ALES 100 years 1915-2015

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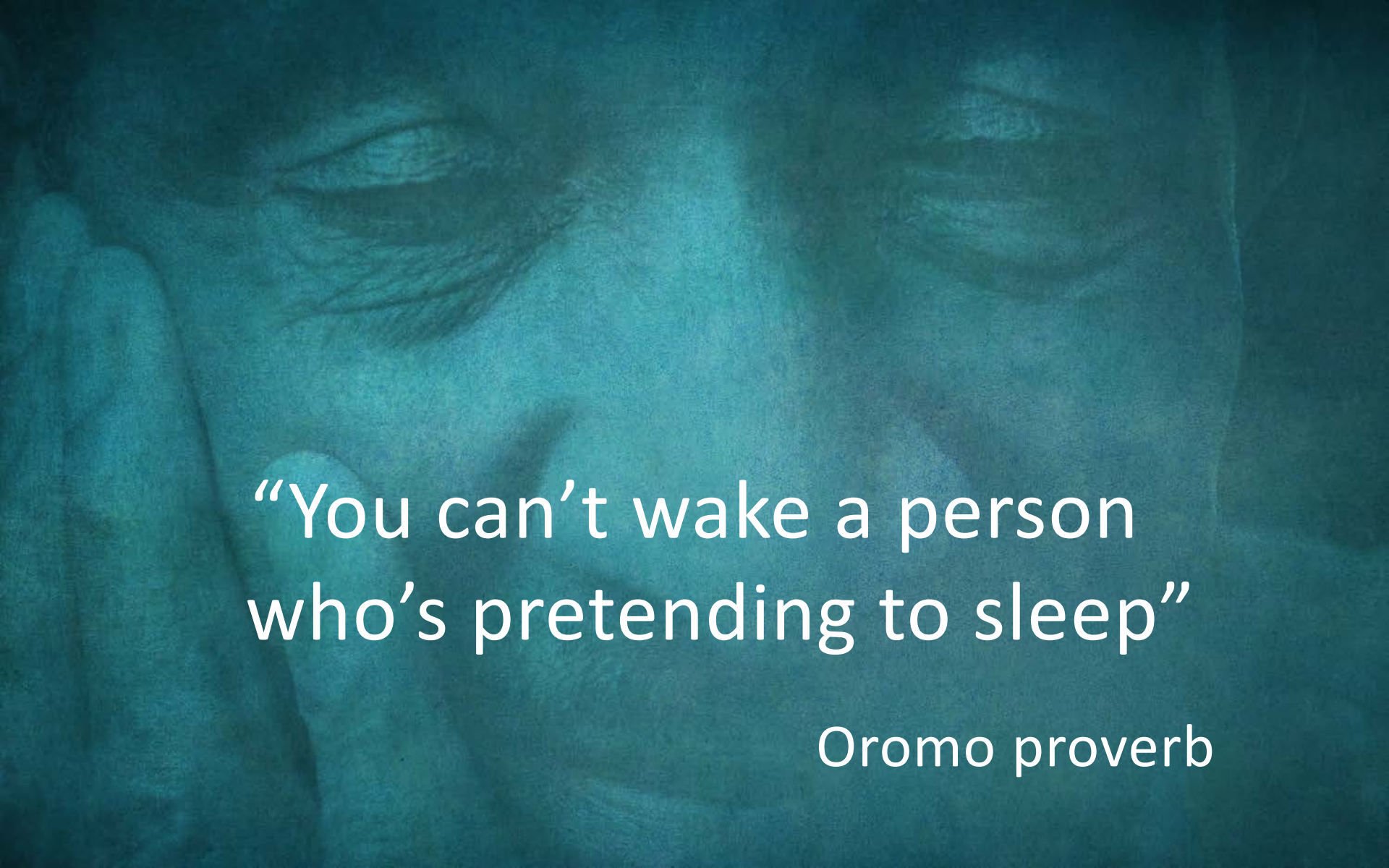
Providing solutions to global challenges

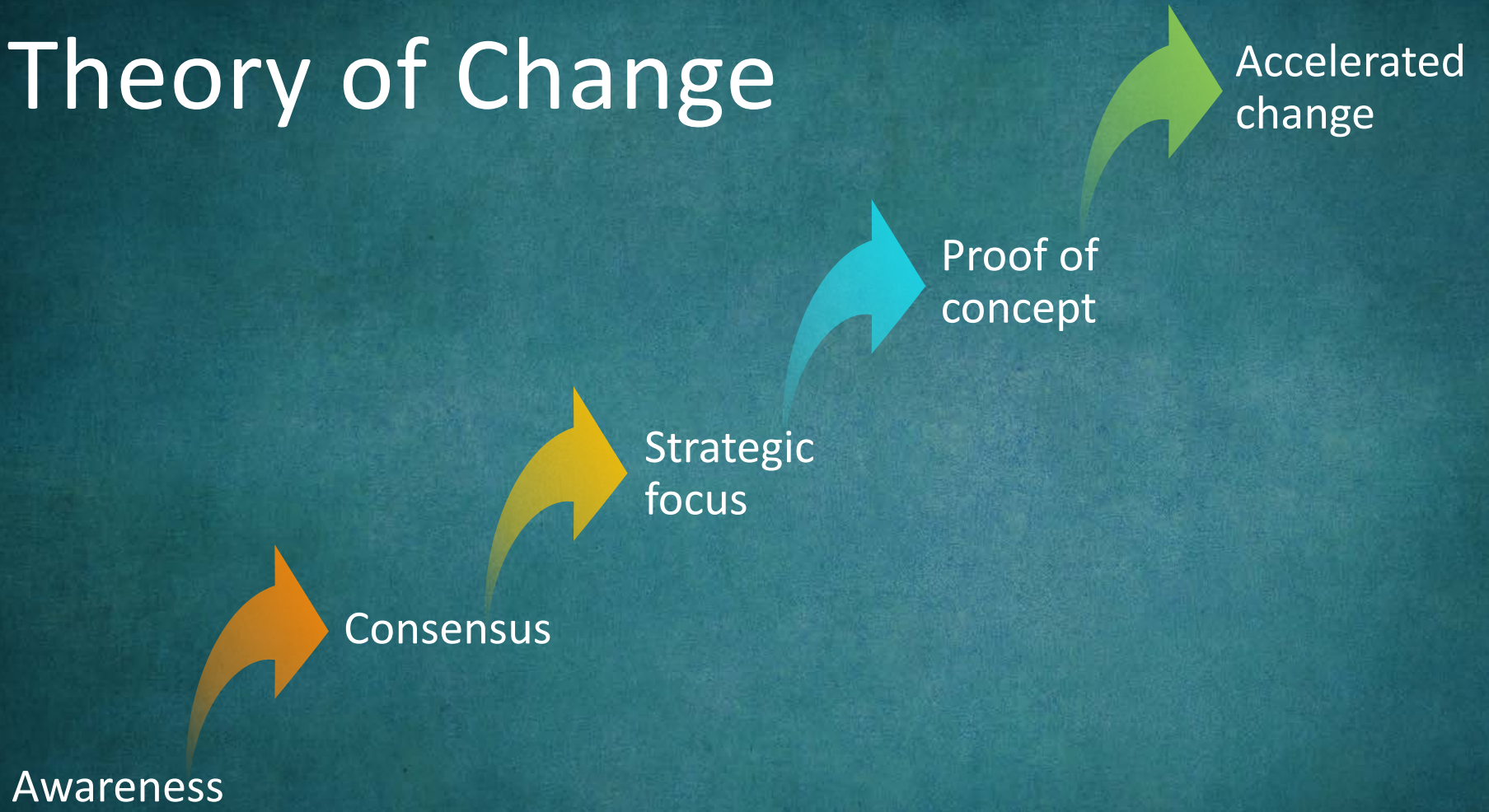
Producing more sustainable food

while maintaining the planet

Jason Clay
SVP Markets
WWF-US


“You can’t wake a person who’s pretending to sleep”
Oromo proverb

Theory of Change




global food
40 years =
8,000 years

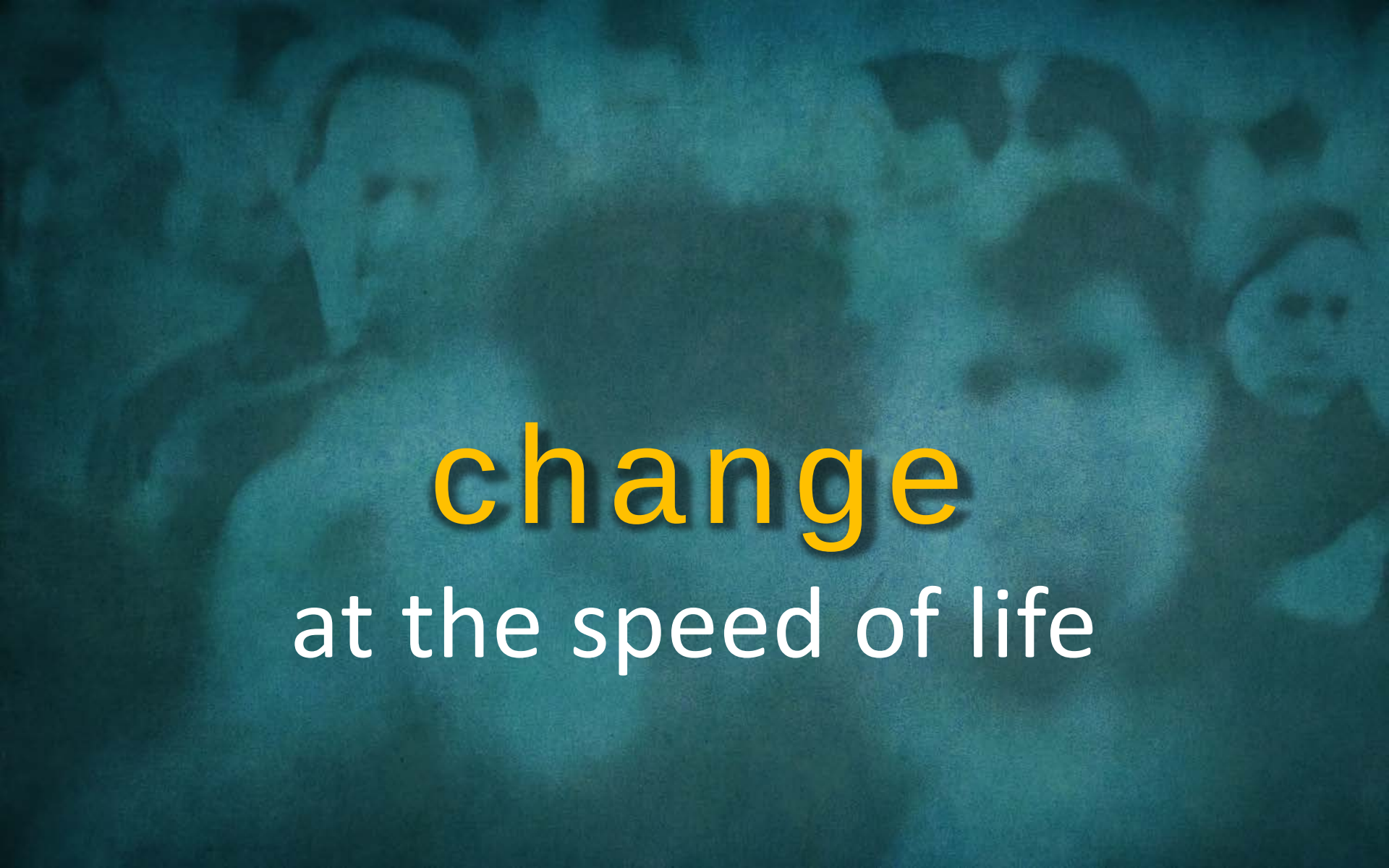
food production

is the biggest threat

x 1 = 7

x 2 = 18

we need more from less


change
at the speed of life

The China phenomenon

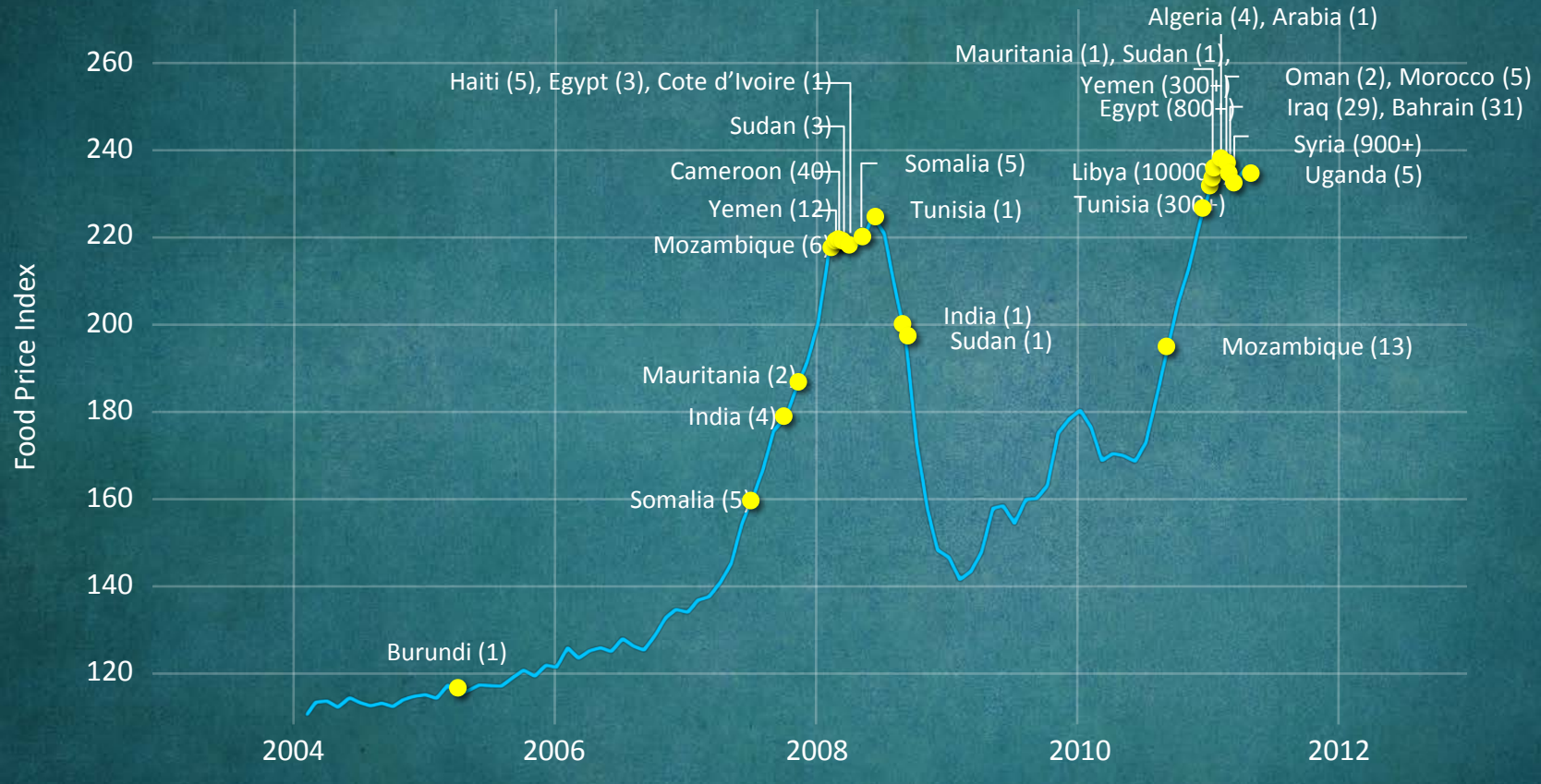
	Population at start of growth period	Years to double GDP per capita[1]
Britain (1700-1855)	9M	155
US (1820-1873)	10M	53
China (1983-1995)	**1,023M**	**12**
India (1989-2006)	822M	17

China doubling of GDP was 12x the speed of Britain during the Industrial Revolution at 100x the scale

400 million lifted out of poverty

1 Time to increase GDP per capita (in PPP terms) from 1,300 to 2,600 USD **Source:** Angus Maddison, University of Groningen

Food prices & food riots, 2004-12

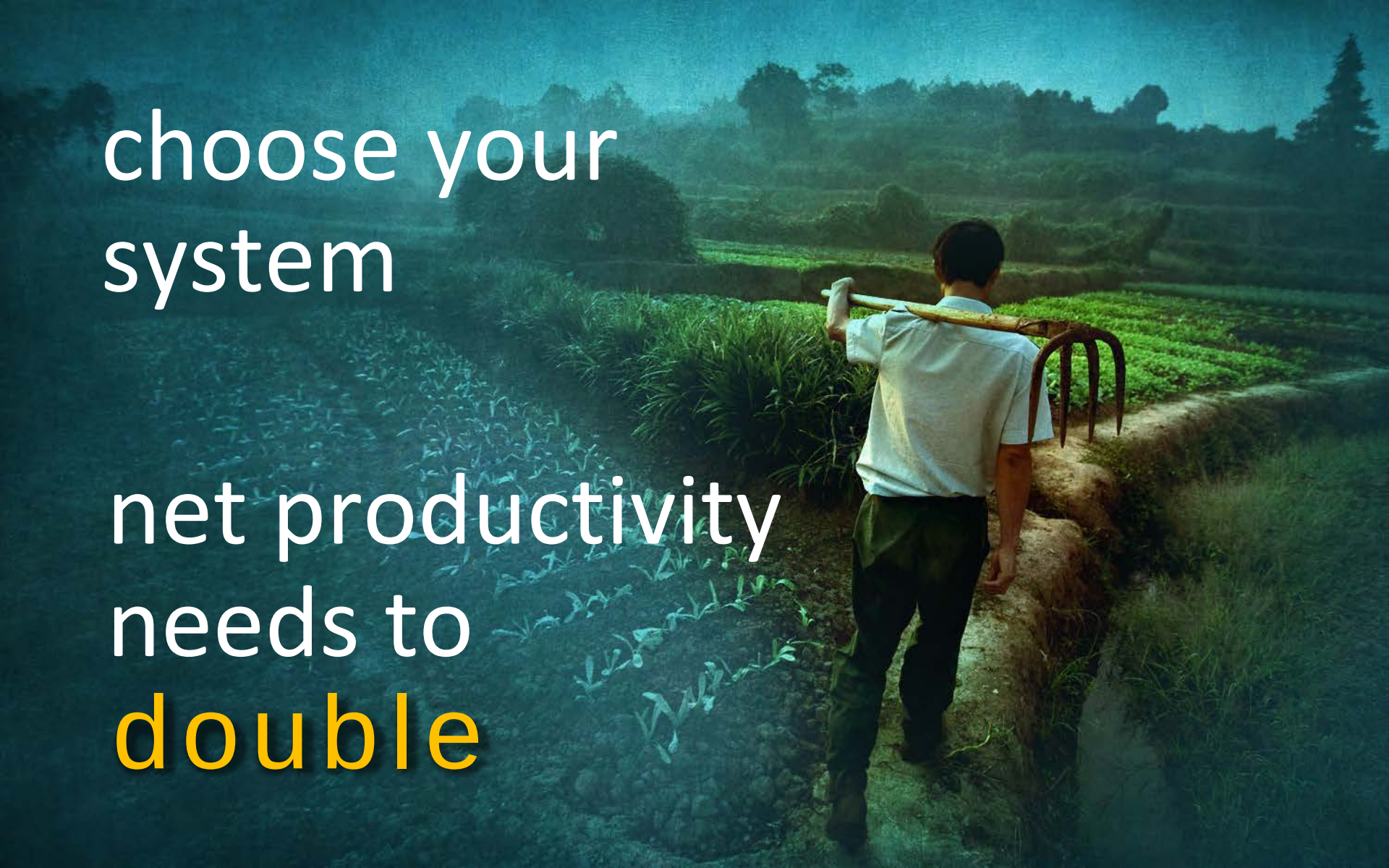


Source: The Chicago Council on Global Affairs, *Advancing Global Food Security in the Face of a Changing Climate*, Gerald C. Nelson, March 2014

the issue isn't
what to think

it's how to think


we must make
production more
efficient
more with less

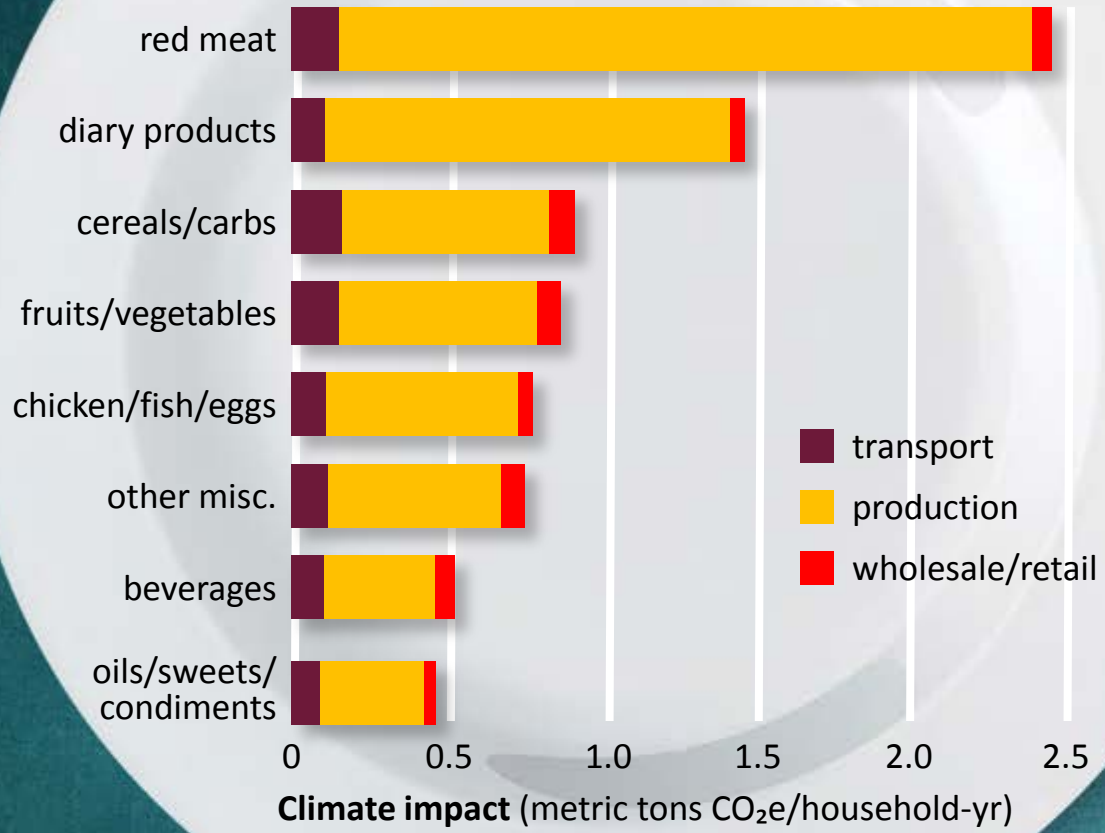

choose your system
net productivity needs to double

shift from

maximizing one variable…

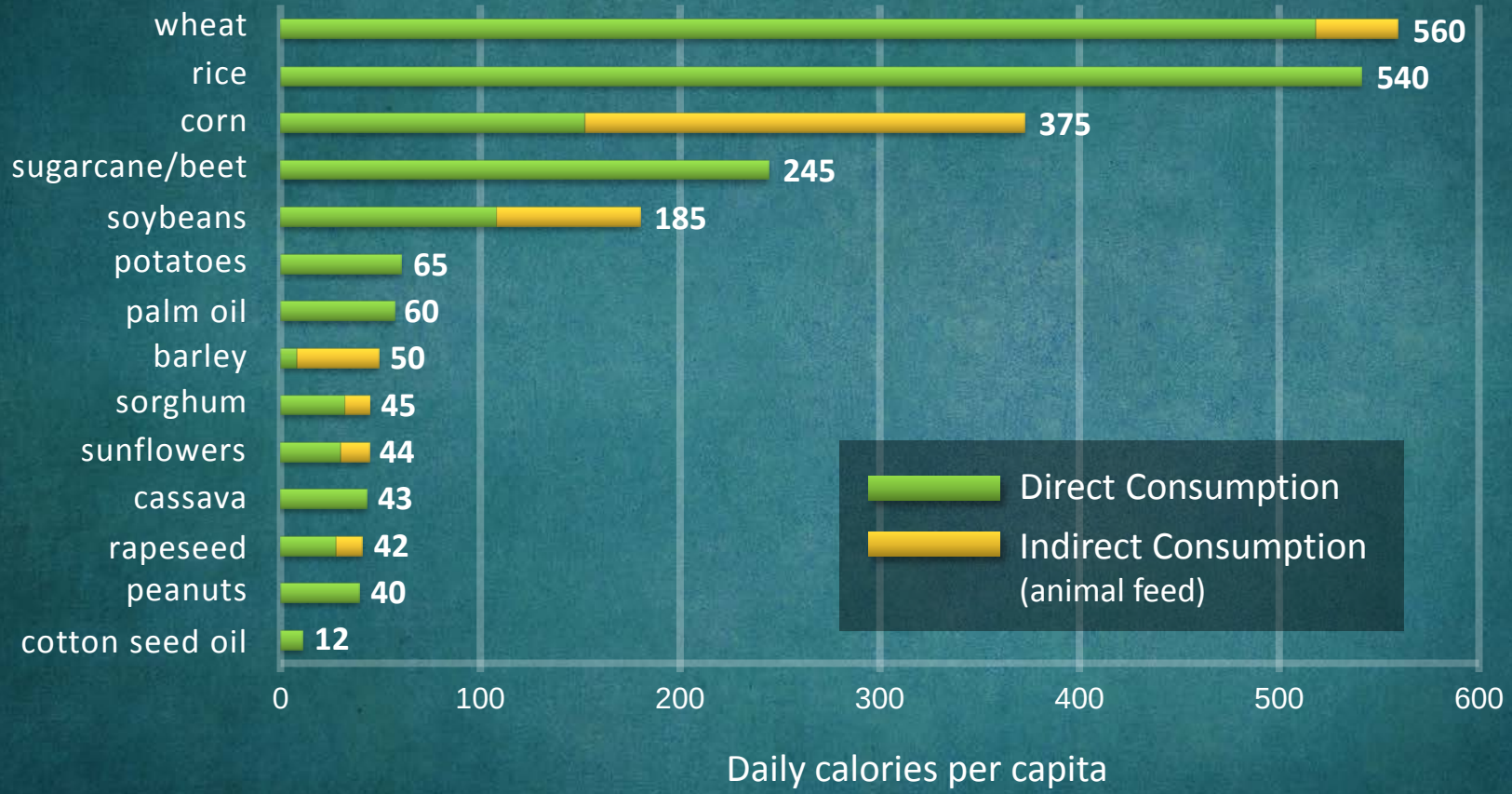
…to optimizing the key ones

Total greenhouse gas emissions by supply chain tier associated with household food consumption in the U.S.

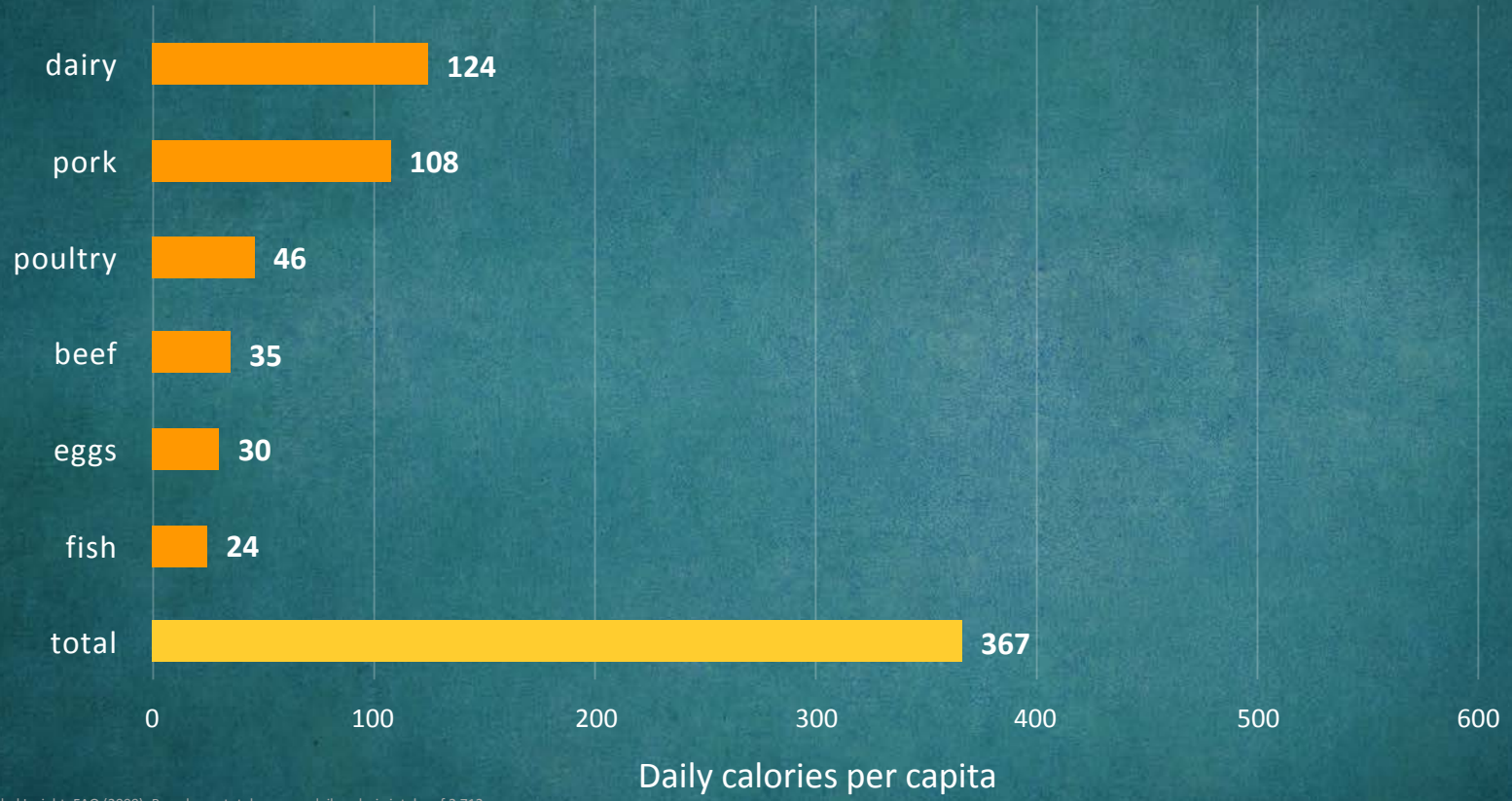


"The Problem of What to Eat" *Conservation.* Natasha Loder, Elizabeth Finkel, Craig Meisner, and Pamela Ronald. July-September 2008 9(3):31

World daily caloric intake



World daily caloric intake – animal protein



Source: Global Insight, FAO (2000). Based on a total average daily caloric intake of 2,712.


food
security is
national
security


Top food exporting countries,
2002-12 (oilseed & cereals)


Drought-affected countries,
2012


trade barriers
for food
are greater
than any
other sector

we are not paying the

true cost of food

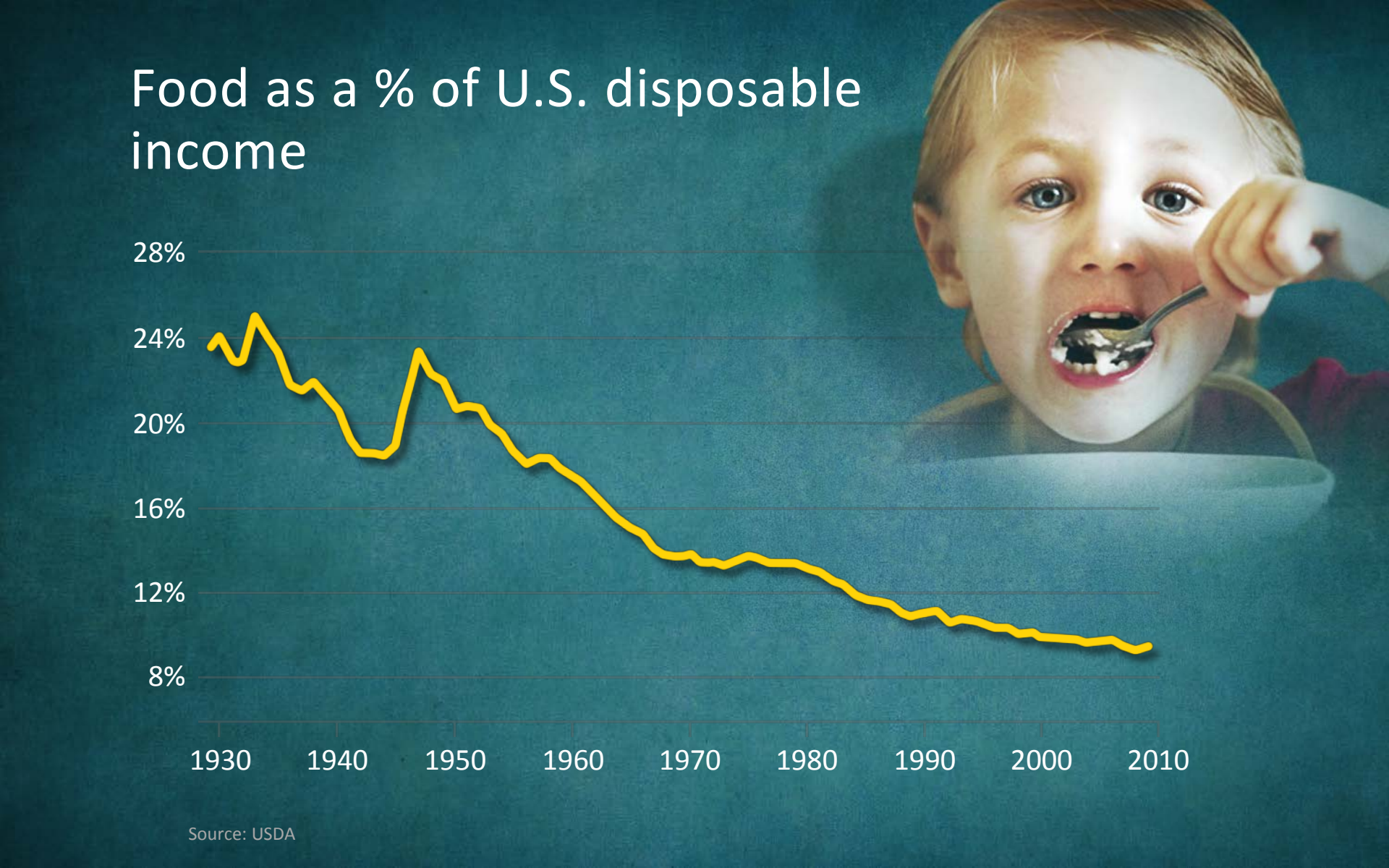
Selected products, water use and farmer income

	Raw material input	Water to produce input	Farm gate price
1 cotton t-shirt	**4 oz** ginned	**500 to 2,000** liters of water	**US $0.18** (US)
1 liter of soda	**6 T** sugar	**175-250** liters of water	**US $0.04** (World)
1 oz slice of cheese	**6 oz** milk	**40** liters of water	**US $0.07** (US)
1 double quarter-pounder	**8 oz** hamburger	**3,000 to 15,000** liters of water	**US $0.92** (US)

Source: USDA

subsidies are the biggest barrier to innovation

Food as a % of U.S. disposable income



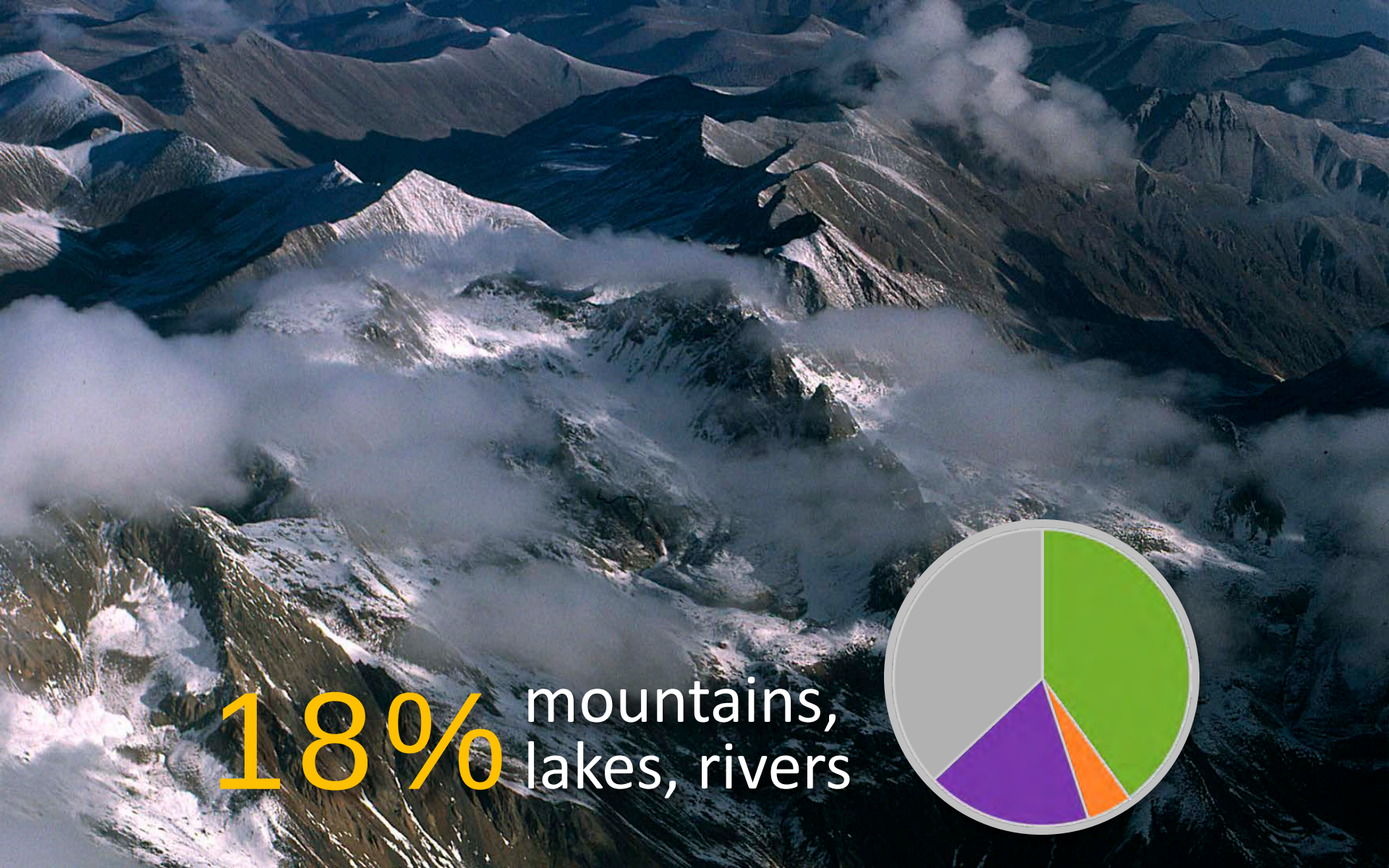
Source: USDA

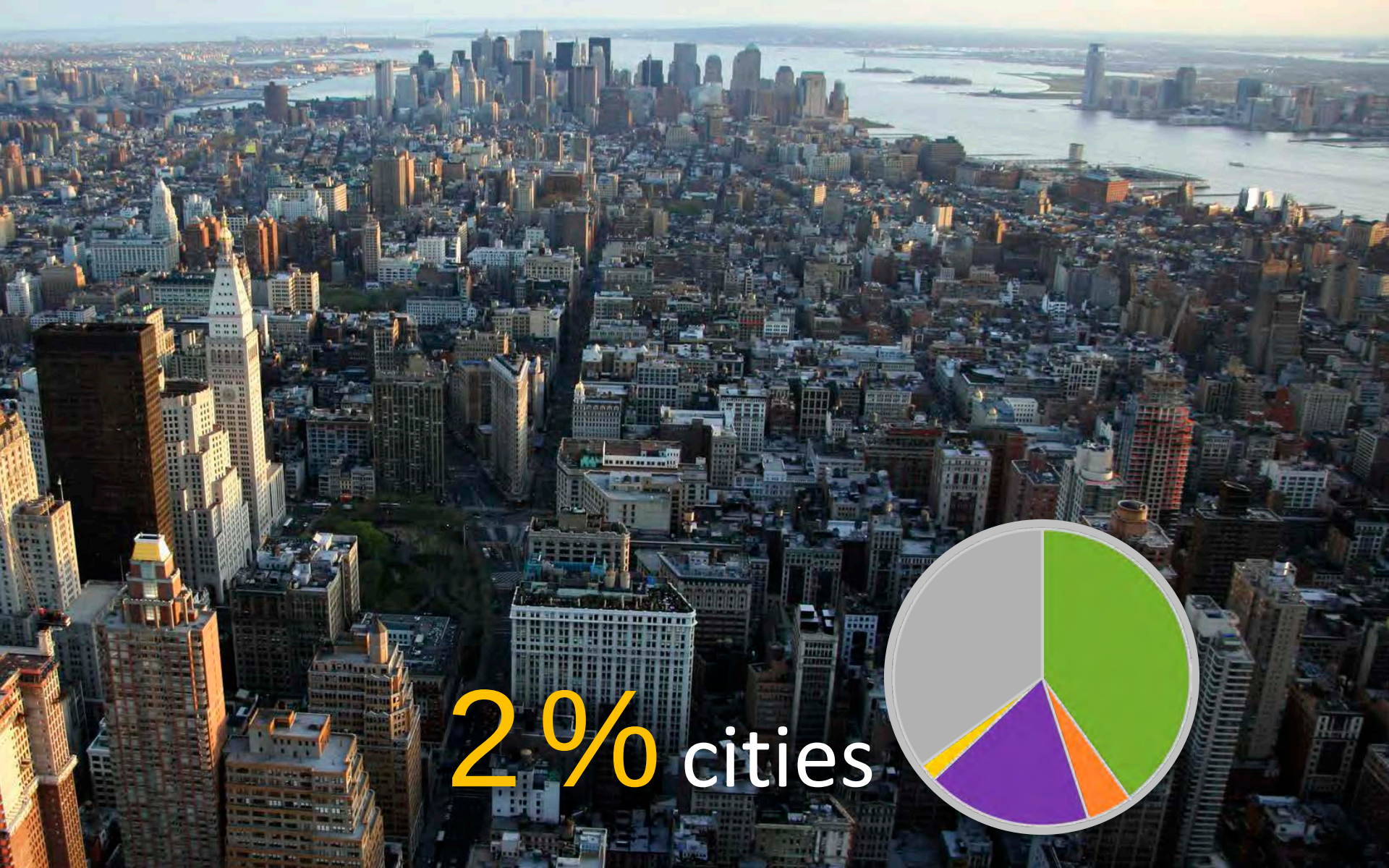

food is
cheap, but
1 billion
can’t afford it


half of farm families
can’t feed themselves

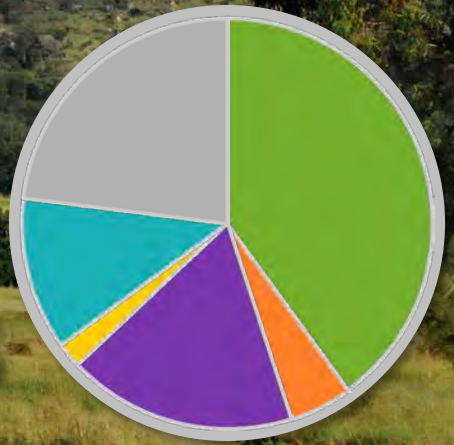
Source: UMN Global Landscapes Initiative


5% desert


18%
mountains,
lakes, rivers


2% cities

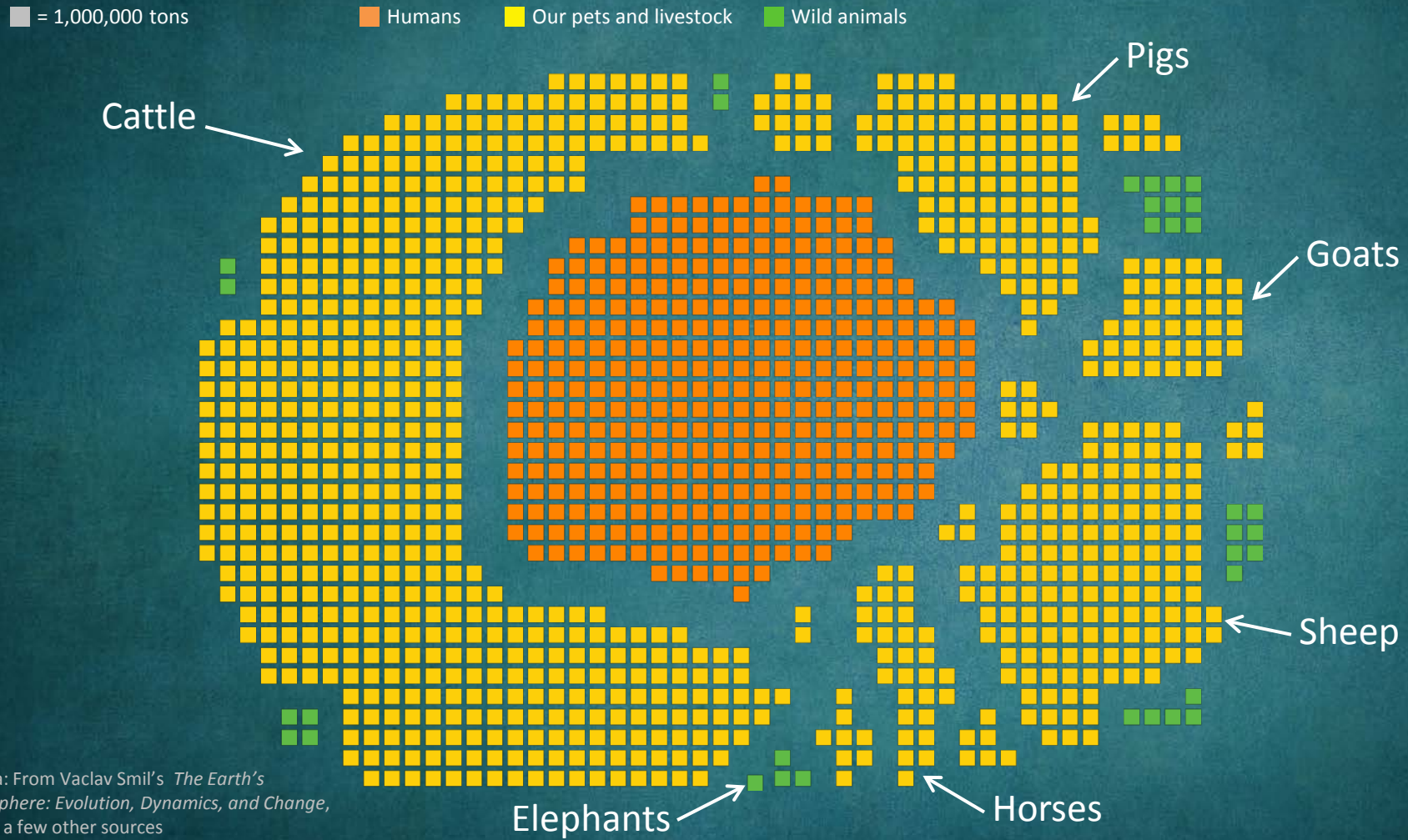
12% parks




23%
more for
food by 2050

Source: WWF PADDDtracker.org

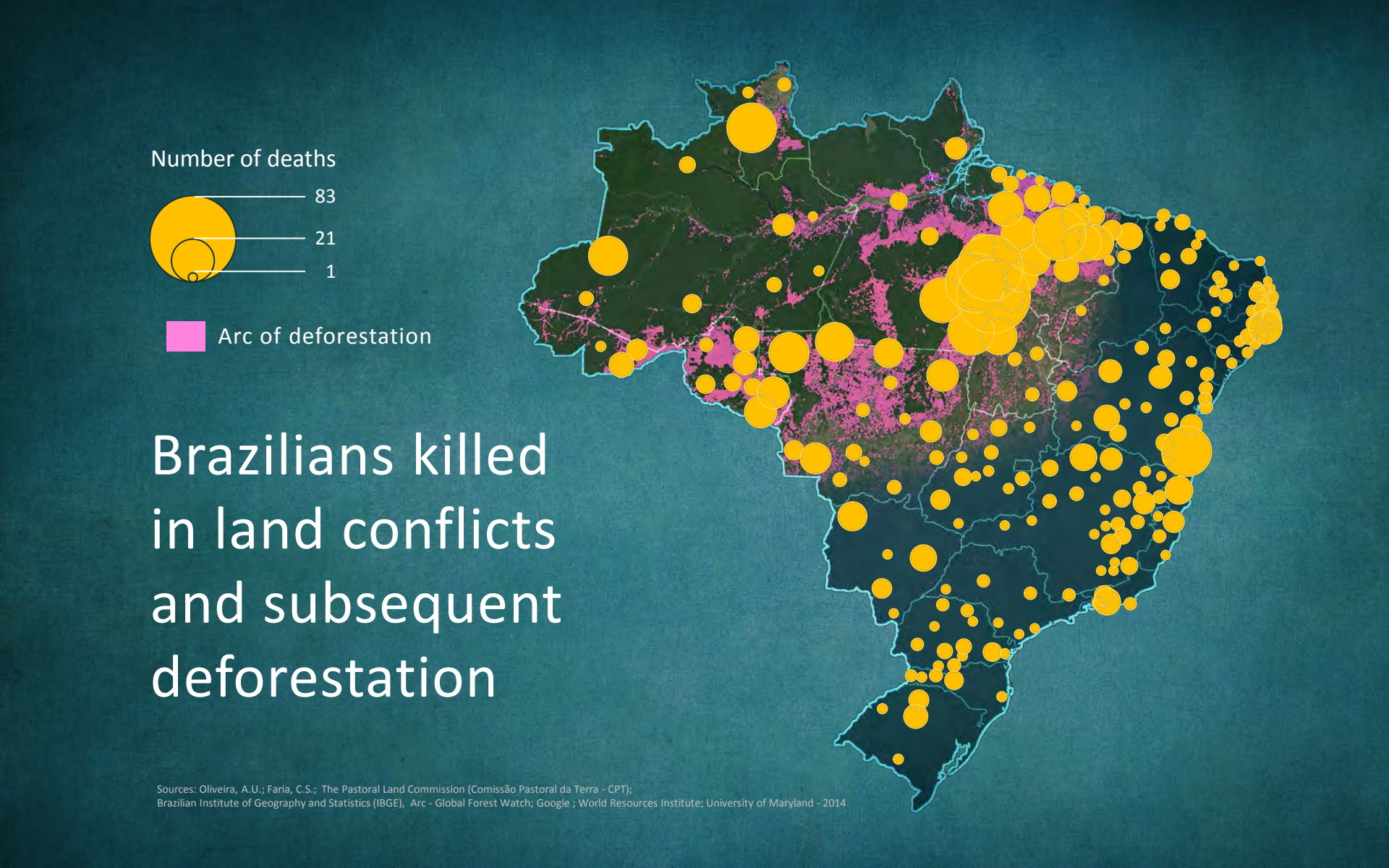
Earth's land mammals by weight



Data: From Vaclav Smil's *The Earth's Biosphere: Evolution, Dynamics, and Change*, plus a few other sources

Brazilians killed in land conflicts (1985-1996)

Sources: Oliveira, A.U.; Faria, C.S.; The Pastoral Land Commission (Comissão Pastoral da Terra - CPT); Brazilian Institute of Geography and Statistics (IBGE)


Number of deaths
83
21
1
Arc of deforestation
Brazilians killed in land conflicts and subsequent deforestation
Sources: Oliveira, A.U.; Faria, C.S.; The Pastoral Land Commission (Comissão Pastoral da Terra - CPT);
Brazilian Institute of Geography and Statistics (IBGE), Arc - Global Forest Watch; Google ; World Resources Institute; University of Maryland - 2014


freeze
the footprint of food


by 2050
double net food availability

productivity & efficiency

and

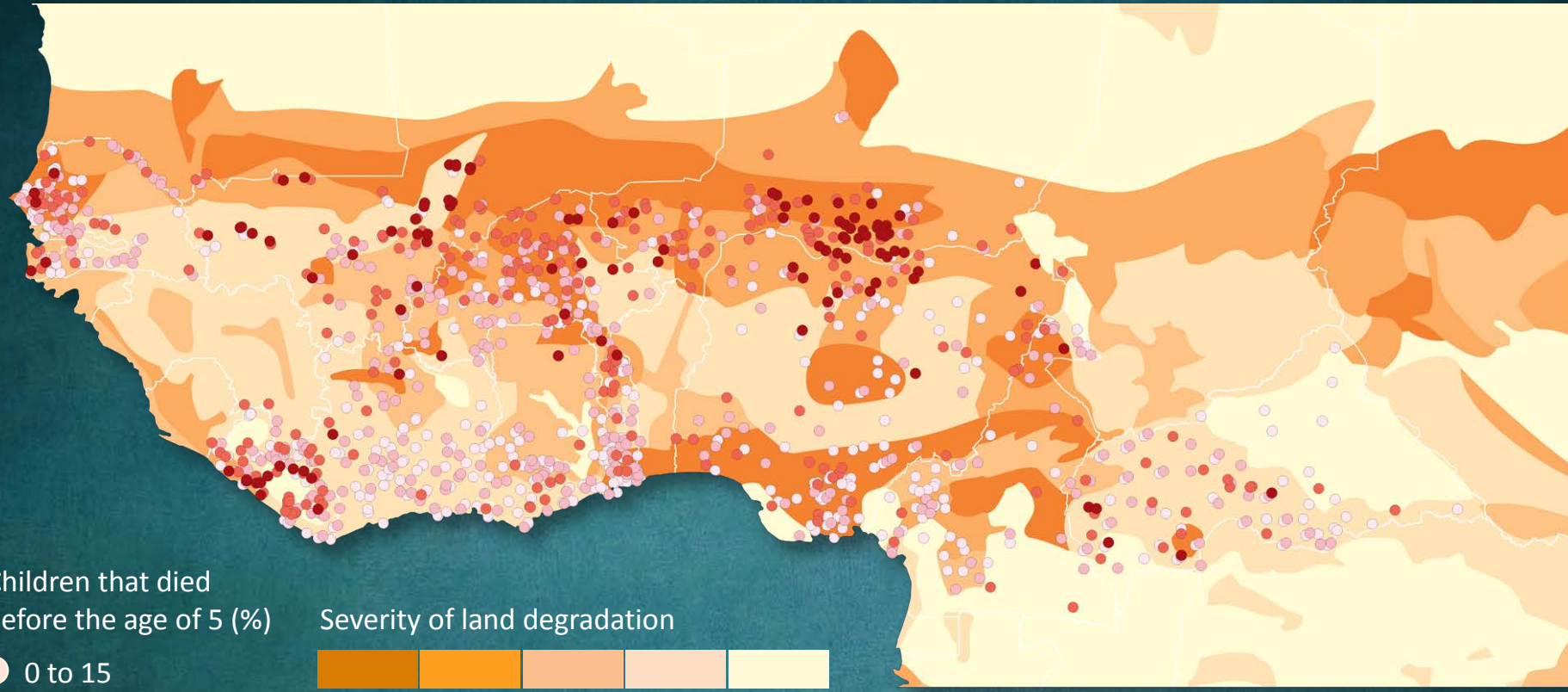
waste & consumption


on a finite planet,
should consumers
have a choice
about sustainable
products?
or should
all choices
be sustainable?

waste

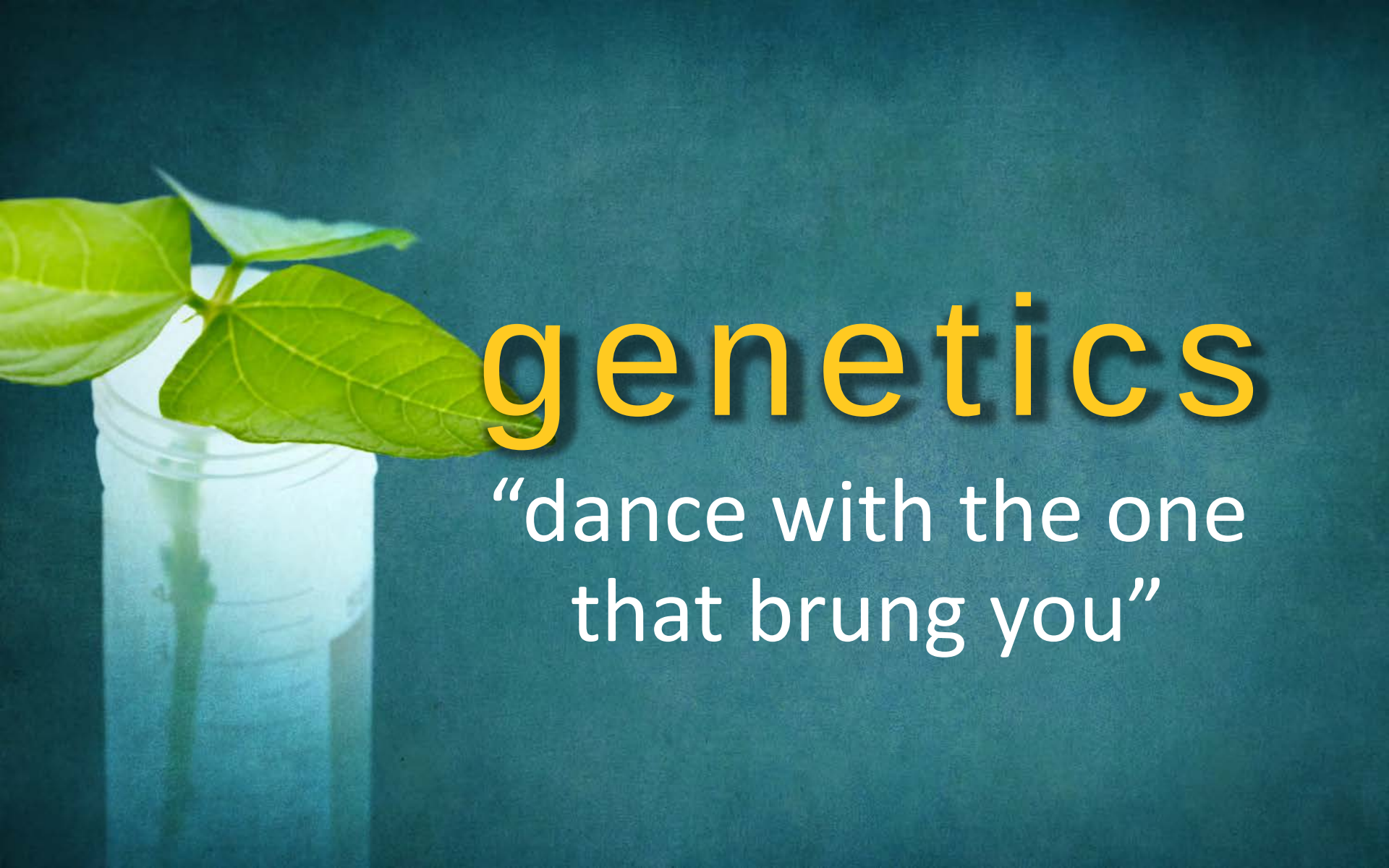
1 out of 3 calories

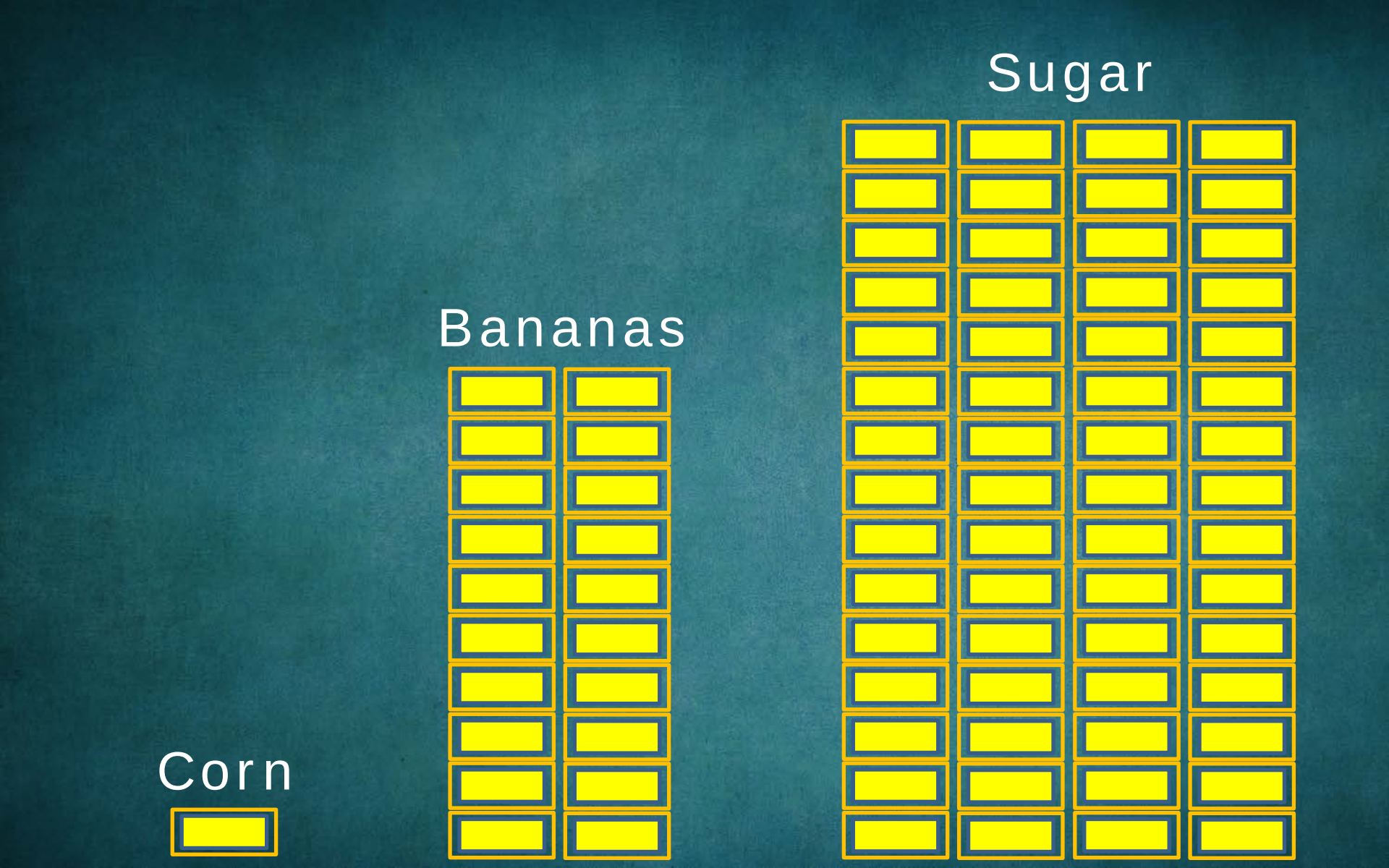

rebuild
soils
250 M hectares
by 2030



Child mortality and land degradation

Source: Demographic Health Survey Points: West Africa Spatial Analysis Prototype (WASAP) dataset, 1995. Land degradation: Global Assessment of Soil Degradation (GLASOW), 1991.


genetics
“dance with the one that brung you”


Sugar
Bananas
Corn

Orphan crops


palm oil


millet


peanut


cowpeas


cassava


sugarcane


plantain

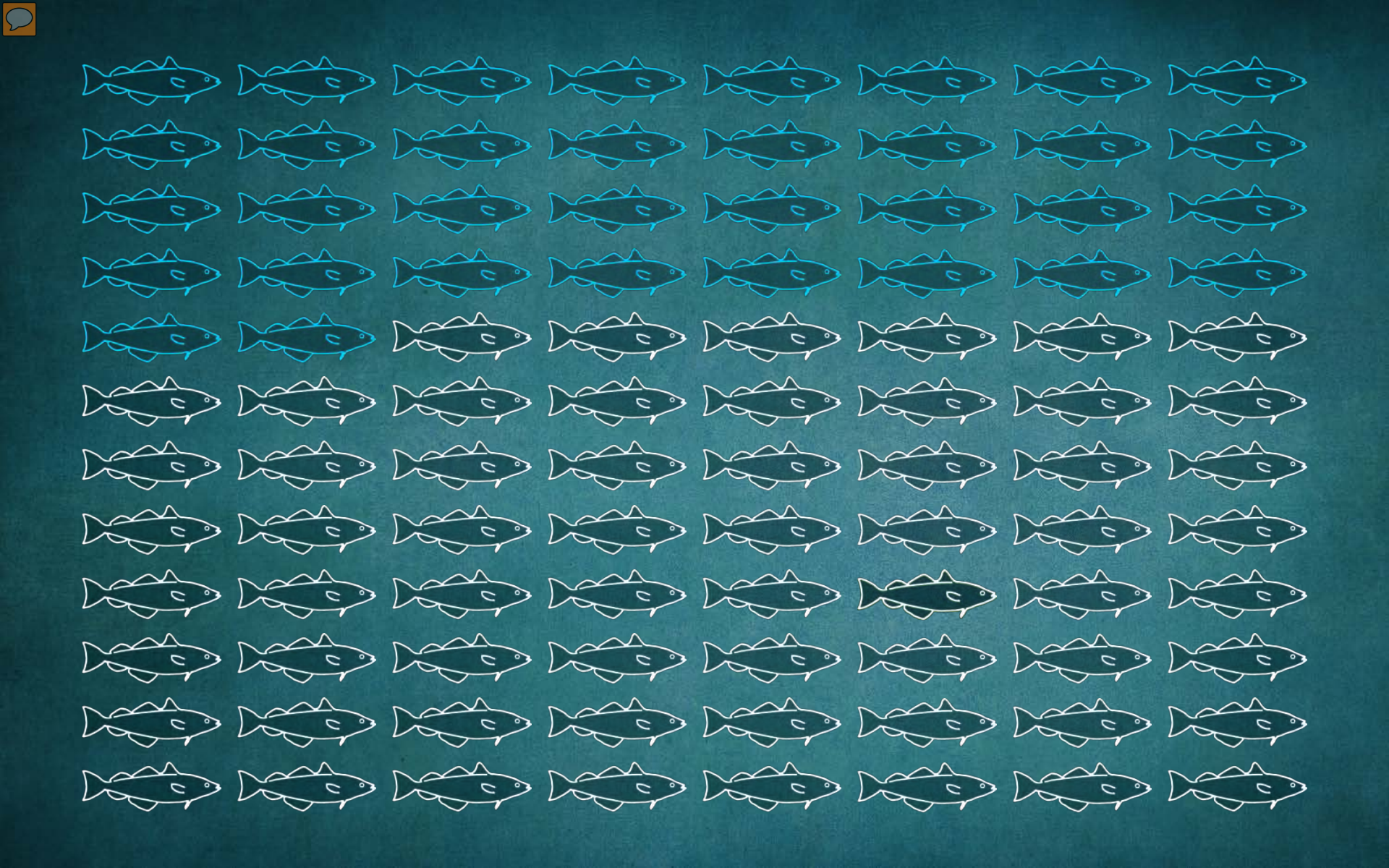

coco yam

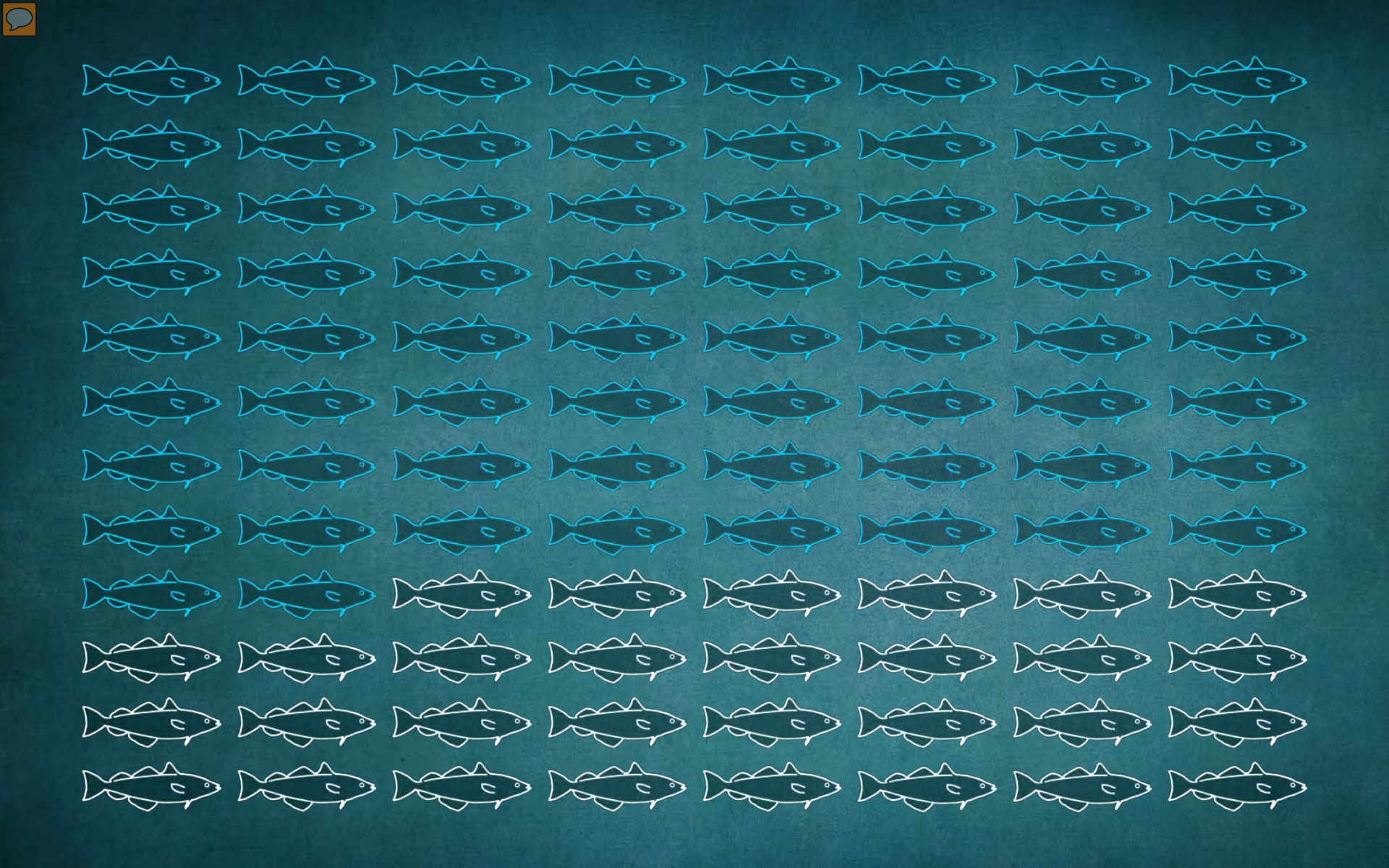

sorghum

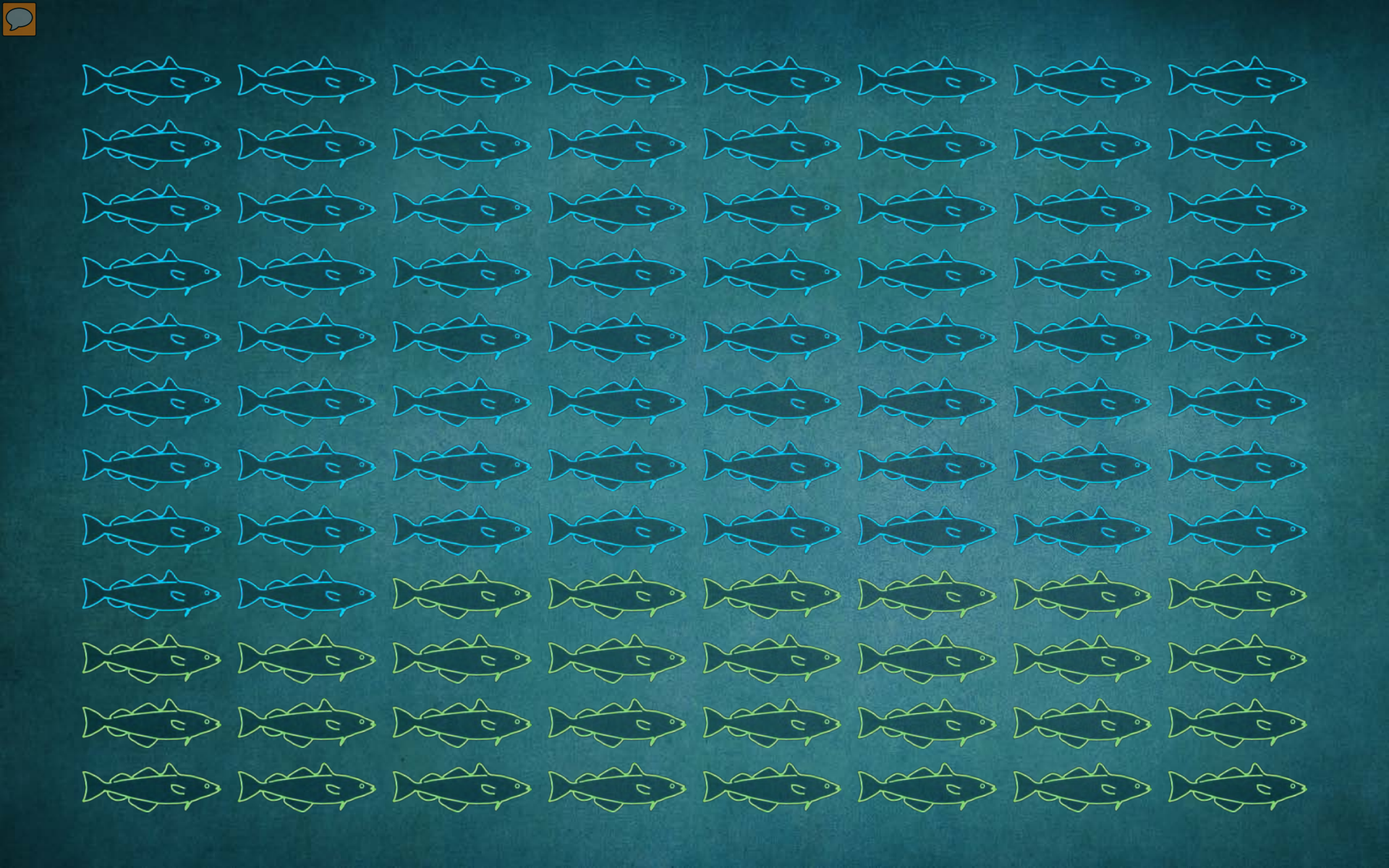

agriculture takes 70%
of all water used by people

1 liter of water = 1 calorie


beef takes 60%
of land,
produces 1.3%
of calories







better practices

100 times better

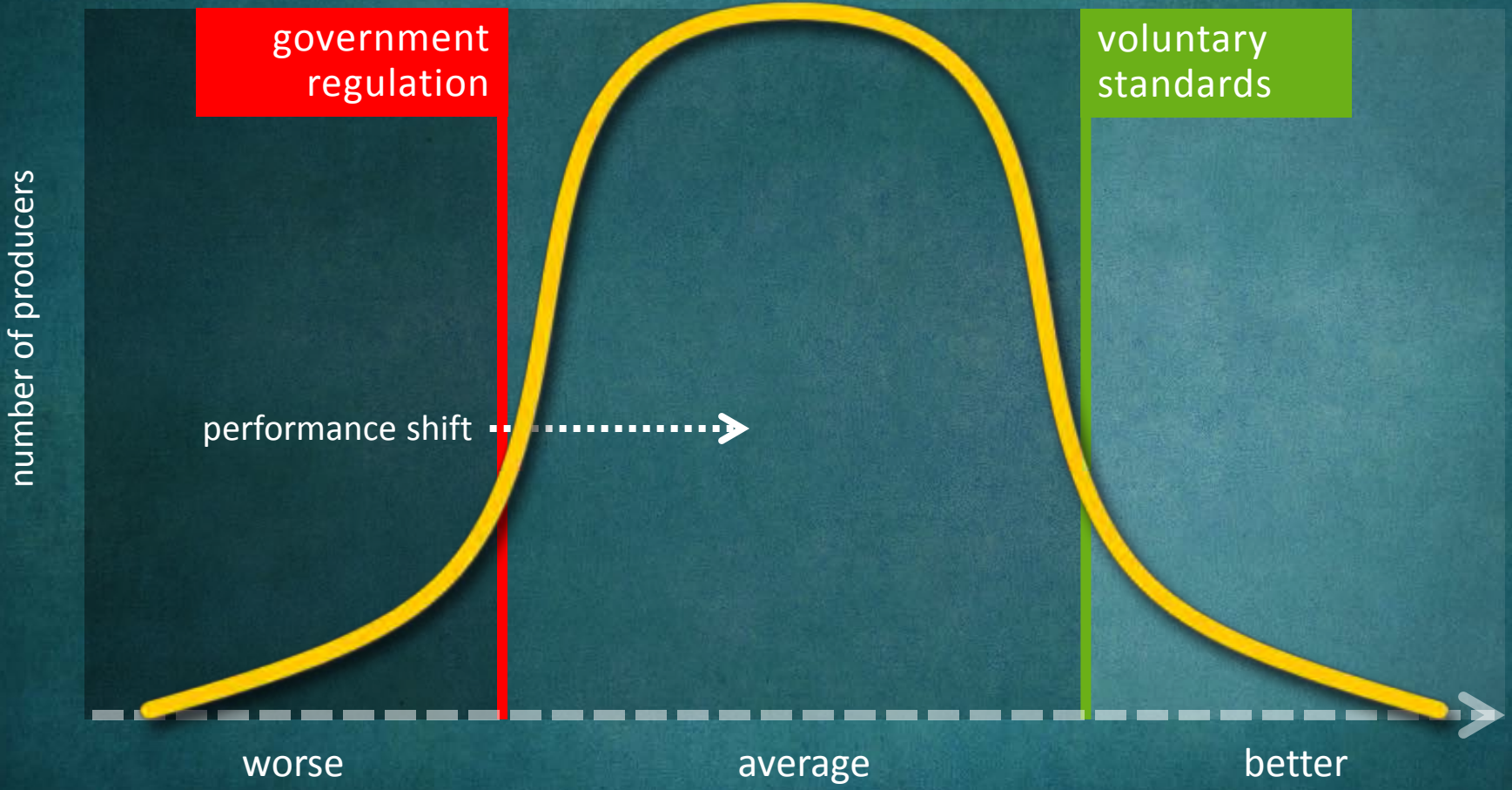
which gives us more food?

recognizing the best

or

moving the rest?

Reward the best, or move the rest?



BCI Cotton, 2005-13

BCI Certified Cotton

- 680,000 producers
- 3.7% of global production

Impacts of Metric-based Standards

- 60% pesticide reduction
- 40% water use reduction
- 30% synthetic fertilizer use reduction
- 15-20% increase in income


climate change &
agriculture

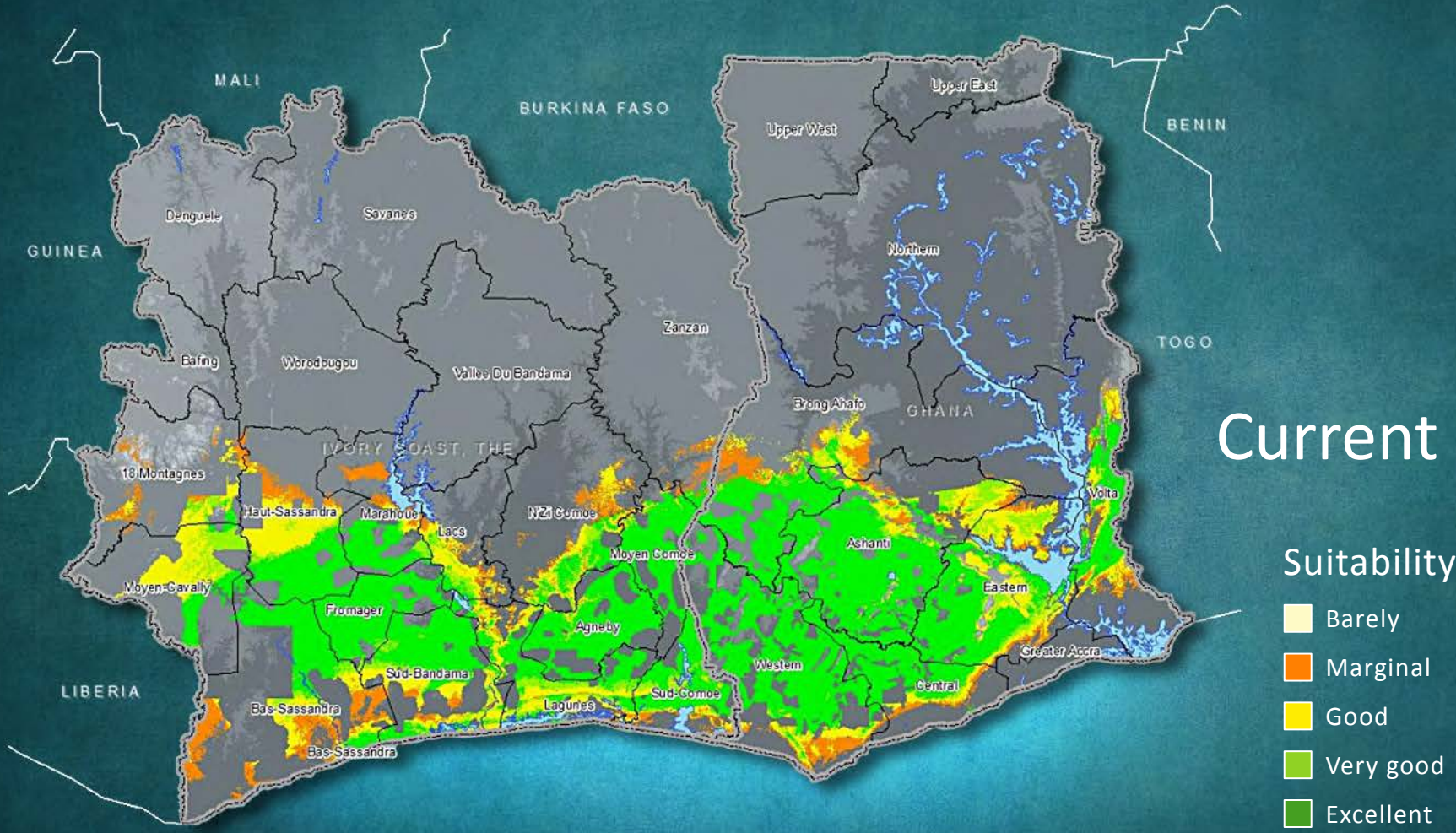
Credit: Associated Press

2012 US drought

- By 2013 soil moisture had not recovered
- Recharge with normal rains takes 2-3 years
- 2 years of drought in a row reduces recovery for 5-10 years
- Soil organic matter “burns”

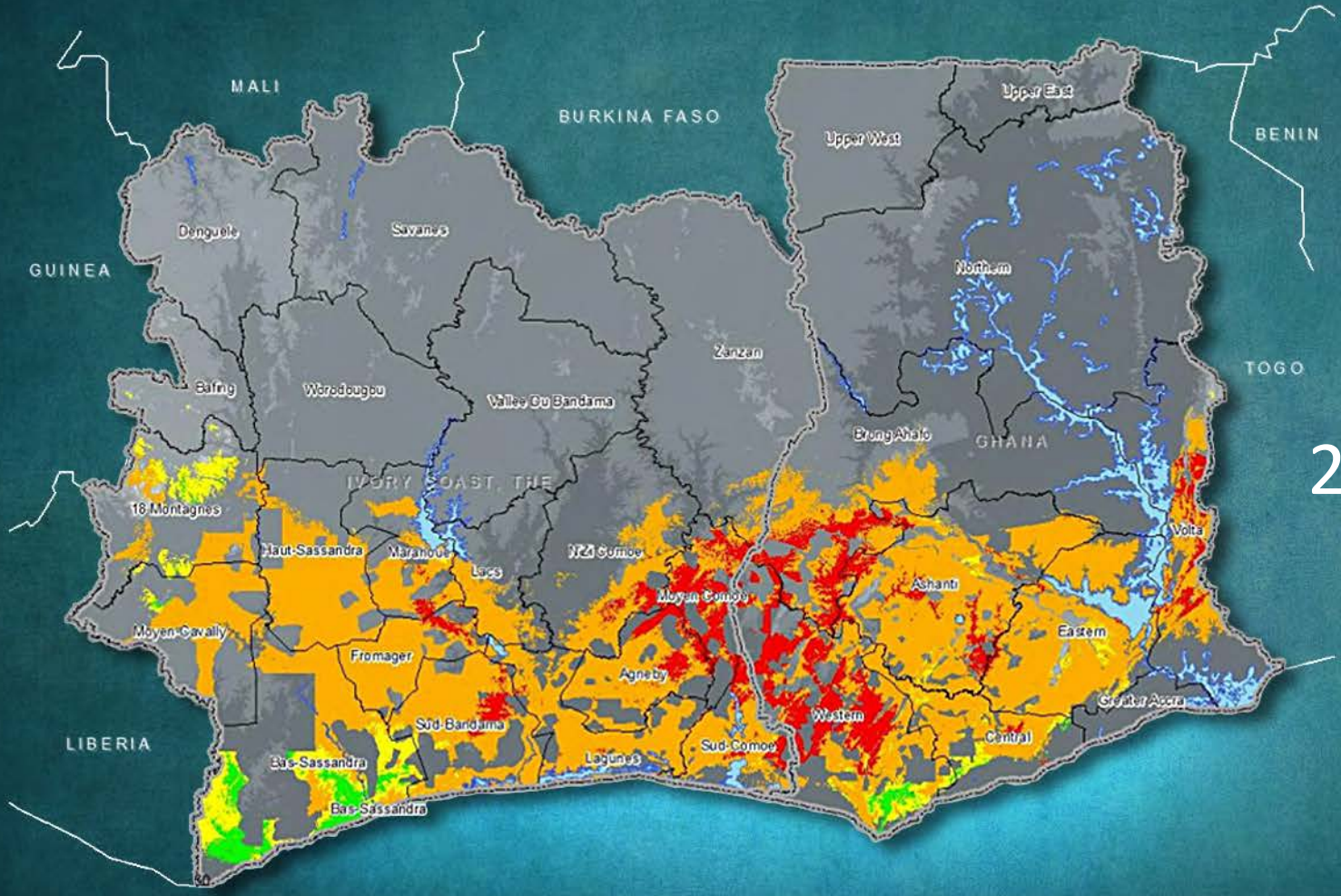
Source: University of Missouri School of Natural Resources, 2013

Suitability of cocoa production



Source: Armando Isaac Martinez, a.i.martinez@cgiar.org; Narioski Castro

Suitability of cocoa production



Source: Armando Isaac Martinez, a.i.martinez@cgiar.org; Narioski Castro

in the short term
climate smart agriculture =
efficient production

in the medium term,
producers change crops

who’s moving sustainability from niche to norm


Unilever


salmon
aquaculture


Barilla
Kellogg's
PEPSICO
Coca-Cola
KRAFT
Ahold
Carrefour
Sara Lee
Kroger
The Consumer Goods
FORUM
The Global Network Serving Shopper & Consumer Needs
Unilever
DELHAIZE GROUP
P&G
General Mills
Henkel
L'ORÉAL
Sobeys
Nestlé
TESCO
Johnson&Johnson
METRO Group
Walmart
Save money. Live better.

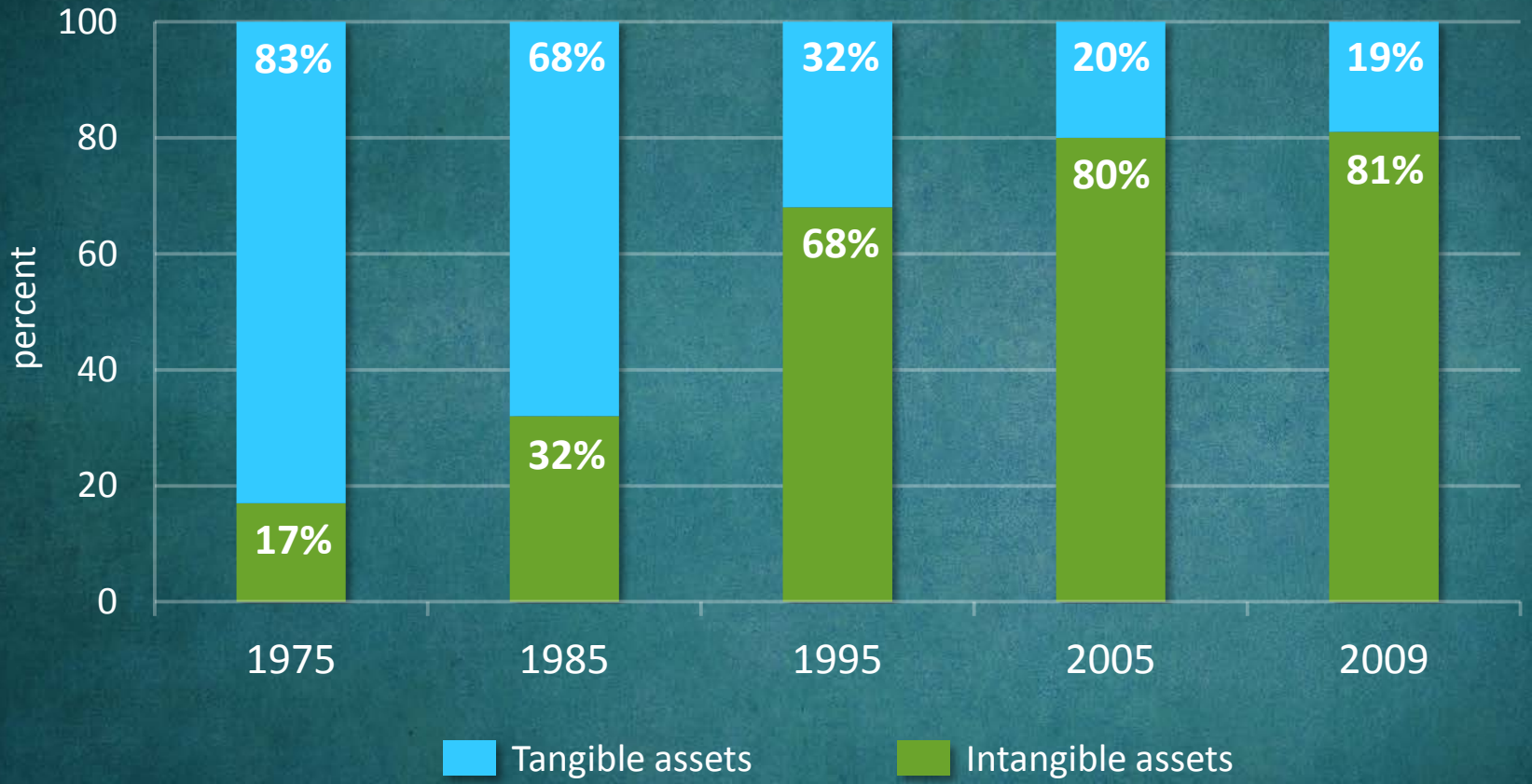
Origin Green
IRELAND

Working with nature

Bord Bia
Irish Food Board

Growing the success of Irish food & horticulture

Components of S&P 500 Market Value



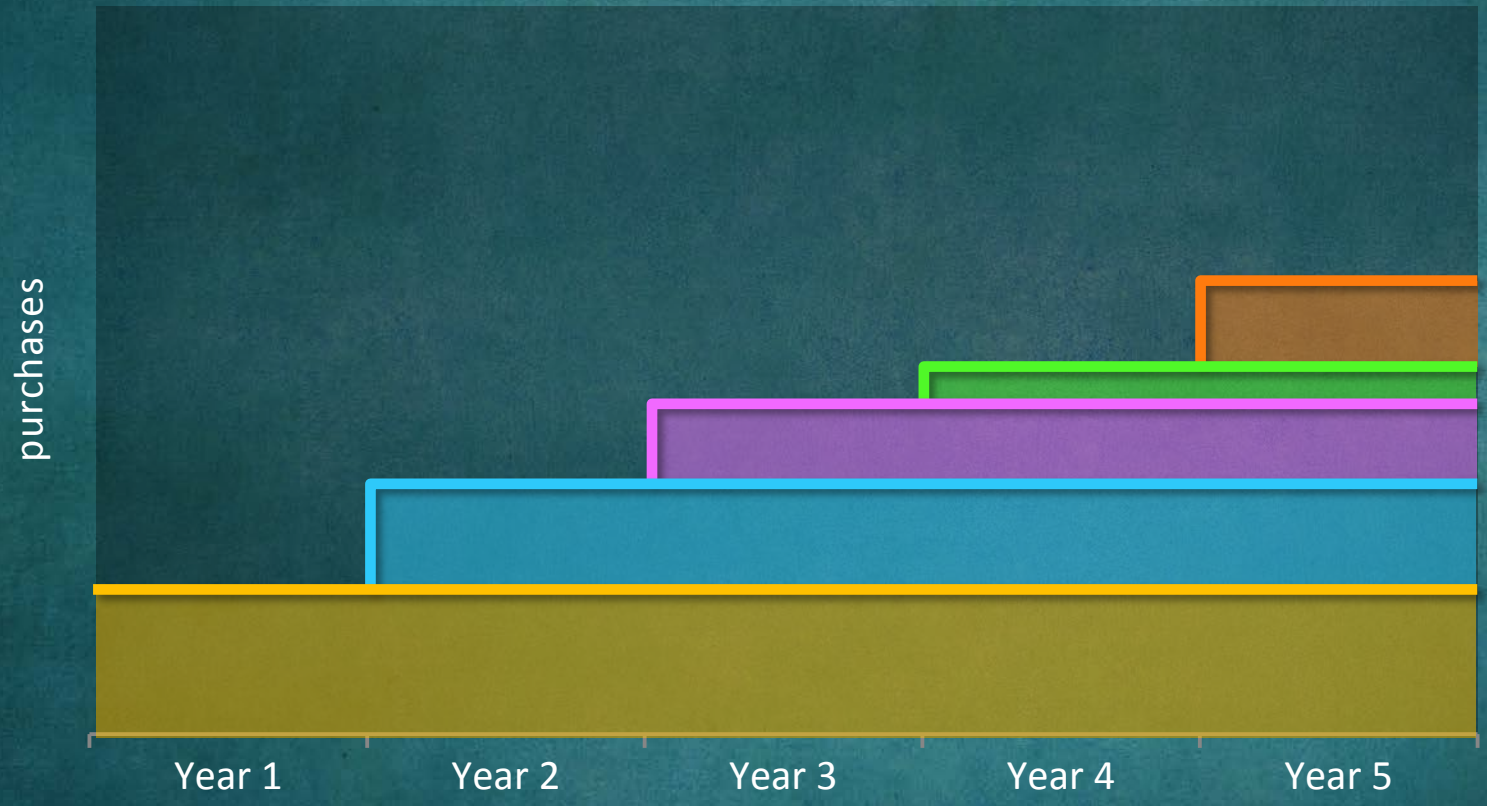
Source: Ocean Tomo

the issue is

risk

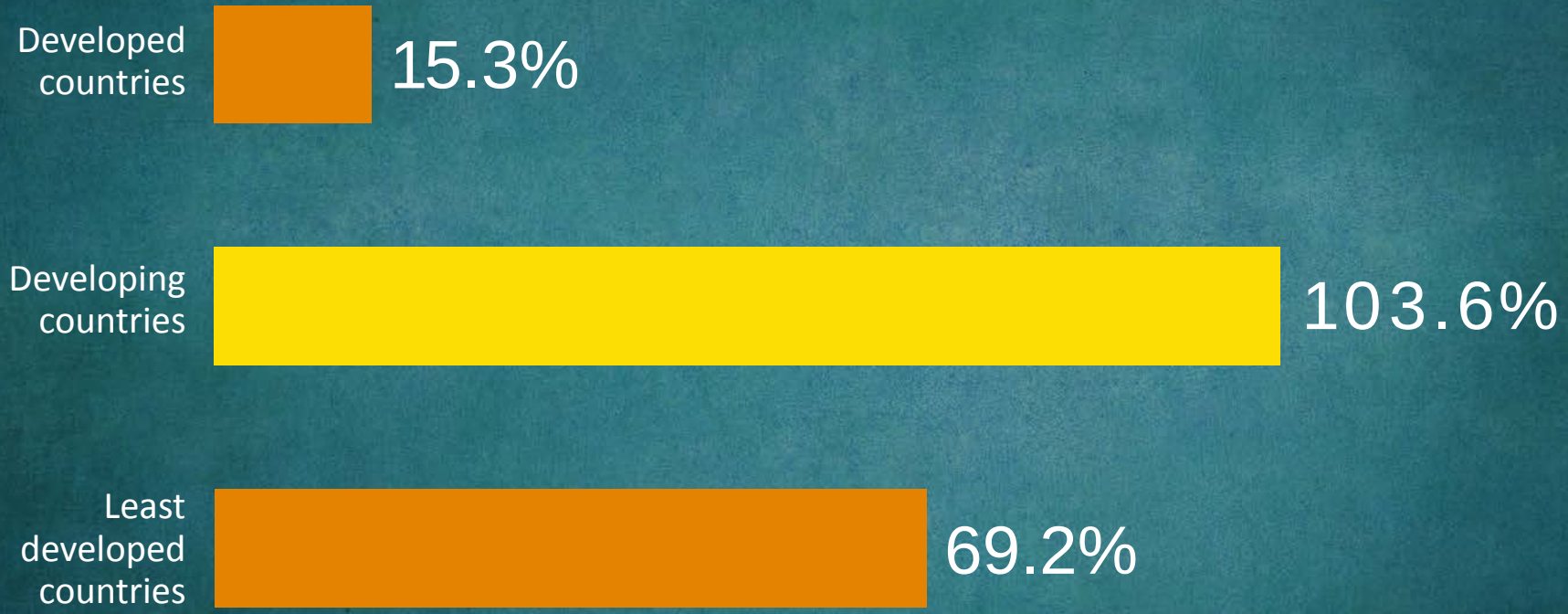
both availability and reputation

Use the system to change it
(long-term contracts, pooled commitments)



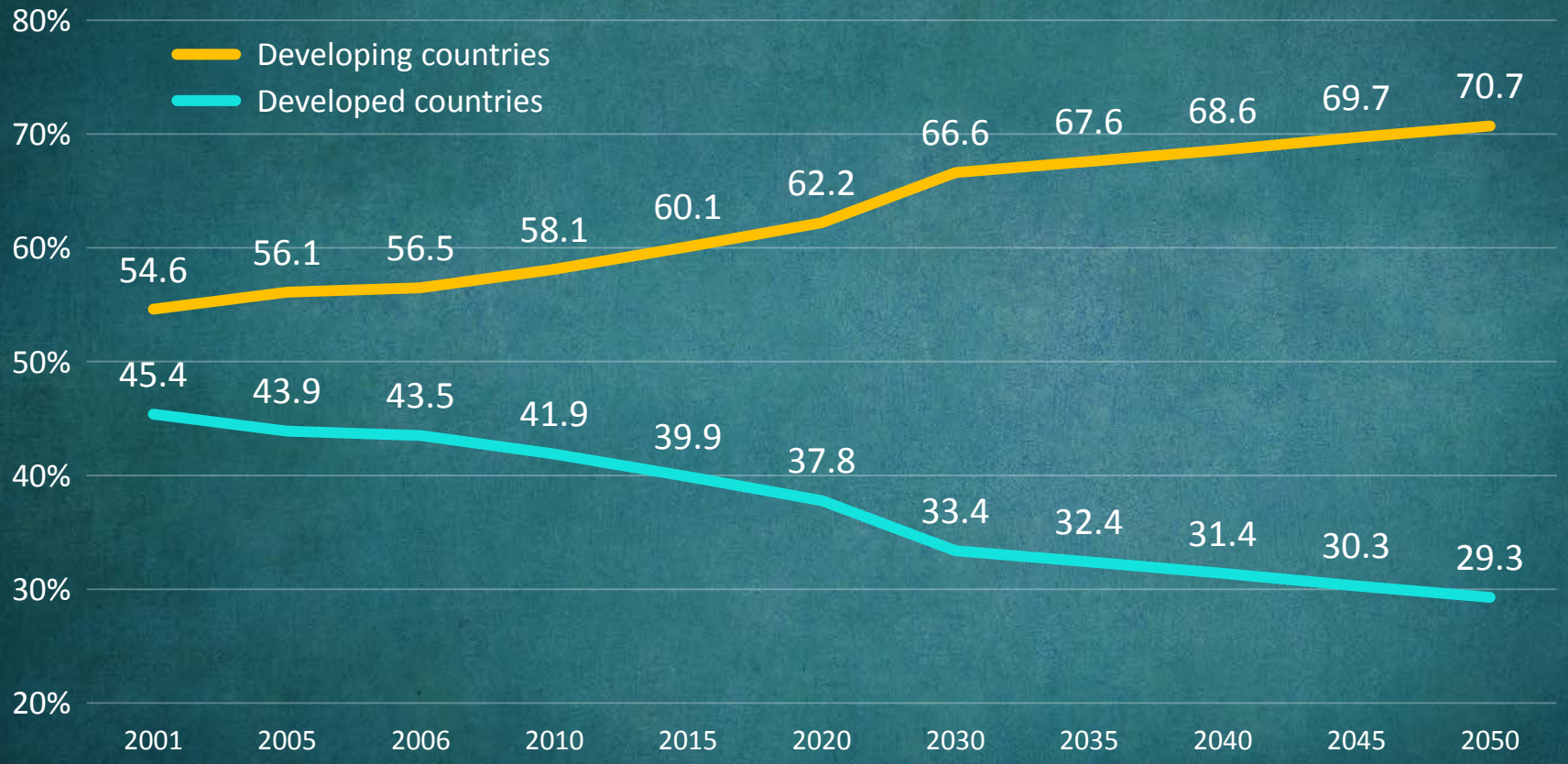

Challenges
for animal protein

Increase in daily animal protein demand per capita by 2050

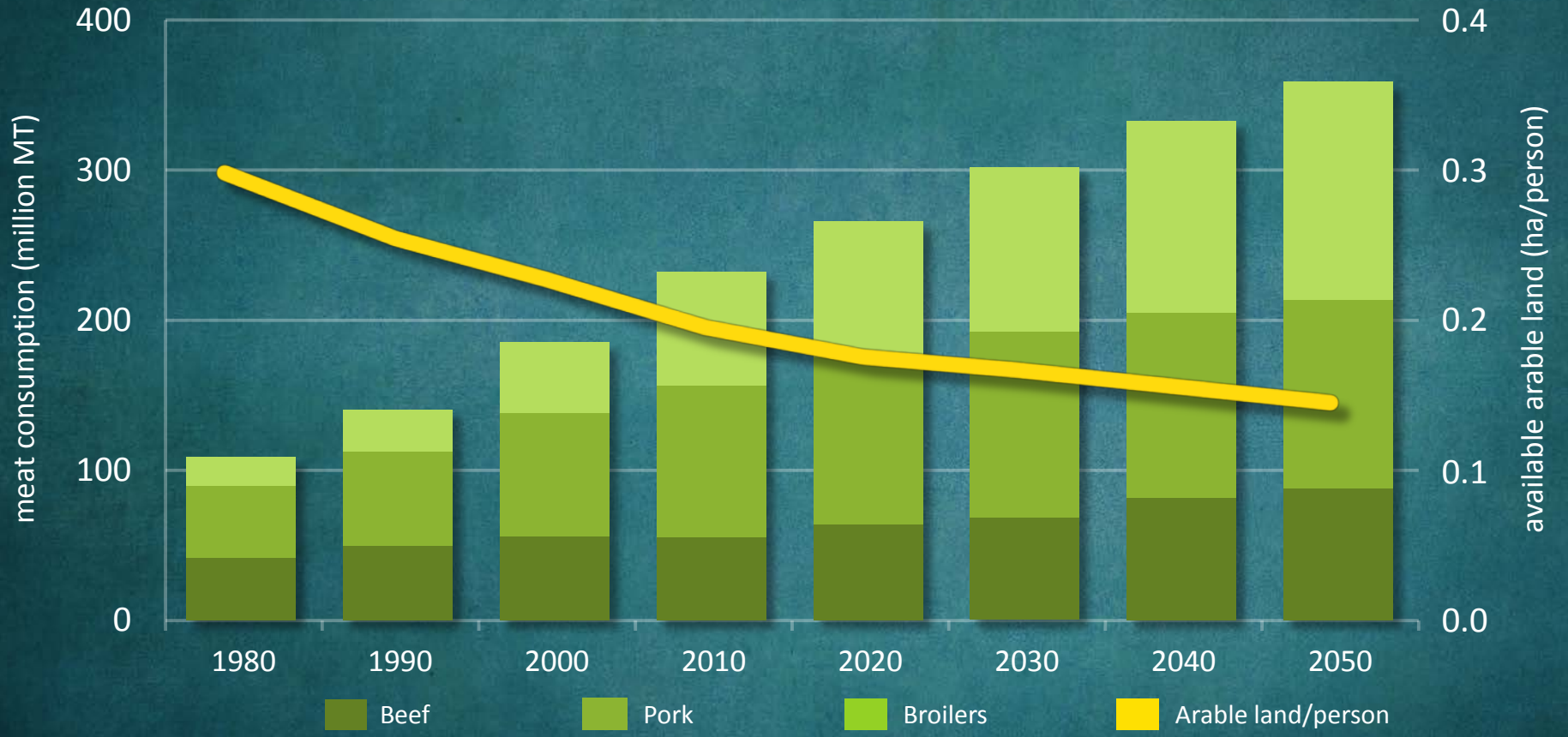


Source: David Tilman, University of Minnesota

Total meat production by category of countries (% of global production)



World beef, pork and poultry consumption: 1980-2050

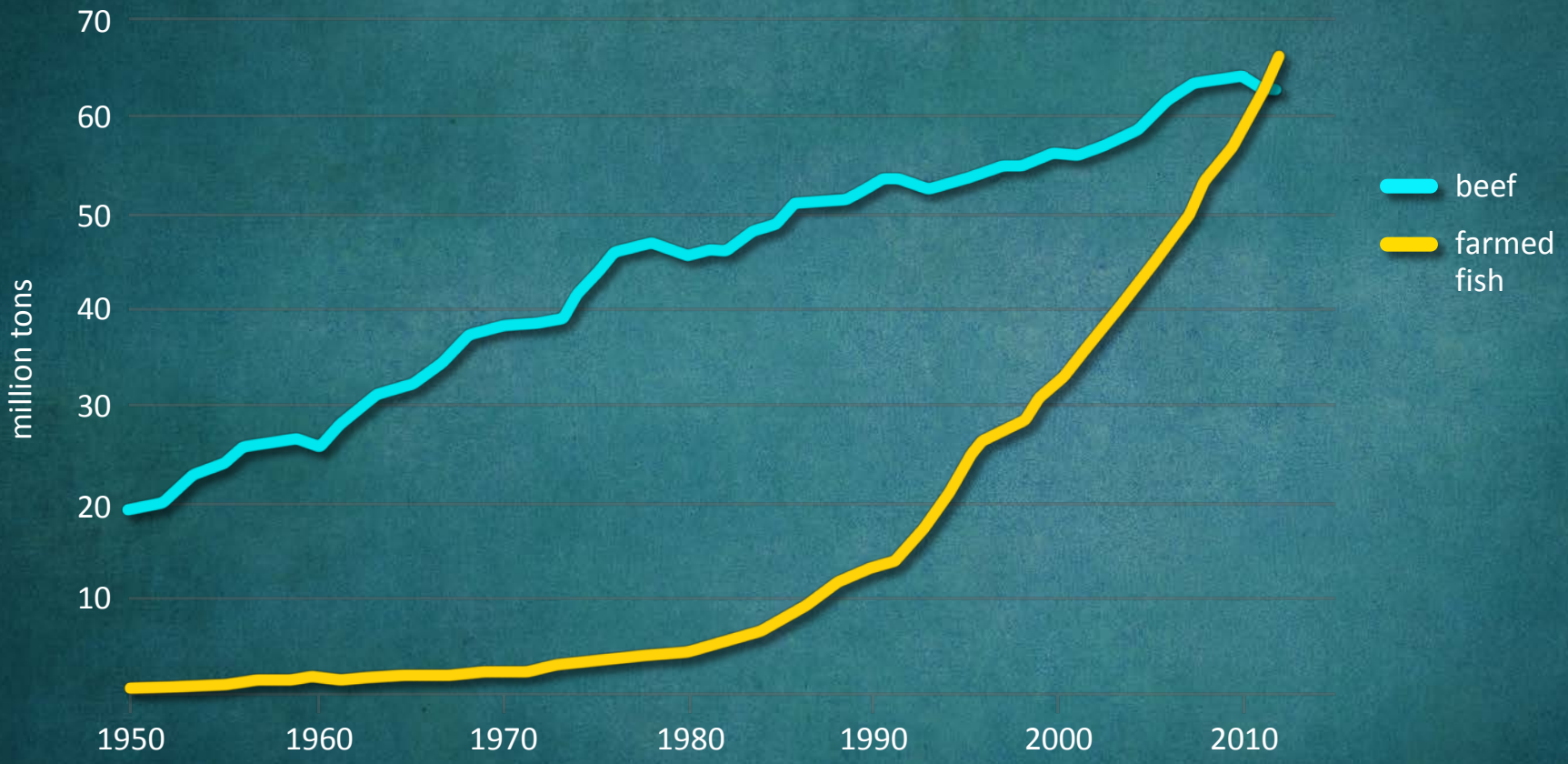


Sources: Global Insight Demand Analysis to 2050; Bauman and Capper (2011) Southwest Nutrition and Management Conference, Tempe, AZ

Aquaculture production

- Aquaculture > wild caught fish consumed by people today
- Most cultured species receive little or no feed
- Shrimp and salmon have FCRs of <2:1
- But, steep learning curves and many concerns

World farmed fish and beef production, 1950-2012



Source: EPI based on FAO, USDA

Earth Policy Institute – www.earth-policy.org

Animal protein trends

- Moving from 10 to 20% of calories globally
- Trends in consumption
  - China
  - India
- Trends in production
  - Shipping ingredients
  - Shipping protein – Brazil, USA

Animal protein sustainability metrics

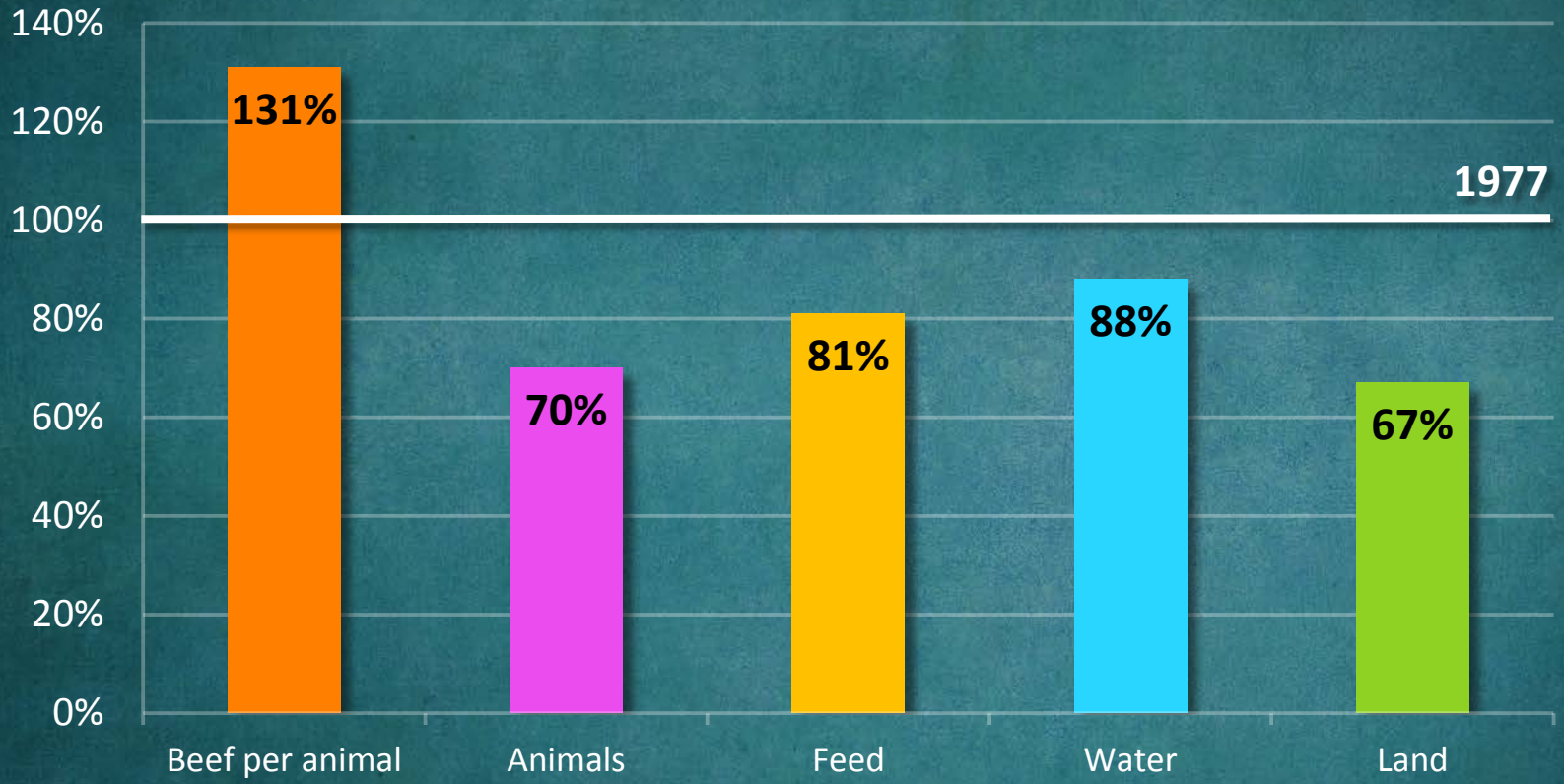
- Protein in/protein out
- Land/gram of protein
- Water/gram of protein
- GHG emissions/gram of protein
- FCR/gram of protein
- Time/gram of protein

Are these the right sustainability indicators for animal protein production?

	Food conversion (kg feed/kg edible weight)	Protein efficiency (%)	N emissions (kg/ton protein produced)	P emissions (kg/ton protein produced)	Land (tons edible product/ha)	Consumptive freshwater use (m^3/ton)
Beef	31.7	5	1200	180	0.24 - 0.37	15497
Chicken	4.2	25	300	40	1.0 – 1.2	3918
Pork	10.7	13	800	120	0.83 – 1.10	4856
Finfish (avg)	2.3	30	360	148	0.15 – 3.70	5000
Bivalves	not fed	not fed	-27	-29	0.28 – 20.0	0

Source: World Bank. Adapted from Phillips et al. 1991, FAO 2003, Hall et al. 2011

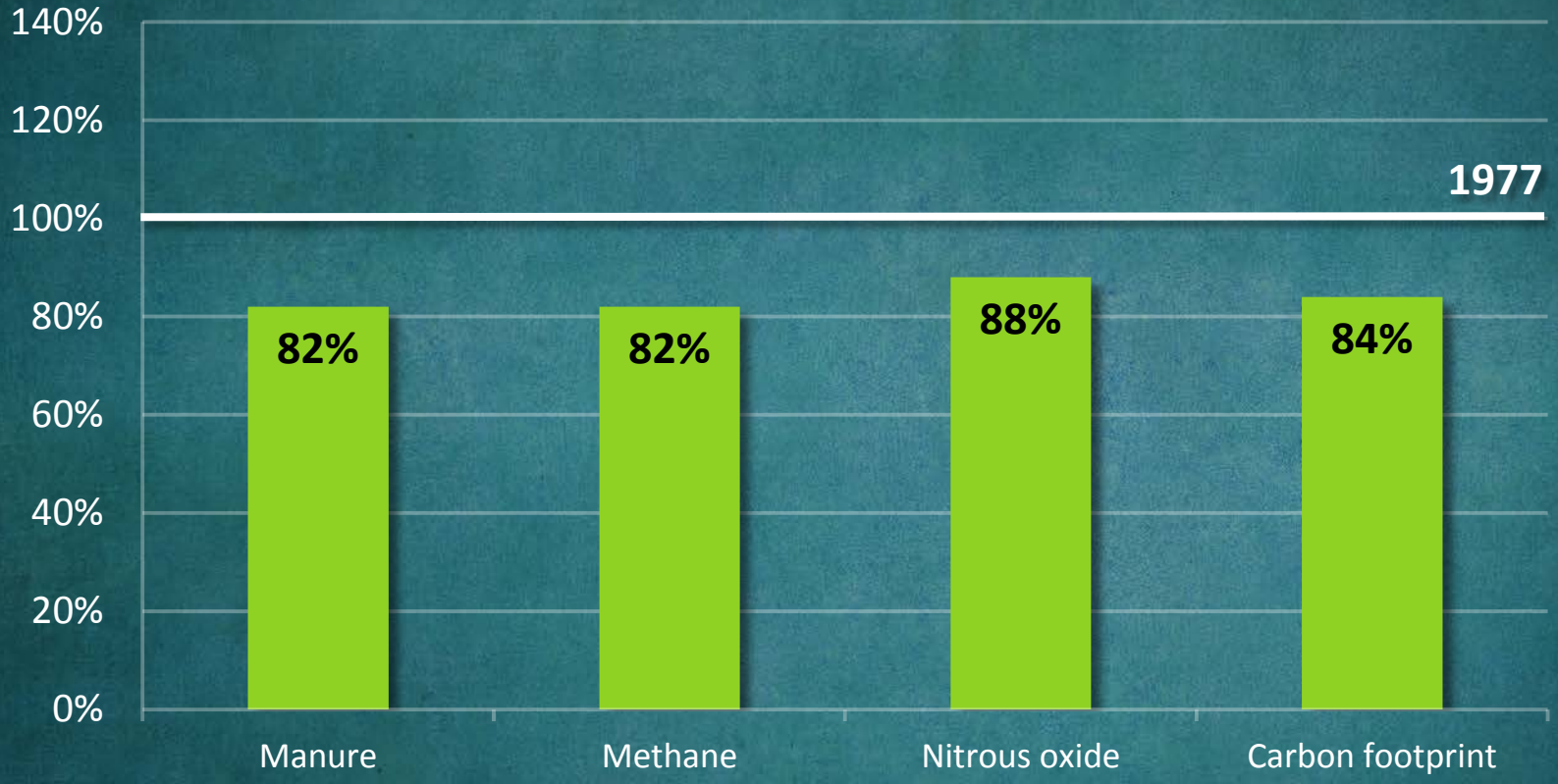
Environmental impact of U.S. beef production reduced by improved productivity (1977 & 2010)



*all values expressed per lb of beef produced

Source: Capper, J.L. (2011). The environmental impact of U.S. beef production: 1977 compared with 2007. *J Anim Sci*

Environmental impact of U.S. beef production reduced by improved productivity (40 years)



*all values expressed per lb of beef produced

Source: Capper, J.L. (2011). The environmental impact of U.S. beef production: 1977 compared with 2007. *J Anim Sci*

Poultry – efficiency matters

Chicken – Improvement evolution

	1925	1945	1965	1985	2005	2045*
Conversion – kg feed/kg live	4.7	4.0	2.4	2.0	1.7	1.6
Mortality %	18%	10%	6%	5%	4%	3%
Age (days)	112	84	63	49	42	40
Live commercial weight - kg	1.0	1.4	1.6	1.9	2.4	3.2

*projected

Source: Dr. Paul Aho, Novus Poultry Roundtable: Feeding the World and the Role of Poultry, January 2010

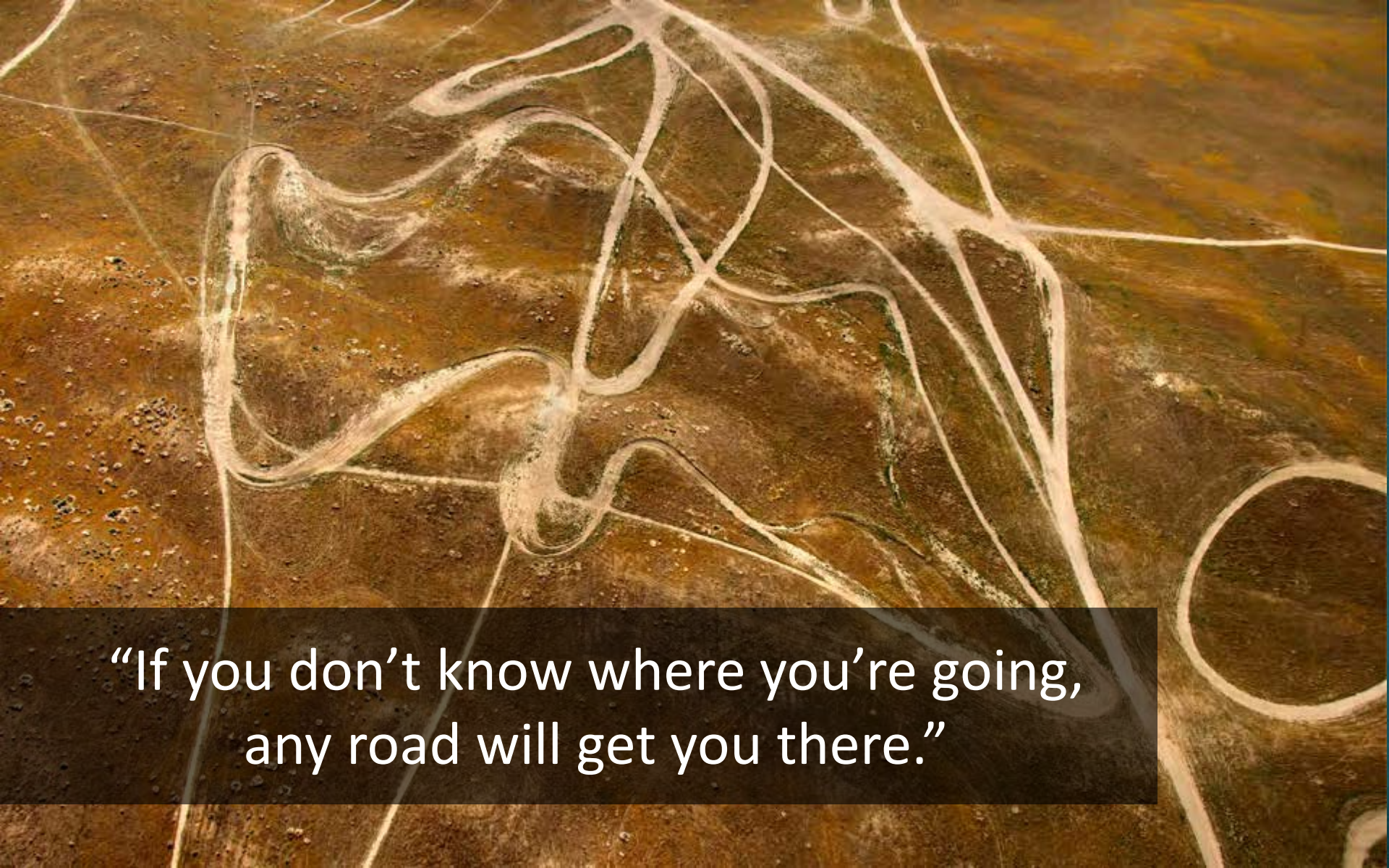
Inefficiency increases environmental impacts

- FCR and feed production
- Morbidity and mortality
- Parasites
- Poor reproduction
- Carcass defects
- Feed shrink

Source: Created by Dr. Jude L. Capper, 2013

Does stocking density = animal welfare?

- Feed conversion ratios (FCRs)
- Time to market
- Survival rates
- Disease outbreaks
- Medicines used per MT of product
- Medical interventions per MT of product
- Air quality


“If you don’t know where you’re going,
any road will get you there.”


WWF
think about it

ALES 100 years 1915-2015

Our accomplished past ... our limitless future

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