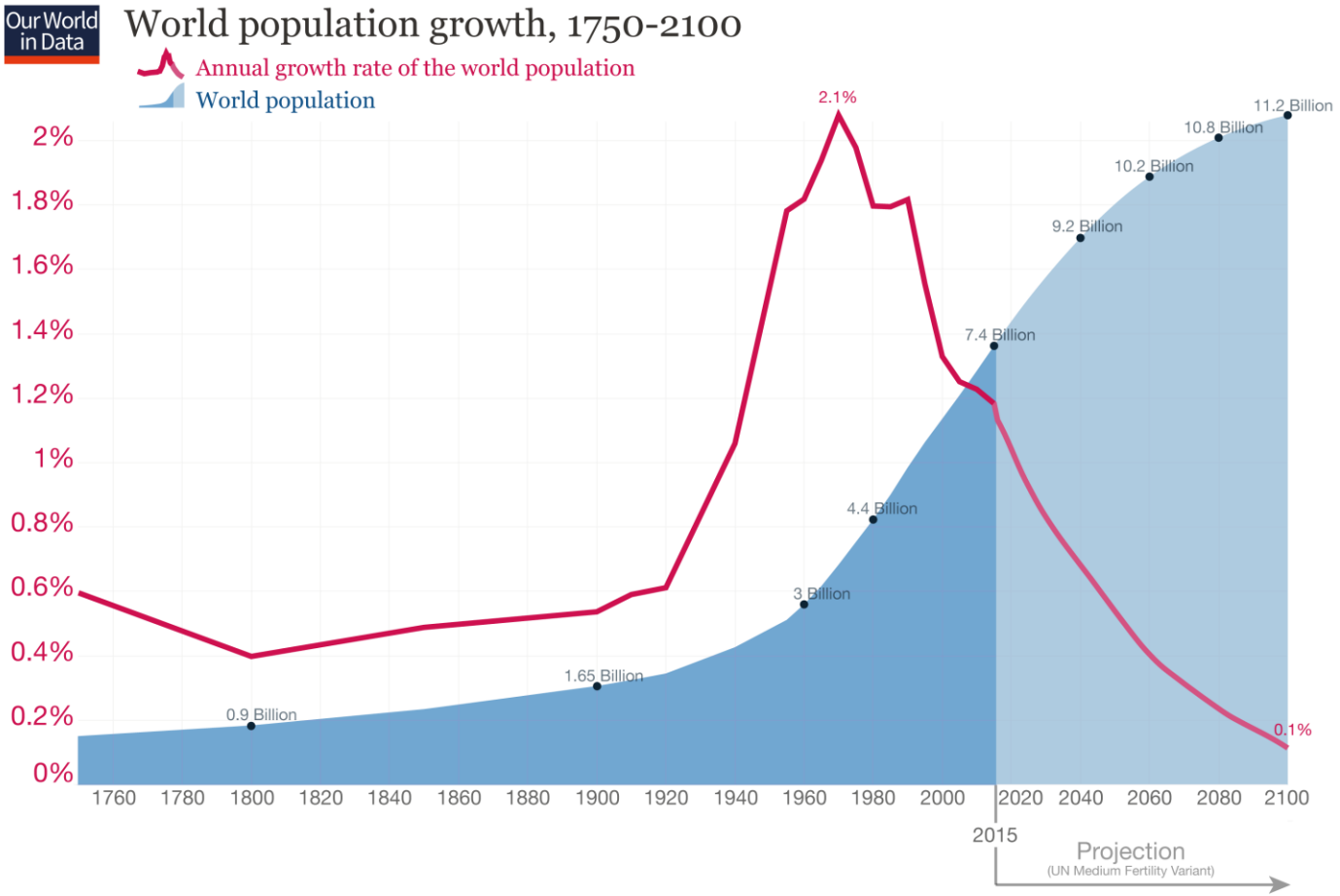
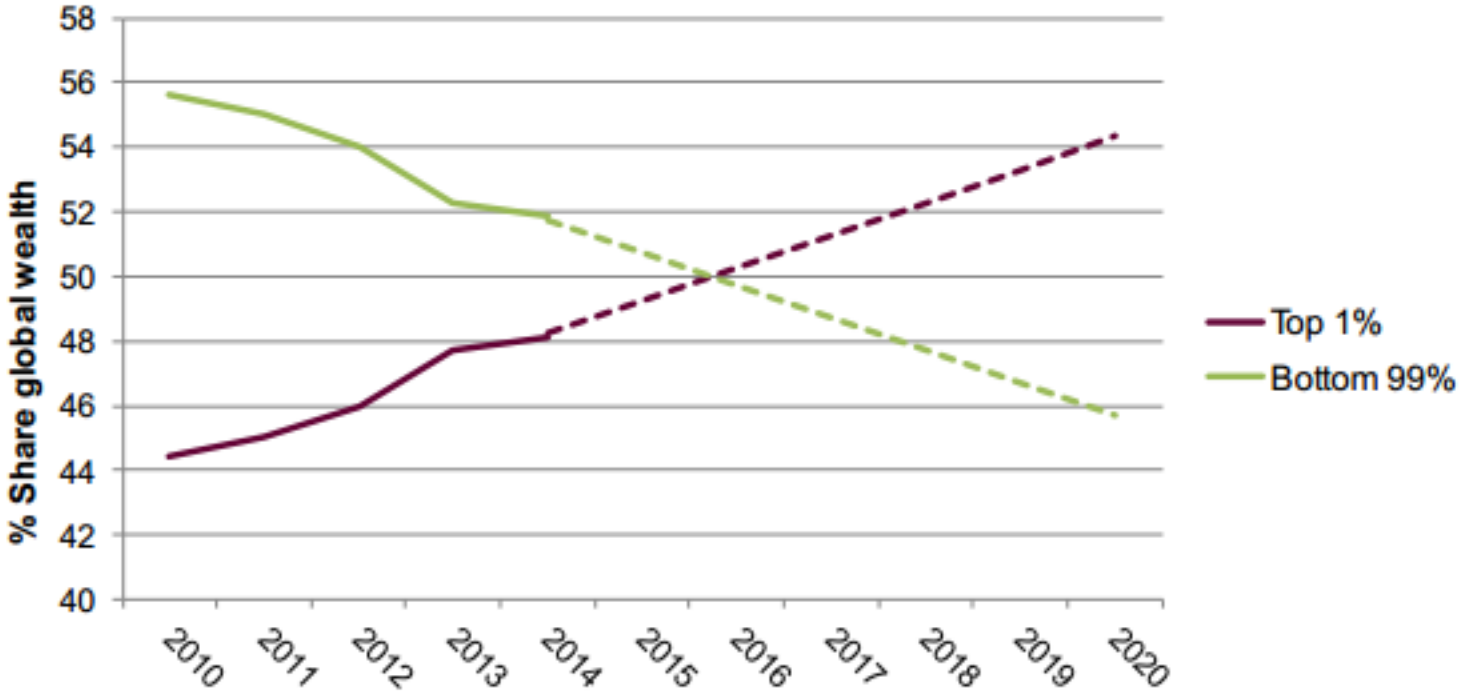
More People: Problematic Success



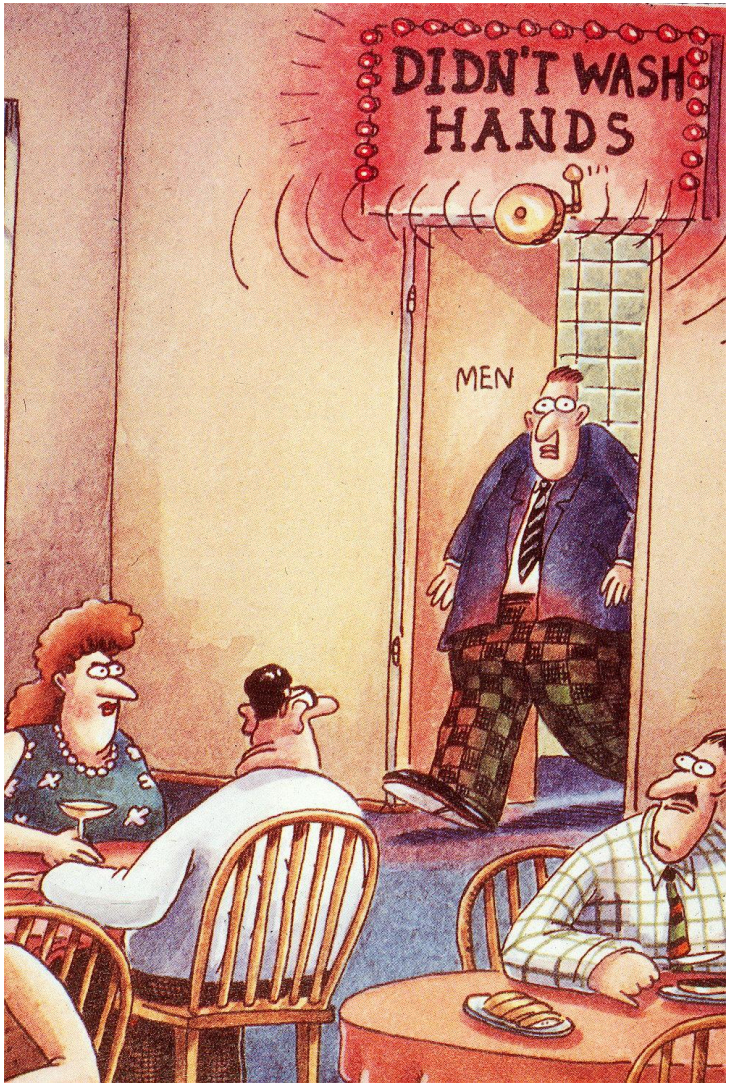
Data sources: Up to 2015 OurWorldInData series based on UN and HYDE. Projections for 2015 to 2100: UN Population Division (2015) – Medium Variant.
The data visualization is taken from OurWorldinData.org. There you find the raw data and more visualizations on this topic.

What about F3 Friends (a.k.a. Social Supports). Consequences of Not Asking Who We and the People are.

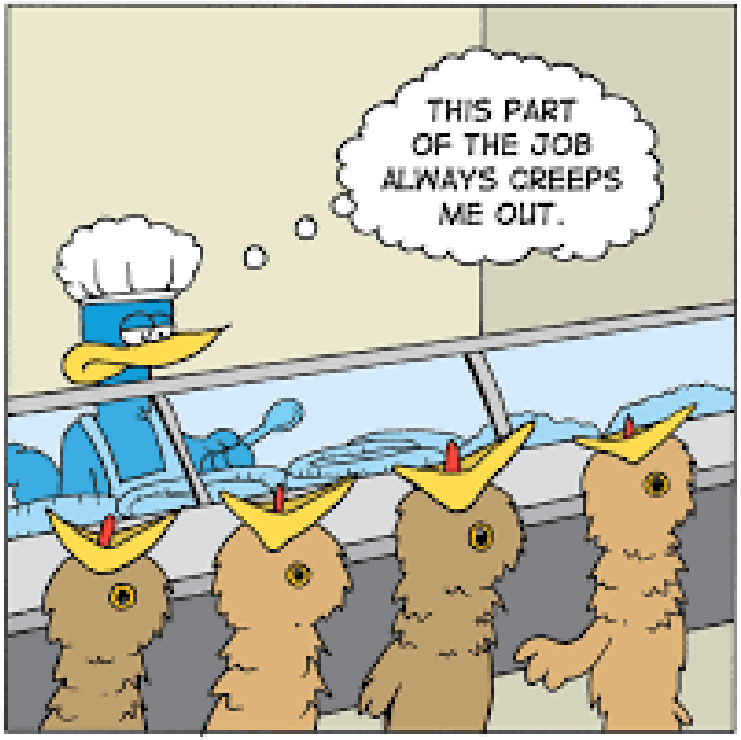
Figure 2: Share of global wealth of the top 1% and bottom 99% respectively; the dashed lines project the 2010–2014 trend. By 2016, the top 1% will have more than 50% of total global wealth.



The end of a simple linear narrative: Blame individual consumers & corporations for collateral damage (Monsanto vs the farmer)



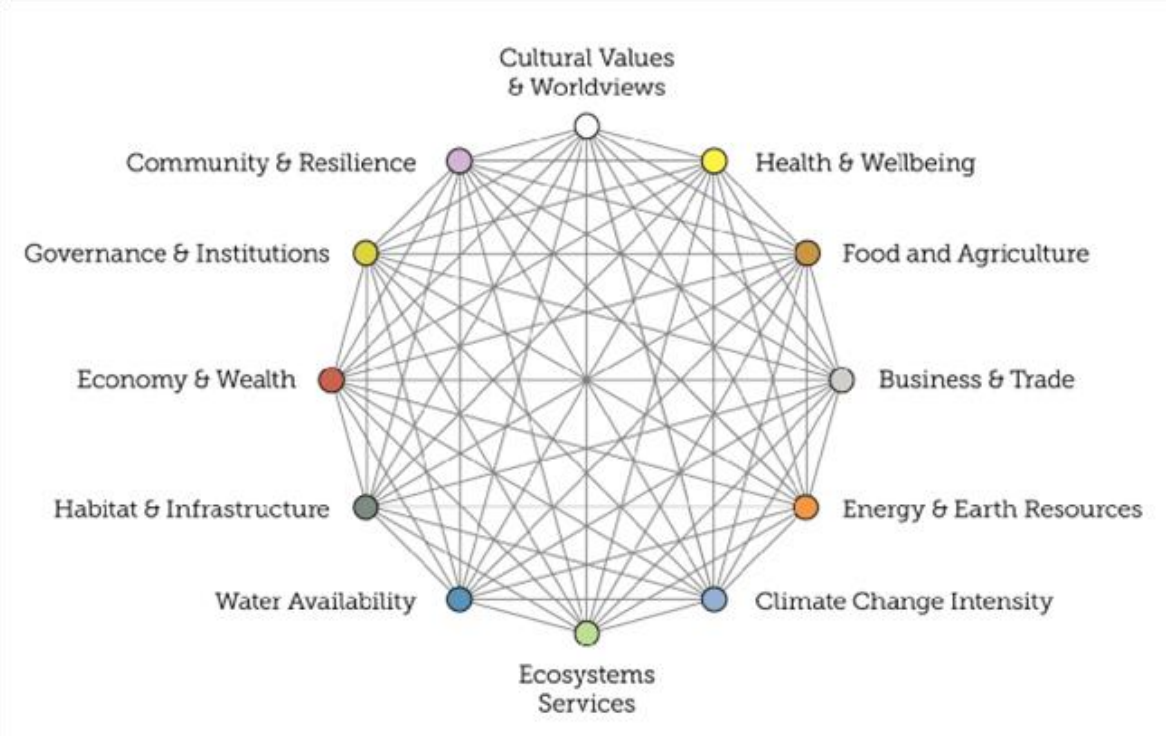
Is “How on earth can *we* feed 8 billion people?” the right question?



INSIDE THE BIRD ELEMENTARY CAFETERIA

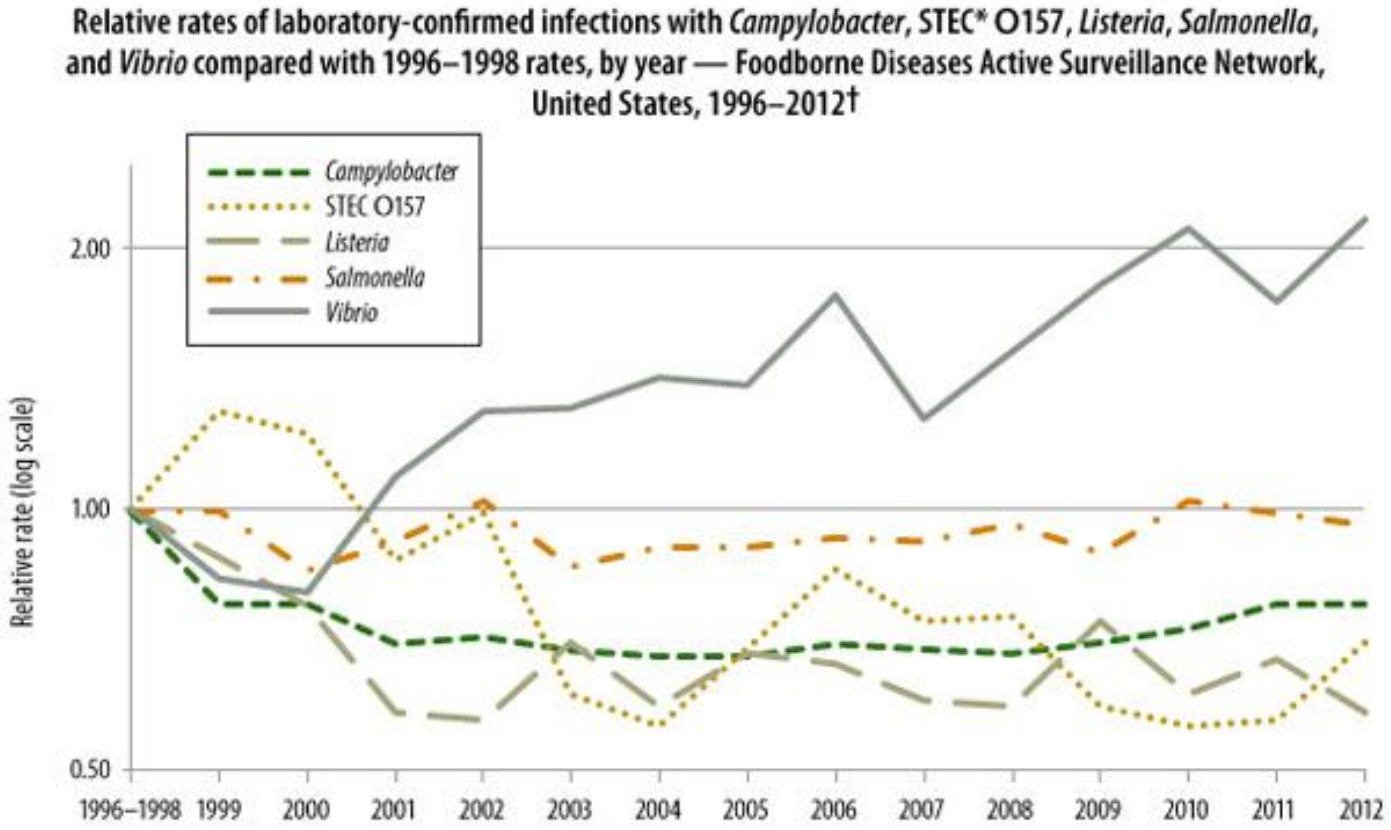
Who are *we*? Who are the *people*?

A non-narrative look inside a complex system



Too many connections - paralysis

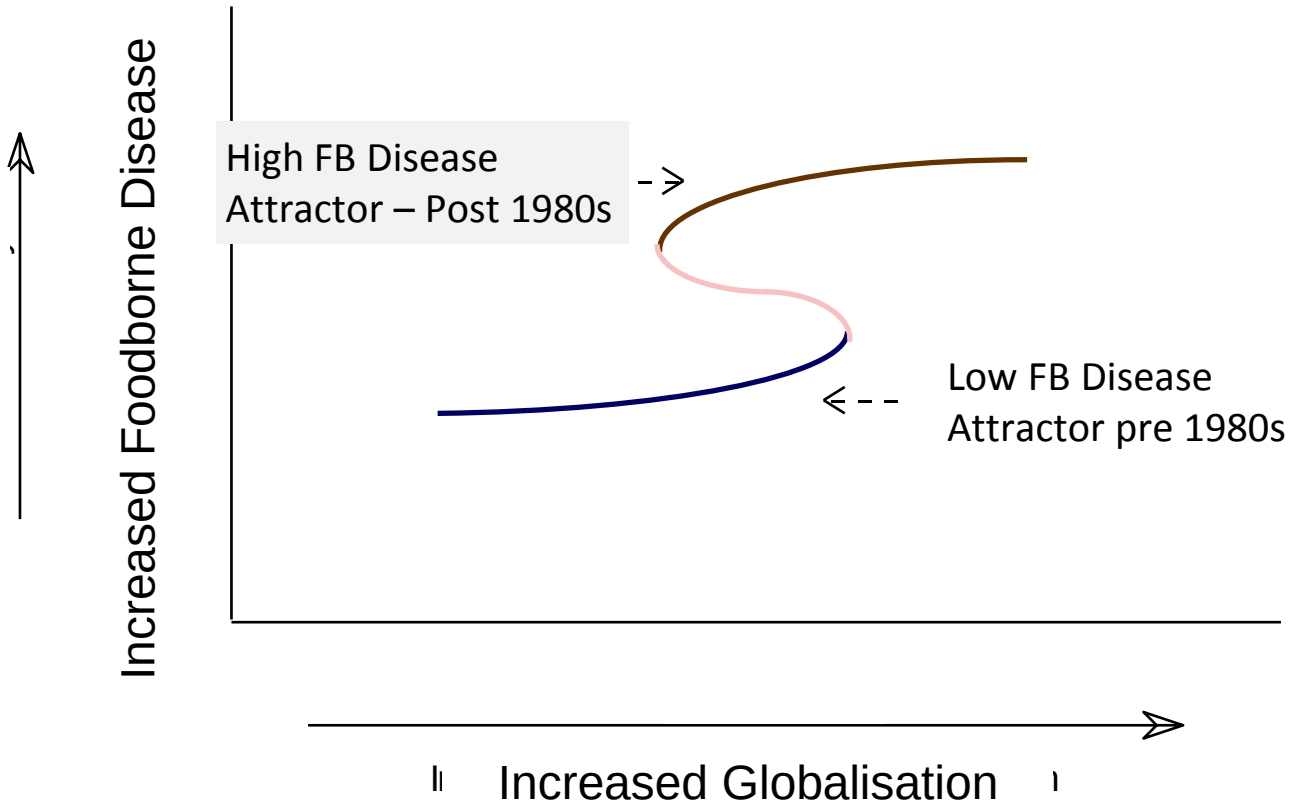
“Whole system” narrative: did rates stabilise?



* Shiga toxin-producing *Escherichia coli*.

† The position of each line indicates the relative change in the incidence of that pathogen compared with 1996–1998. The actual incidences of these infections cannot be determined from this graph. Data for 2012 are preliminary.

Fold-Catastrophe. Are high levels of FB disease an essential characteristic of the post-globalization?



Beyond Systems: Unstable transitions: Multiple Values & Perspectives

- **Chickens, nuts, insects, soybeans, GMOs, economies of scale, industrialization, meat, excrement…[pick your story & your evidence] are:**
  - causes of world's worst environmental problems
  - major drivers of emerging infectious diseases
  - the best solution to protein insufficiency
  - a way out of poverty for women
  - a way to improve childhood learning
  - a way to reinforce patriarchy and gender-based inequity
  - a way to reinforce the power of multinational industries
  - a way to solve social problems with science & technology
  - **Some perspectives are privileged for reasons of gender, values, power, wealth, sustainability. Whose evidence counts?**

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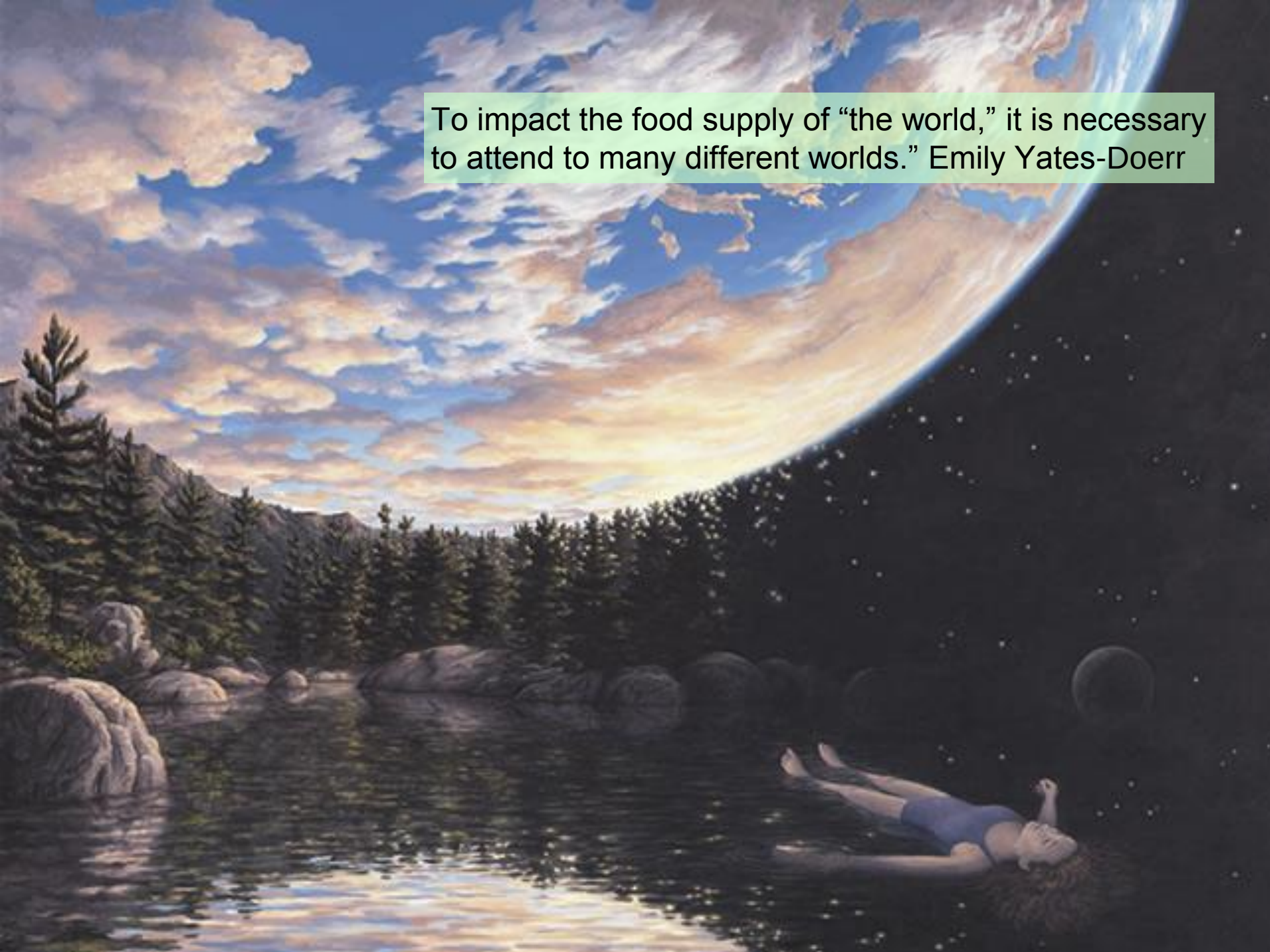
The Challenge for Policy

- Diseases are emerging under circumstances where "facts are uncertain, values in dispute, stakes high and decisions urgent."
- Many offer guidance through the labyrinth. **Neither superheroes nor super-technologies can "resolve" this. Marvel Comics do not have the answer.**
- There are many possible responses to globalization & FB disease. Some are likely to have larger negative **[my value judgement]** social and ecological impacts than others.
- **The task for risk analysts is to work with people** who have conflicting goals, unequal power, at different temporal & spatial scales, where outcomes & processes need to be continually renegotiated in the context of dynamically changing technological, political and ecological landscapes.


To impact the food supply of “the world,” it is necessary to attend to many different worlds.” Emily Yates-Doerr