



# SCIENCE OF RESISTANCE

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AFRICA ANIMAL WELFARE CONFERENCE-ONLINE

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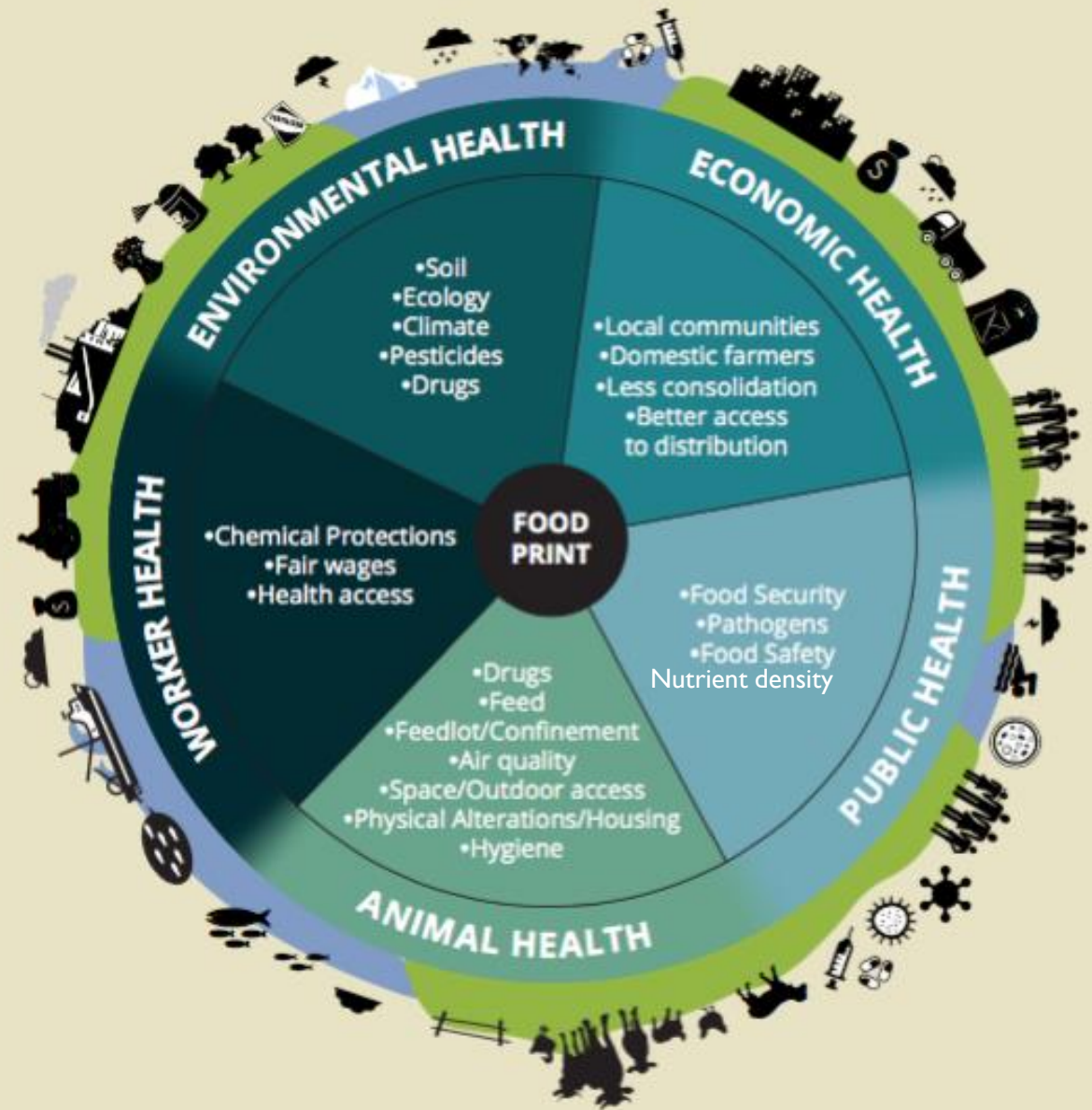
# URVASHI'S BACKGROUND



- Environmental Health Scientist /Toxicologist School of Public Health
- Chief Science Advisor, GRACE Communications, Co-chair Funders for Regenerative Ag, Chair True Cost Accounting impact area for Global Alliance for Future of Food
- Experience in labeling, tests, national surveys, messaging, consortium building, science, messaging, testing, legal cases for good food movement
- Executive Director Food Safety and Sustainability at Consumer Reports
- Consumer Representative and Member, FDA Food Advisory Committee (2012-2017)
- Mom, cook, gardener



# INTERSECTIONS




# INDUSTRIAL

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- High chemical input
- High drug input including healthy animals
- High pesticide use
- Rapid release chemical fertilizers
- Cheap animal feed
- Poor animal living conditions / confinement
- Highly processed ingredients
- Low biodiversity
- Poor soil health
- Nutrient compromised
- Inadequately protected labor and subpar wages

# REGENERATIVE SYSTEMS

- Low chemical input
  - Drug use minimized and only in sick animals
  - No synthetic pesticides
  - Slow release natural, compost fertilization
  - Food that animals were supposed to eat
  - Good hygiene, animal welfare and no confinement
  - Few or no processed ingredients
  - High biodiversity
  - Rich soil health
  - Nutrient dense
  - Protected labor and fair wages
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community health

public health

cleaner air

human health / biome

local economies

cleaner water

safer food

fewer pathogens

worker health

animal health

nutrient quality

unconfined

pasture  
health

disease  
resistance

managed grazing

managed manure

**PLANET**

**PEOPLE**

**ANIMAL**

weather resilience

biodiversity

pasture/crop nutrition

**PLANT**

water retention

carbon sequestration

nutrient  
uptake

soil fertility

root depth

cover crops

topsoil depth

soil health / biome

soil porosity

microbes, beneficial insects and more

**ECOLOGY**

**SOIL**

# HOW WE PROMOTE RESISTANCE AND VIRULENCE IN FOOD PRODUCTION

- Food safety and food sustainability issues are often intertwined
- 80% of antibiotics are used in producing food, driving up global public health crisis of antibiotic resistance.
- Bacteria evolve to resist antibiotics, routine antibiotic use accelerates this resistance making the drugs less effective in animals and humans (declared public health crisis)
- Pests evolve to resist pesticides, weeds evolve to resist herbicides. Pesticide use exacerbates this problem leading to increased use and reduced effectiveness (glyphosate, 2,4-D, dicamba). Many pesticides are carcinogenic
- Synthetic fertilizers degenerate soil and allow pathogenic bacteria to proliferate and compromise fertility and nutrient uptake systems
- Confinement spreads disease
- Unnatural diets compromise animal health
- *Pasture raised, regenerative livestock have better gut health, harbor less e.coli and have a better meat and dairy nutrient profile than grainfed*

## There is scientific evidence to show that truly regenerative agriculture systems can:

- Restore degraded lands much faster than science originally predicted
- Increase soil fertility over time and reverse increasing potential for soil collapse in 50 (or less) years
- Work with natural systems to control pests, weeds and diseases
- Eliminate reliance on hazardous chemicals
- Eliminate reliance on synthetic fertilizers
- Cultivate biodiversity in the soils, ecology and plants
- Promote resilience and natural resistance to pests, weeds, disease, weather extremes
- Return equilibrium to water, carbon, nitrogen cycles
- Increase nutrient density from soil to food
- Bring back dormant/"extinct" insects, pollinators
- Work with and not against nature



- **Human health:** Grassfed beef is more healthful for people because of its significantly better omega-6 to omega-3 fatty acid ratio, higher concentration of conjugated linoleic acids (CLAs), higher levels of antioxidants and lower risk of E. coli infection and antibiotic-resistant bacteria.
- **Animal welfare:** Cattle are healthier and require little drug treatment when they are not confined, have constant access to well managed pasture and eat a predominantly grass diet.
- **Environmental protection and soil health:** The concentration of manure in and around feedlots can pollute air and water, whereas well-managed grazing systems can regenerate grassland, build soil fertility and protect watersheds.
- **Climate change mitigation:** Intensive grain farming and feedlot cattle production are major sources of greenhouse gases, whereas grasslands managed with regenerative grazing can sequester carbon and act as net carbon sinks, offsetting methane emitted by cattle.
- **Better taste and flavor:** Grassfed cattle of the right breed, produced to high standards, result in beef that is tender, well-marbled and, in the opinion of many connoisseurs, better-tasting than grain-fed beef.

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much less likely than  
Only 13 percent of  
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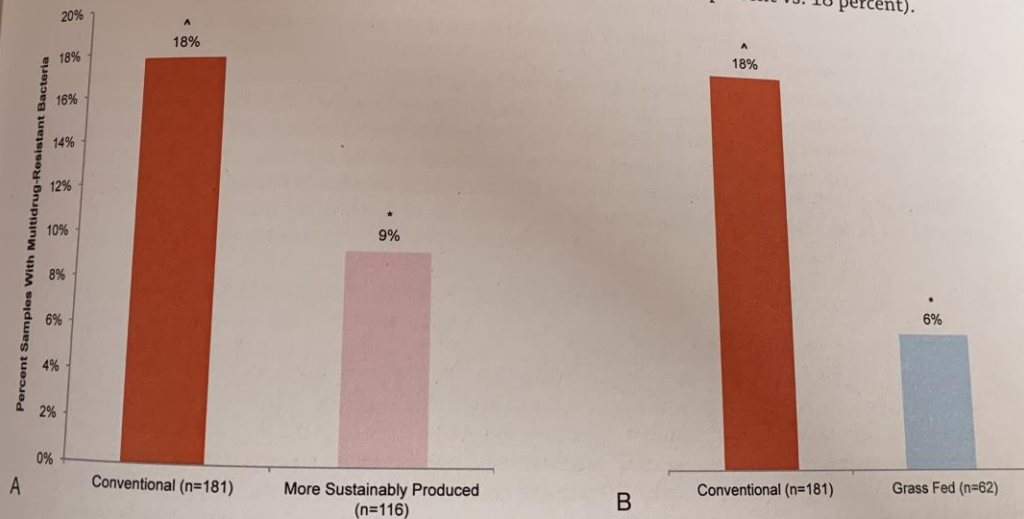
gories.

No Antibiotics Organic Grass-Fed (n=31)	
13	(42%)
14	(45%)
2	(6%)
2	(6%)
0	(0%)
0.8*	

^; no difference

-resistant

MDR bacterial isolates were twice as likely to be found on conventional samples (18 percent) as on the more sustainably produced samples (9 percent). That difference was marginally significant (Figure R1A). The difference was mainly driven by the grass-fed samples, which were three times less likely than conventional samples to contain MDR isolates (6 percent for grass-fed compared with 18 percent for conventional) (Figure R1B). More sustainably produced samples that had a no-antibiotics claim but did not have a grass-fed claim were not statistically different from conventional (13 percent vs. 18 percent).



**Figure R1.** A. Percentage of conventional samples and more sustainably produced samples with multidrug-resistant bacteria. B. Percentage of conventional samples and more sustainably produced samples with a grass-fed label claim with multidrug-resistant bacteria. Statistically significant difference found between groups marked with \* and those marked with ^.

MORE RESISTANCE TO CLASSES THAT HAD APPROVALS FOR GROWTH PROMOTION AND DISEASE PREVENTION IN CATTLE



## A Tale of Two Cows



CONVENTIONAL

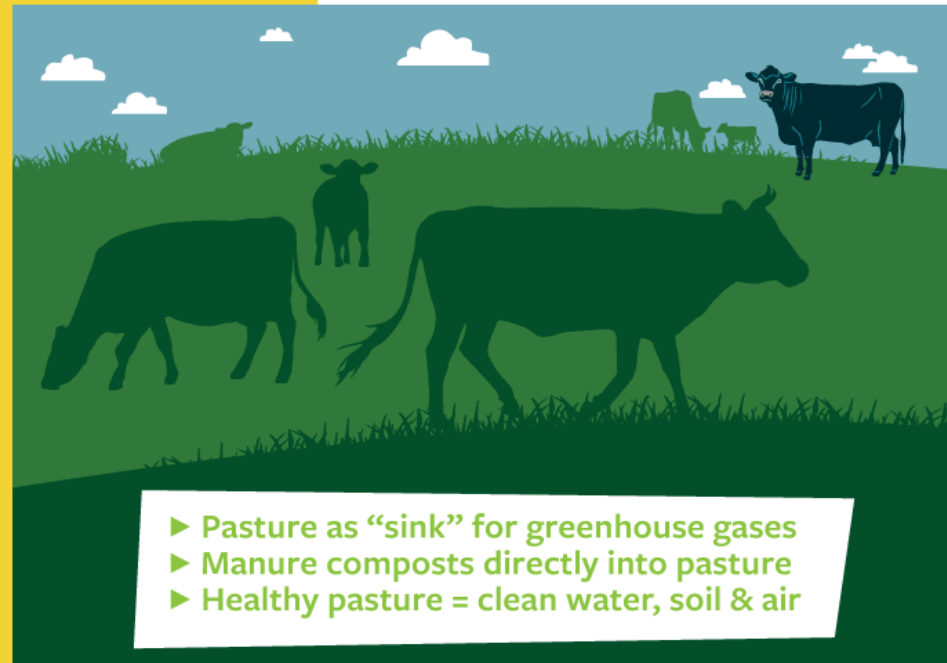
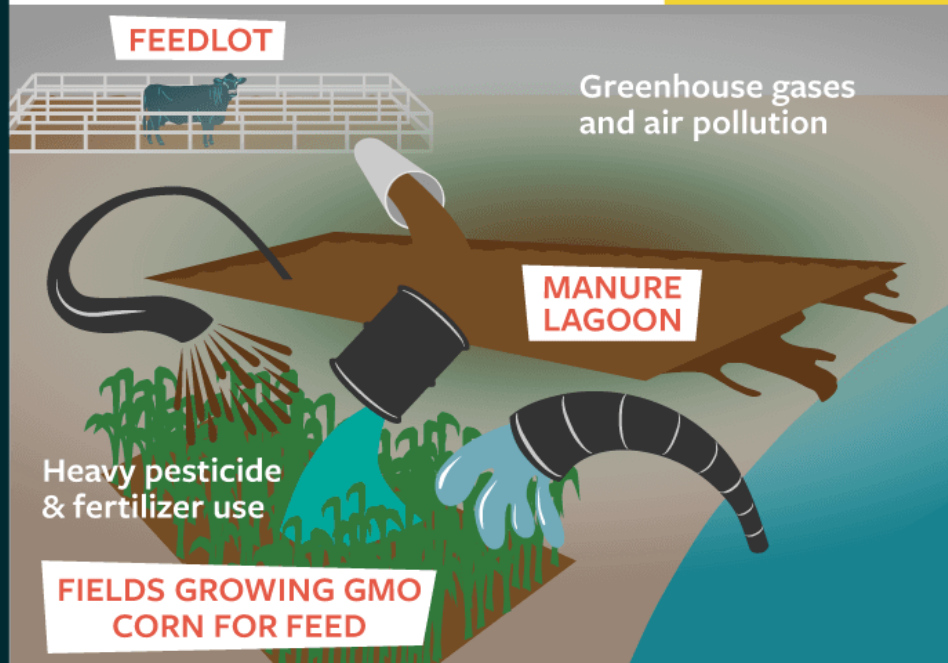


REGENERATIVE

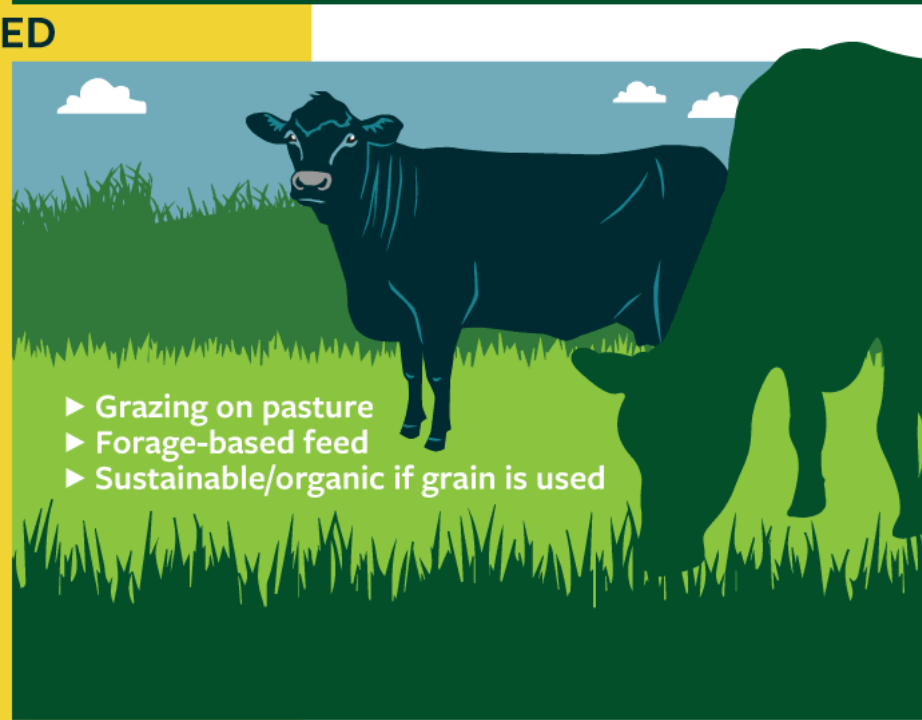
## LIVING CONDITIONS



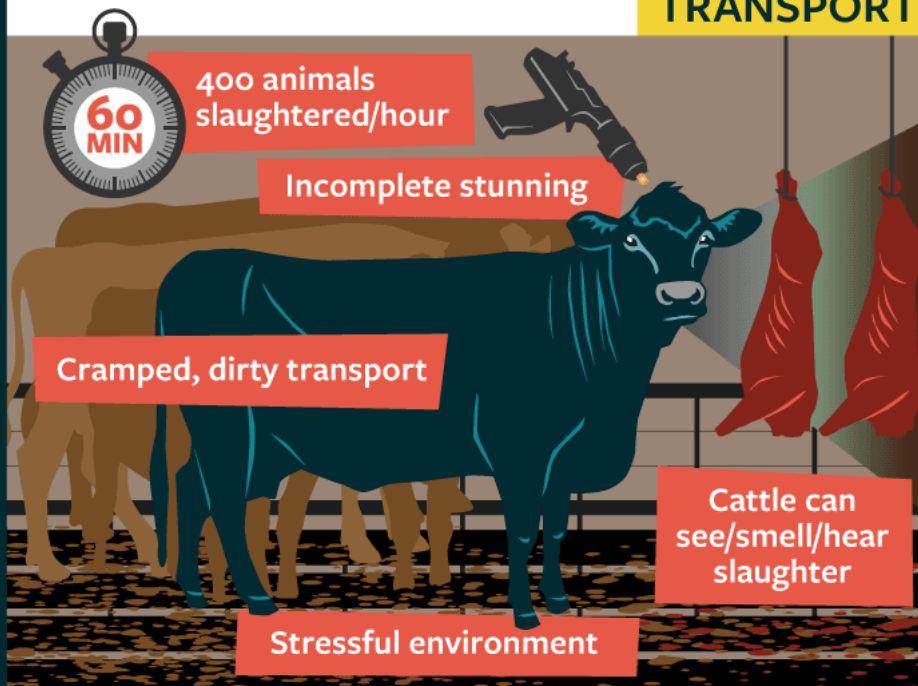
## ENVIRONMENTAL IMPACT



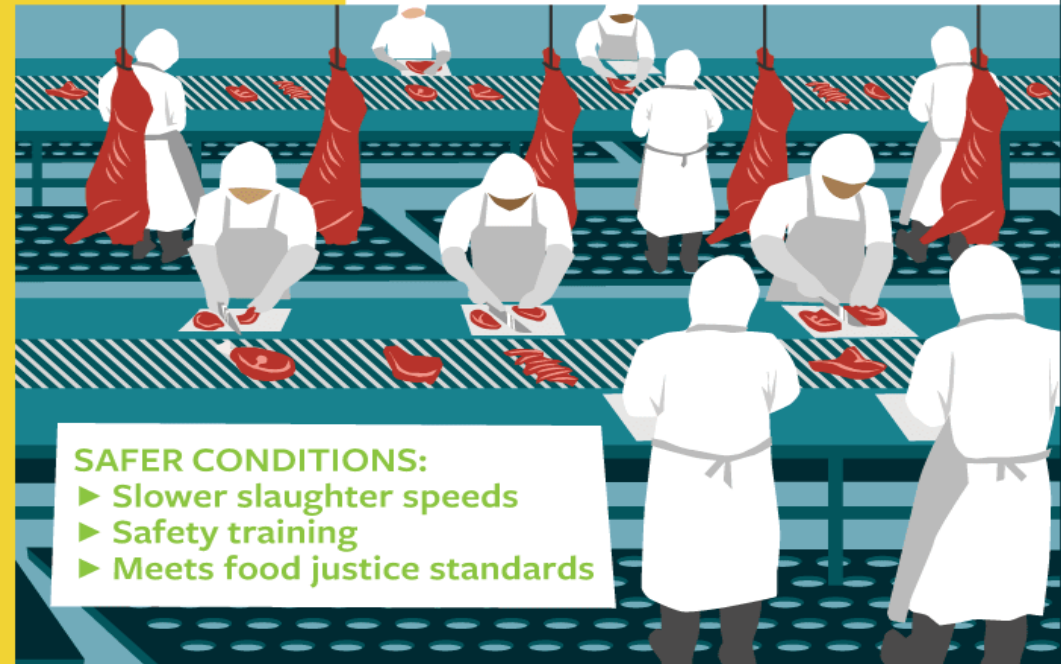
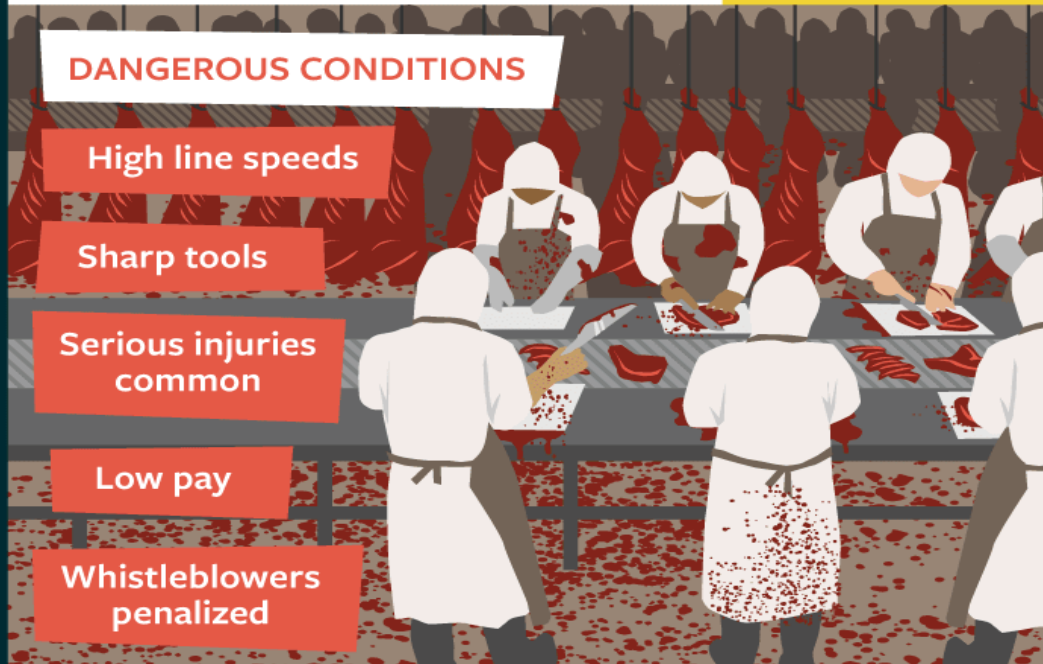
## FEED



## TRANSPORT & SLAUGHTER



## WORKER SAFETY

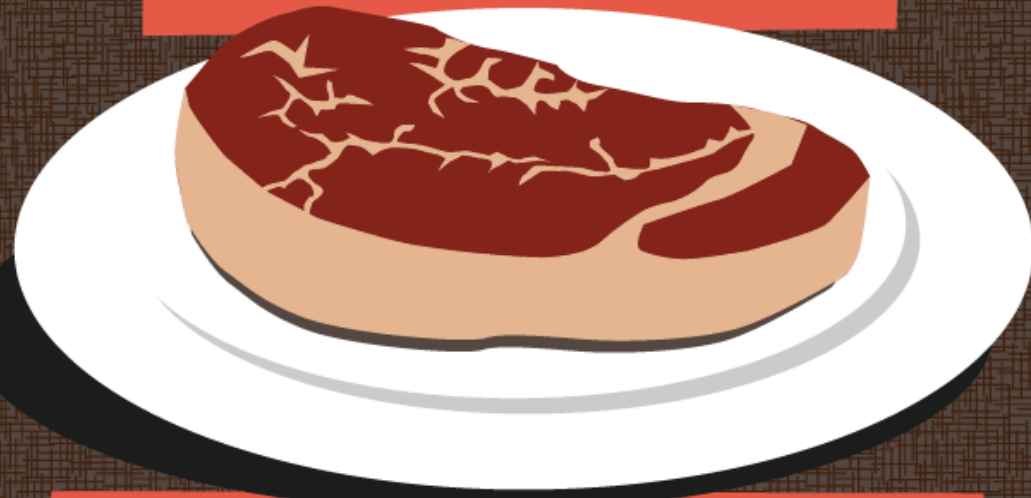


## PUBLIC SAFETY

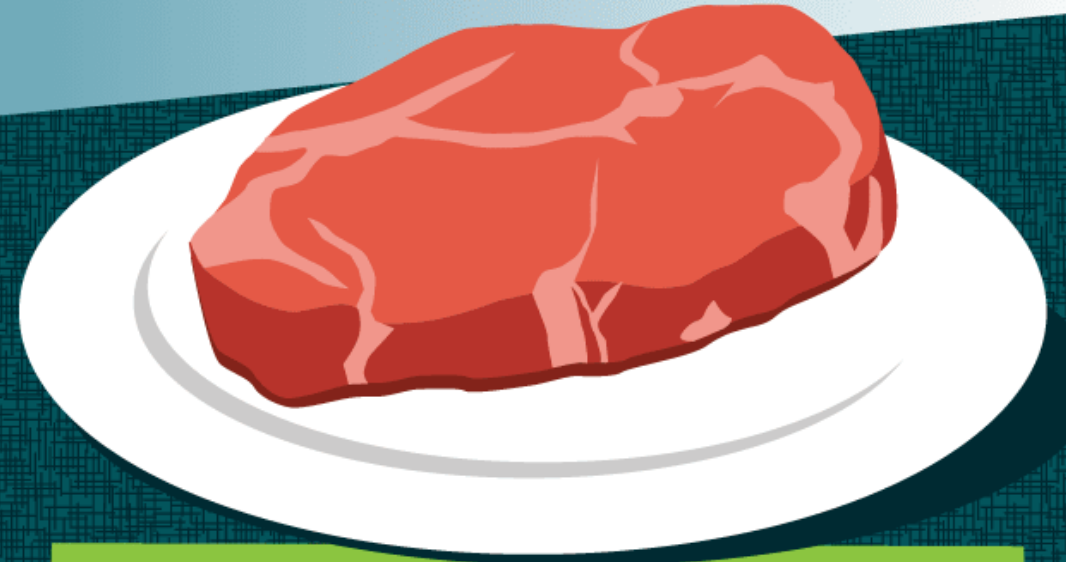


## MEAT QUALITY

Tough meat: increased stress hormone levels before slaughter



Poor fatty acid profile: industrial grain feed



- ▶ More tender meat: fewer stress hormones
- ▶ Higher fatty acid, more vitamins & enzymes: grass diet