







Most of us love meat....



But is it a fatal attraction?

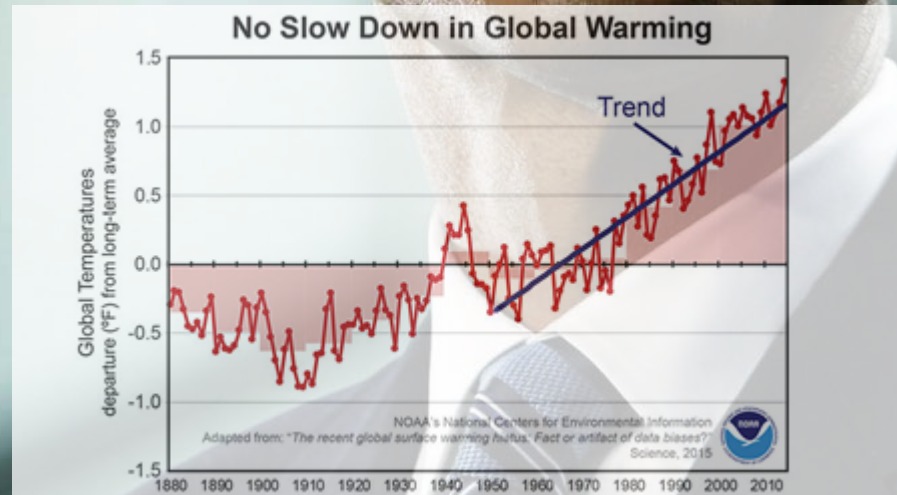


feed 6.7	Pounds of grains and forage	
water 52.8	Gallons for drinking water and irrigating feed crops	
land 74.5	Square feet for grazing and growing feed crops	
fossil fuel energy 1,036	Btus for feed production and transport. That's enough to power a typical microwave for 18 minutes.	

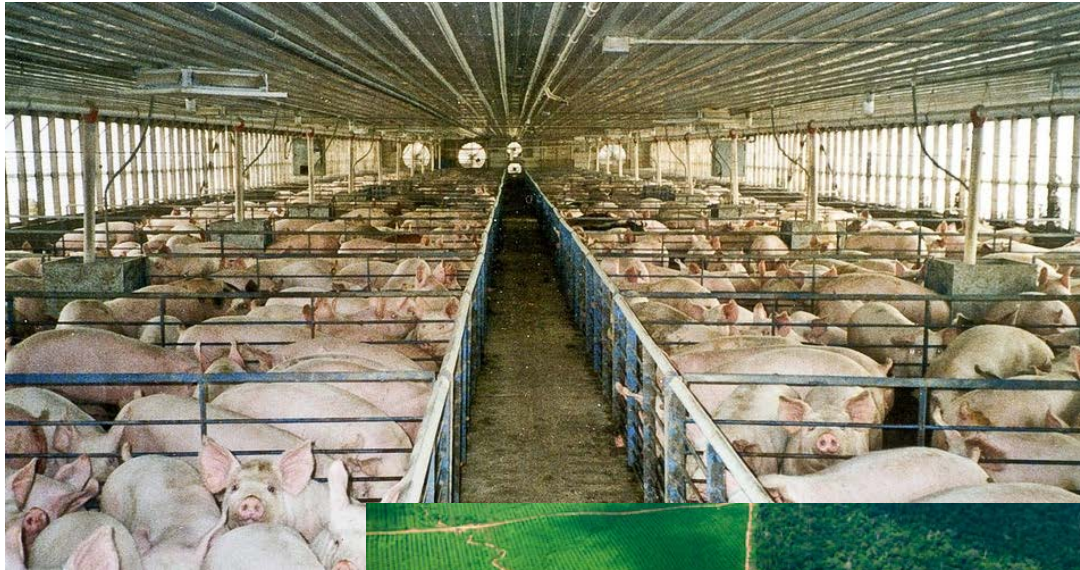
GREENHOUSE GASES



***“No challenge poses a greater threat to future generations than climate change”
- Barack Obama 2015***



Environmental impact and animal welfare



but also food security risks

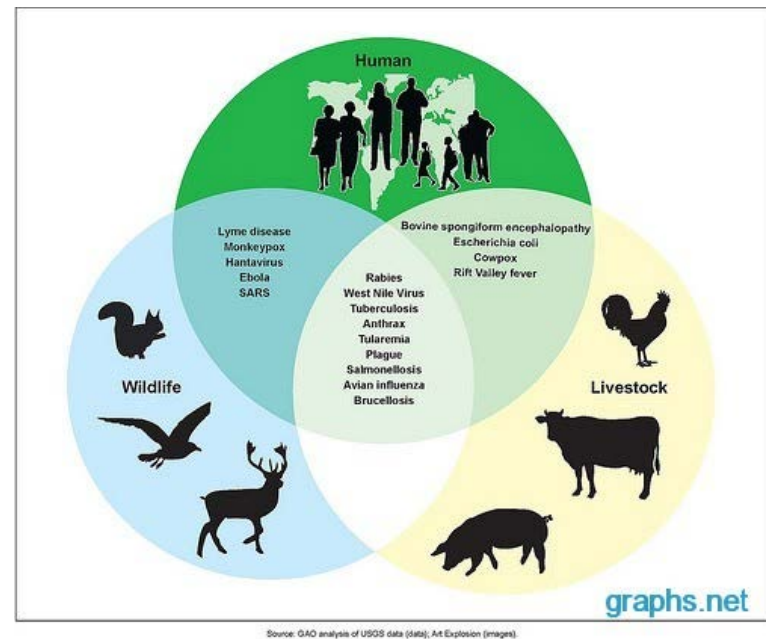
ANTIBIOTIC RESISTANCE THE GLOBAL THREAT

Antibiotic resistance – when bacteria change and cause antibiotics to fail – is happening **RIGHT NOW**, across the world

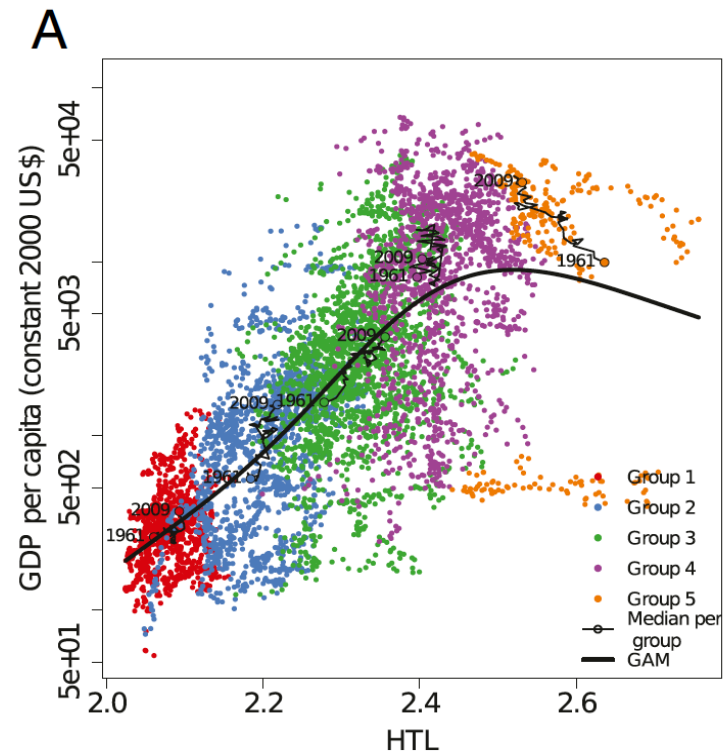
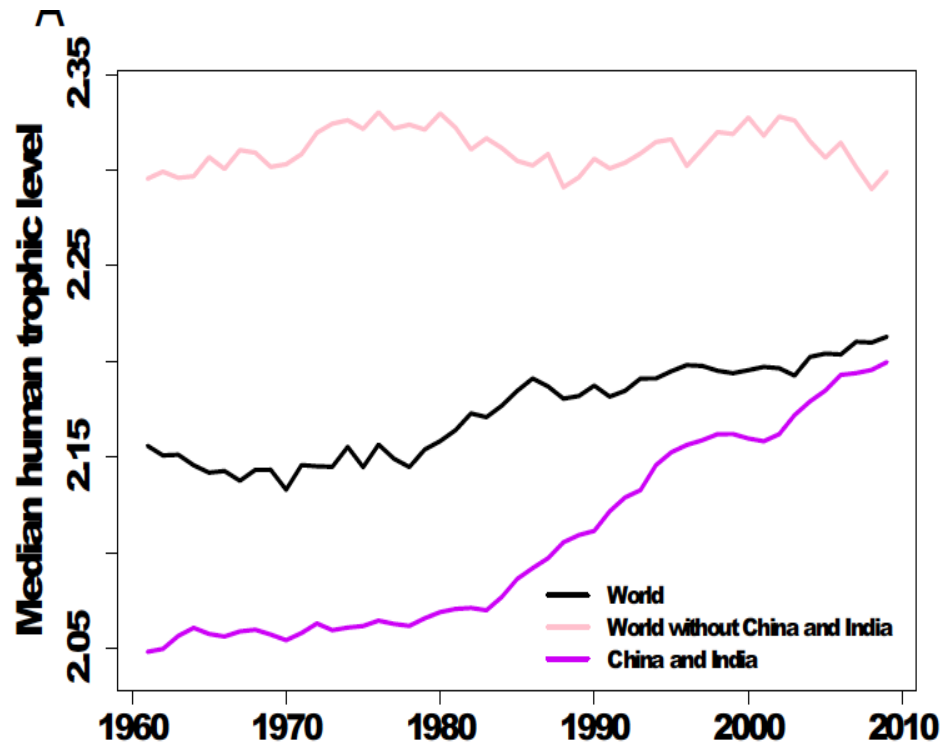
The full impact is unknown. There is no system in place to track antibiotic resistance globally

Without urgent action, many modern medicines could become obsolete, turning even common infections into deadly threats.

A GROWING CRISIS WORLDWIDE

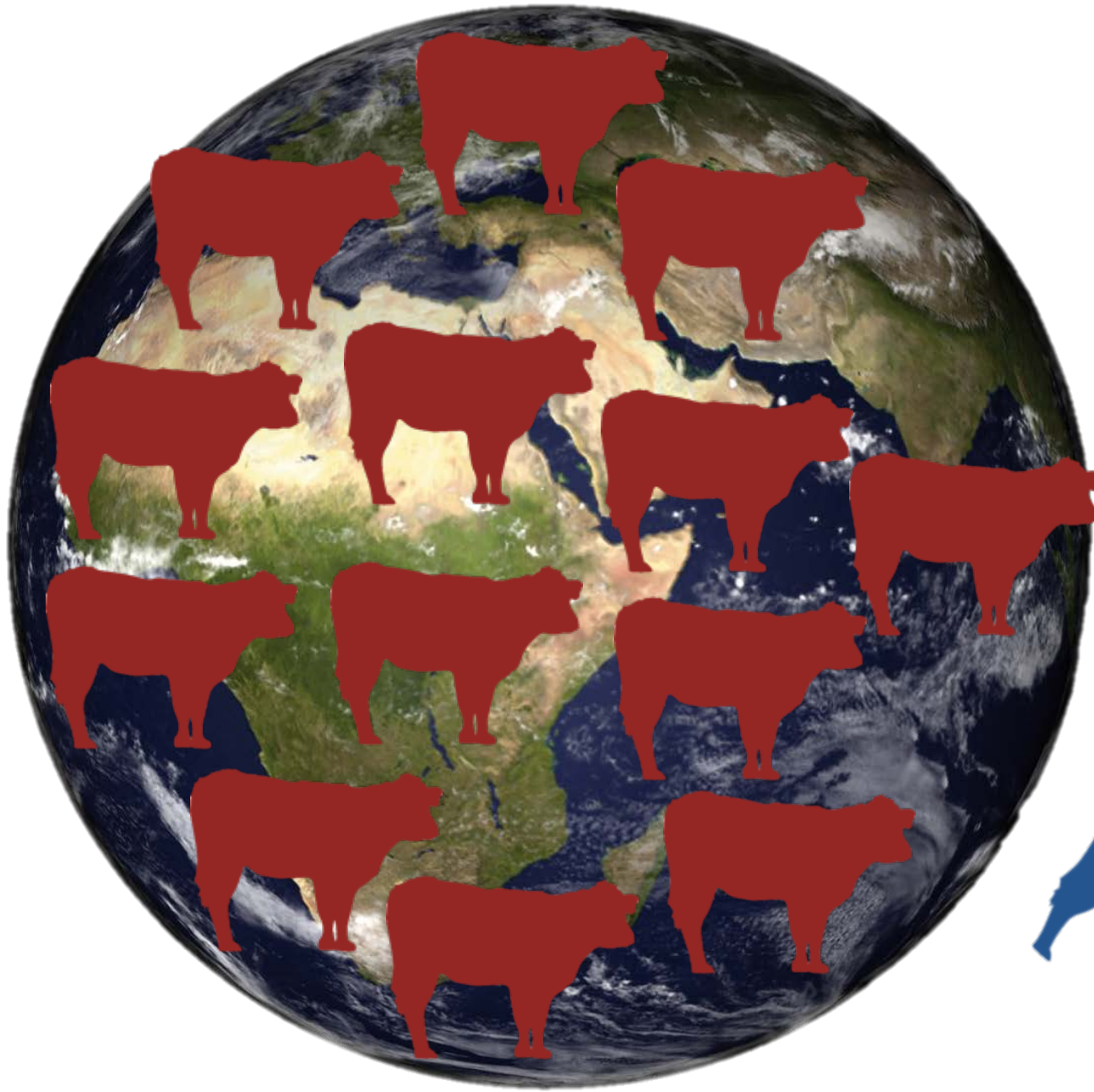
An infographic with a dark blue background. At the top, the title 'ANTIBIOTIC RESISTANCE THE GLOBAL THREAT' is written in white and light blue. Below it, a paragraph explains that antibiotic resistance is happening 'RIGHT NOW' across the world. To the right, a large orange circle contains white silhouettes of bacteria. To the left, a smaller orange circle contains a white silhouette of a microscope. Another paragraph states that without urgent action, modern medicines could become obsolete. At the bottom, a teal banner contains the text 'A GROWING CRISIS WORLDWIDE' in white.

More income? More meat!



Global meat demand estimated to increase by 2050





WHAT

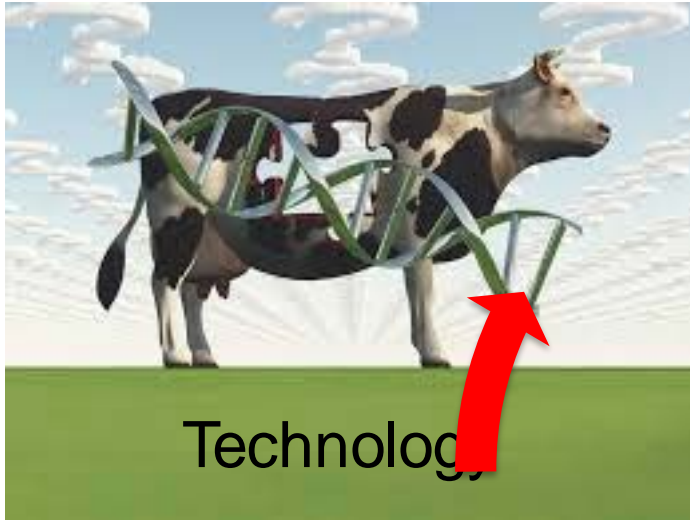
CAN WE

DO

Do nothing



Drivers of change: behaviour and technology



Replace

Rebuild

Reroute



1

Replace meat with more sustainable products



Meat analogues are getting better



Foto's: Henk Hoogenkamp





THE IMPOSSIBLE BURGER

It's here. A delicious burger made entirely from plants for people who love meat. No more compromises. Ready for an introduction?



- 70 scientists / 5 years
- Large database with fundamental properties of natural plant proteins
- Deconstruct (meat) to molecular level
- Data analysis
- “Recipe building” to match meat properties → *designing*
- Big investments prior to first introduction (>200 mi. \$)
- Introduced in 2017



Meat substitutes grow, but will remain relatively small.....

SURE..

You're right in liking **MEAT**

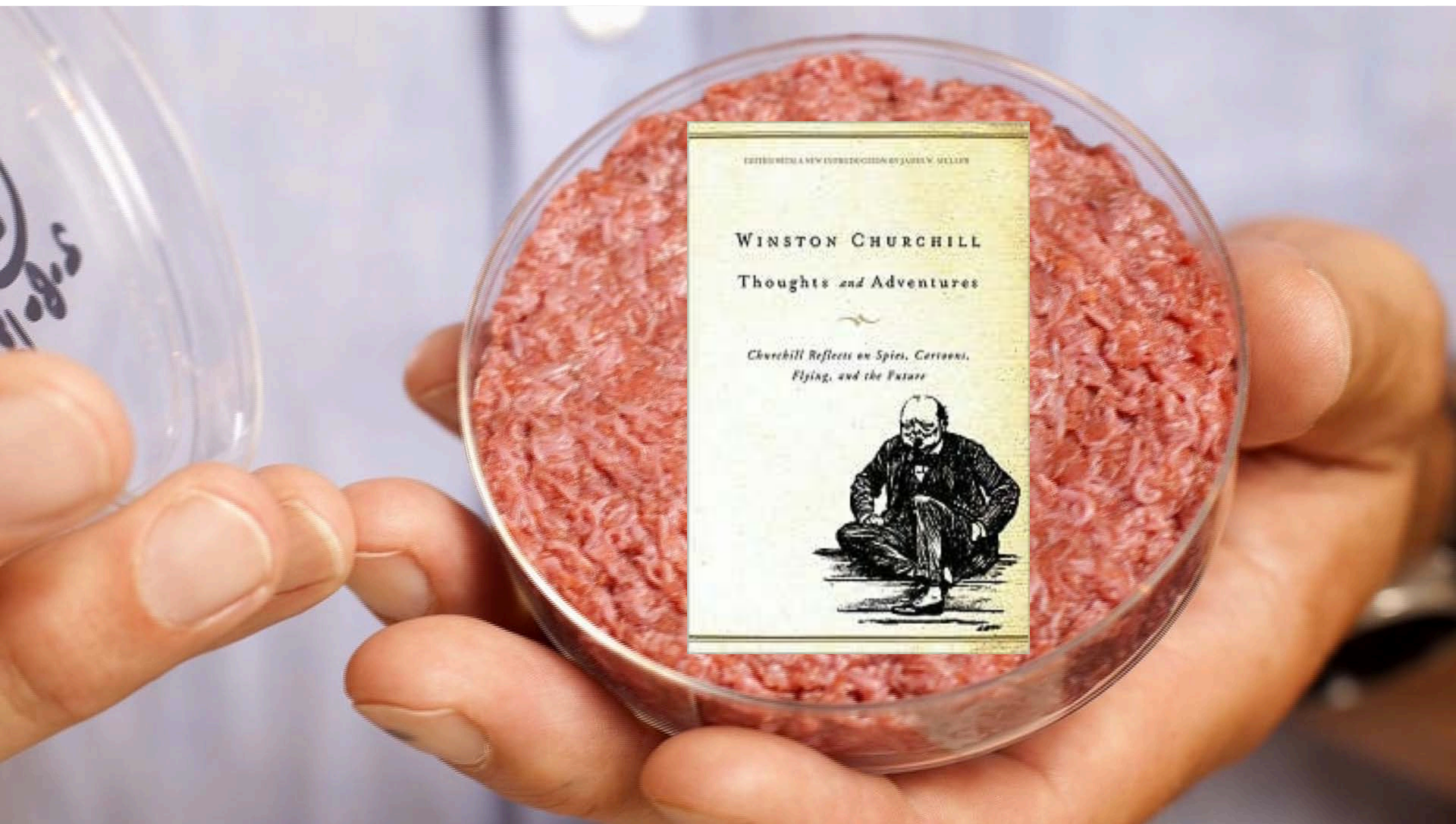


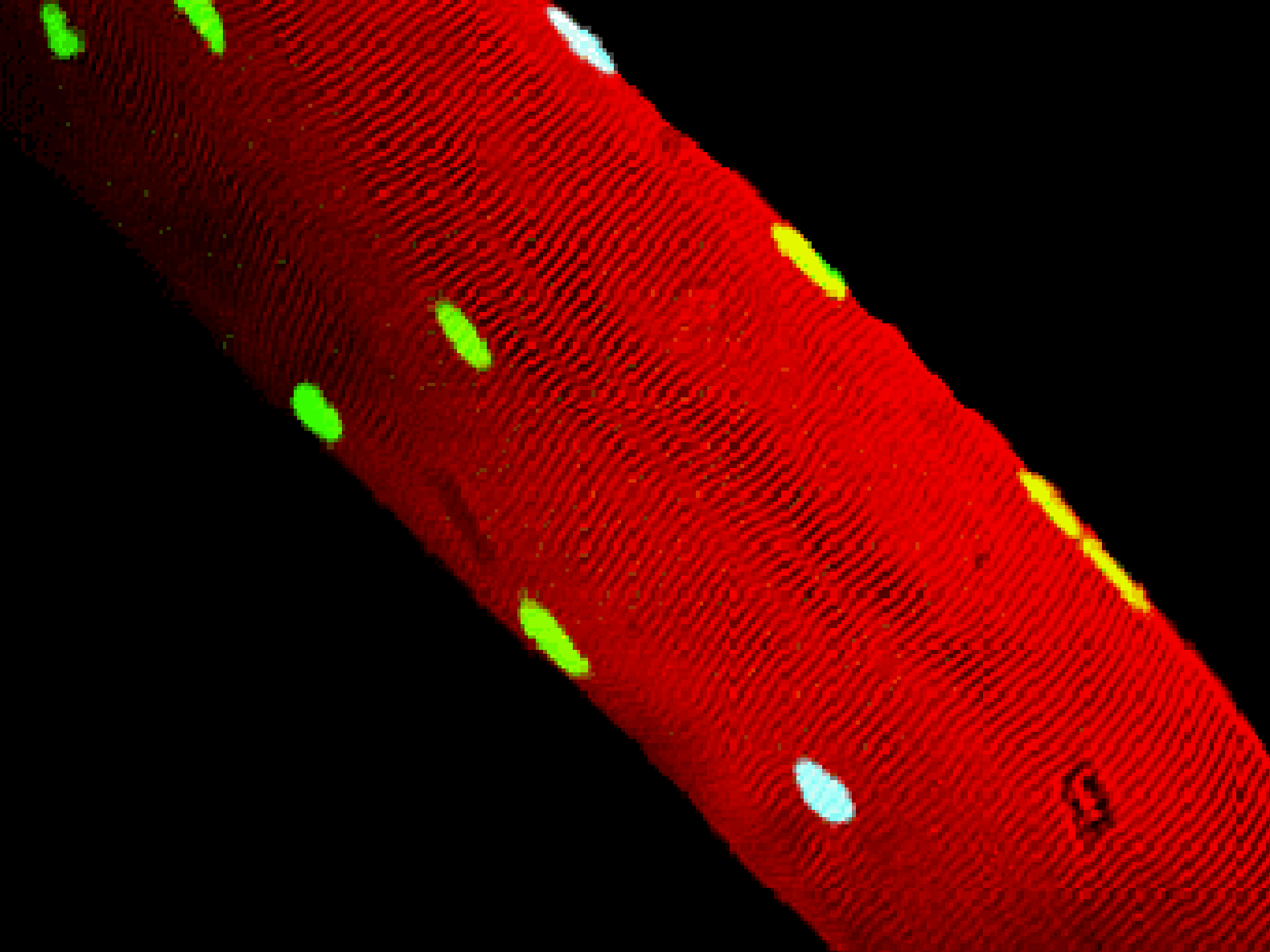
	Italy
	176.2
	187.9
	261.8

tions, and

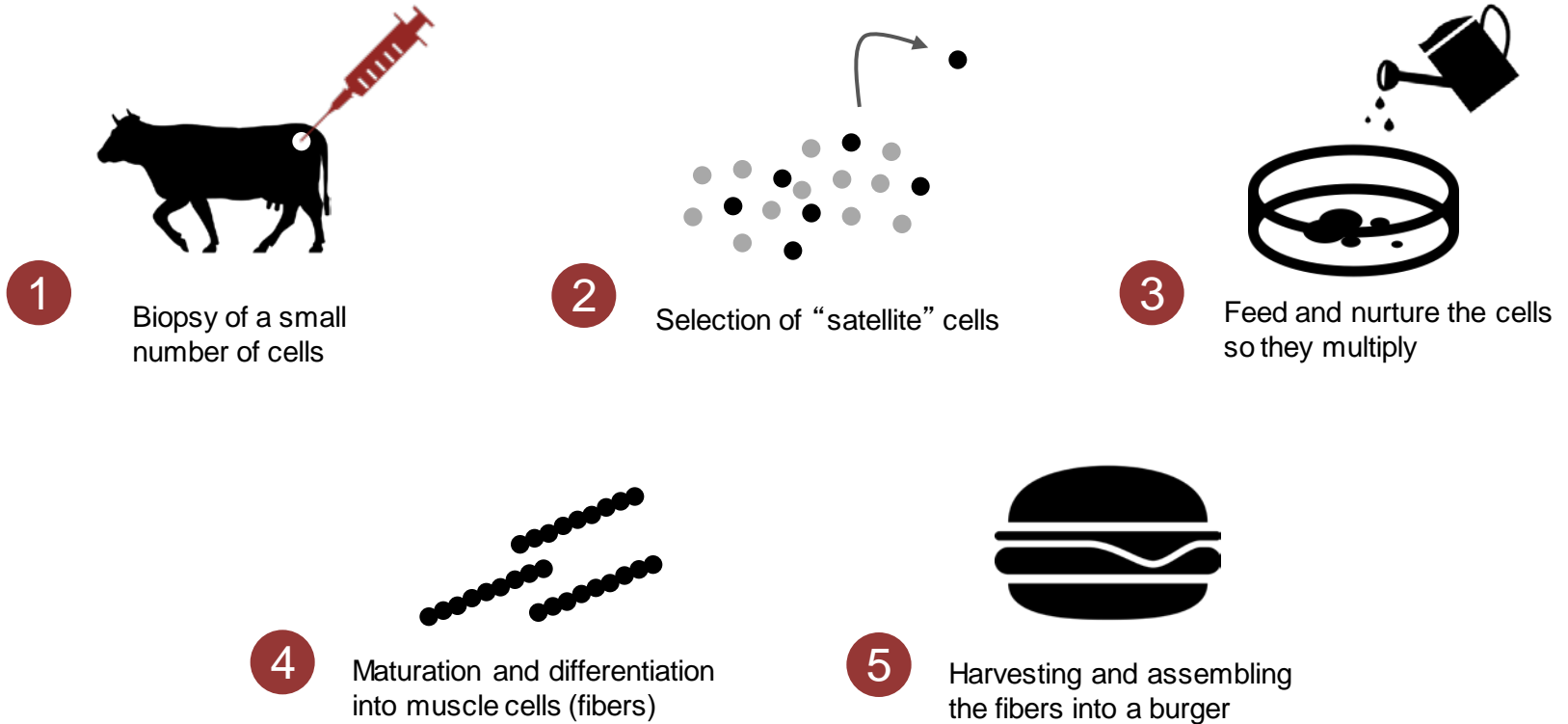
Find truly transformative solutions

3 Reroute: Tissue Engineered meat





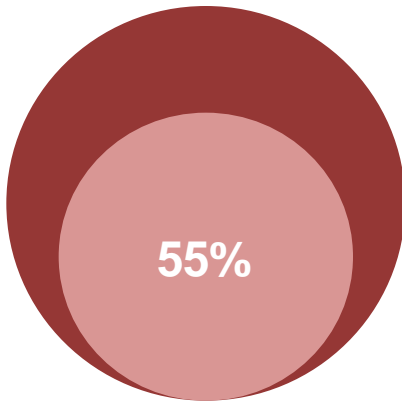
How does it work?



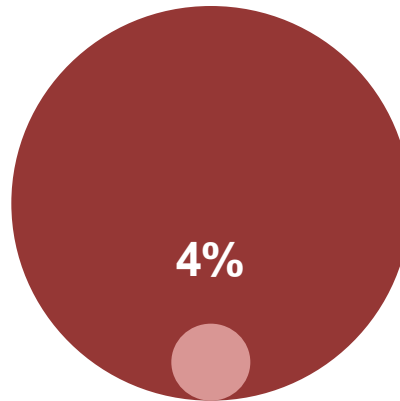
**One cell sample taken from a living animal
can create tons of cultured beef**

How does cultured meat compare?

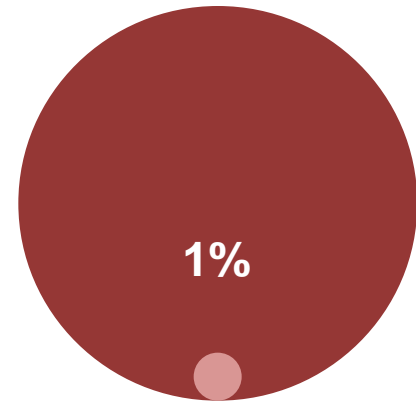
Environmental impact compared



Energy use



Greenhouse
Gas emissions




Land use

Consumer acceptance

>50%

Attitudes to in vitro meat: A survey of potential consumers in the United States

Matti Wilks  Clive J. C. Phillips

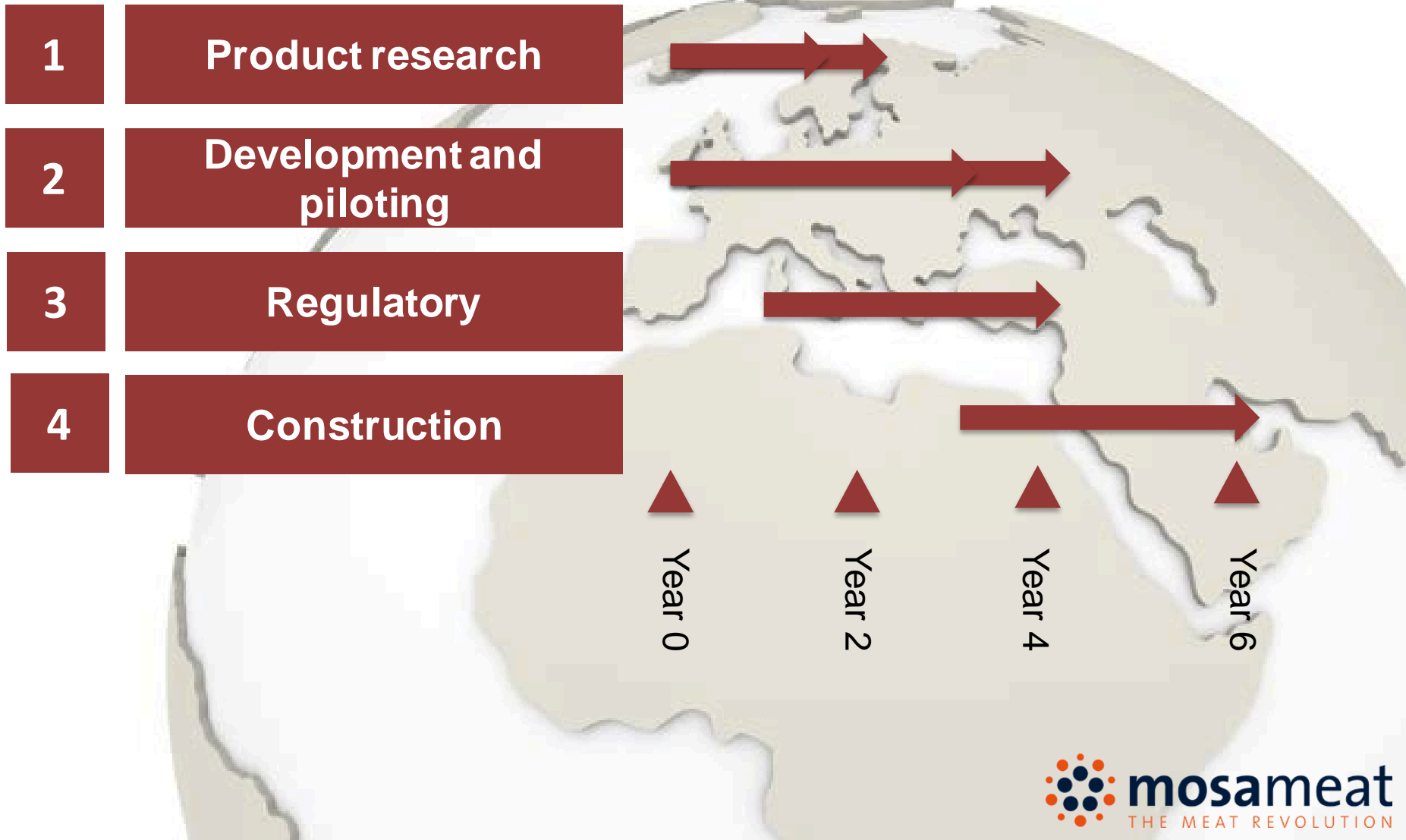
Published: February 16, 2017 • <http://dx.doi.org/10.1371/journal.pone.0171904>







The next steps: continue research towards production



To the market → possible scenario

Small scale, premium, local

Spreading of the technology

Gradual development towards
cost competitiveness

Commoditizing, available in
retail

▲
2021

▲
2026

▲
2031

▲
2036

We're not alone.....



Cell-Ag is coming



