



# 21<sup>st</sup> Century Supply Chains

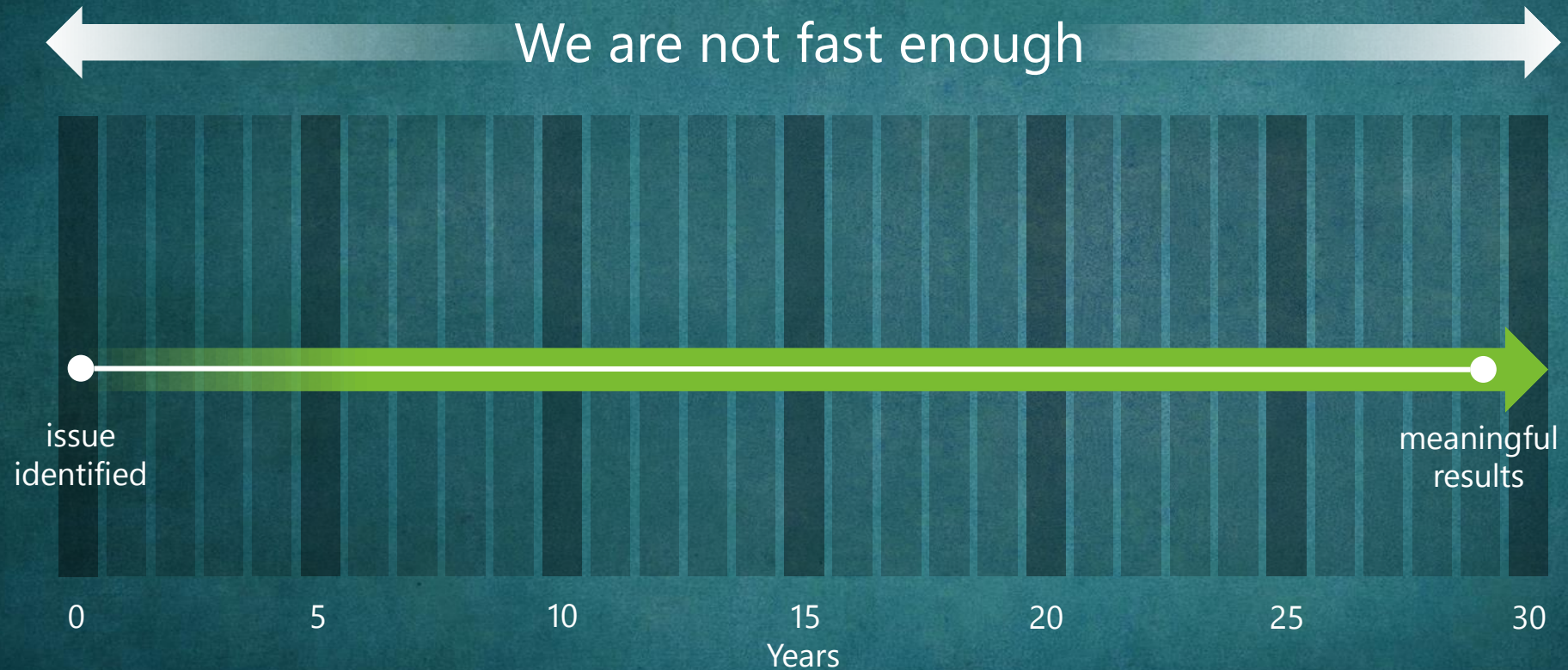
a few key issues and trends

Jason Clay  
SVP Markets and Food  
WWF-US



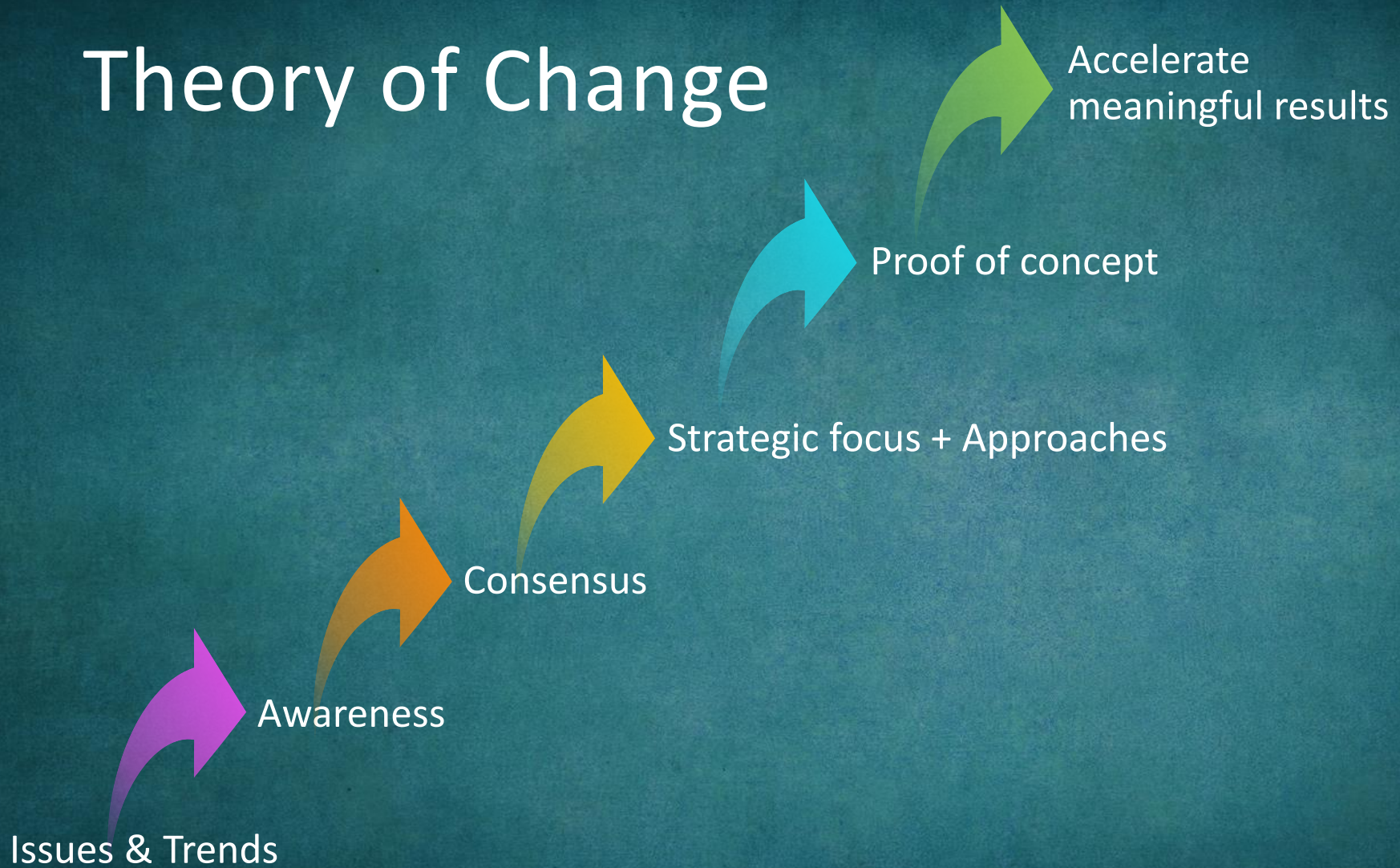


# The speed of change – faster than our response





# Theory of Change





A close-up photograph of a hand holding a small, light-colored onion over a dark, textured surface of soil. The image is overlaid with a semi-transparent teal filter. The text is centered over the image.

Global food

**40 years =  
8,000 years**





$$\times 1 = 7$$



$$\times 2 = 18$$



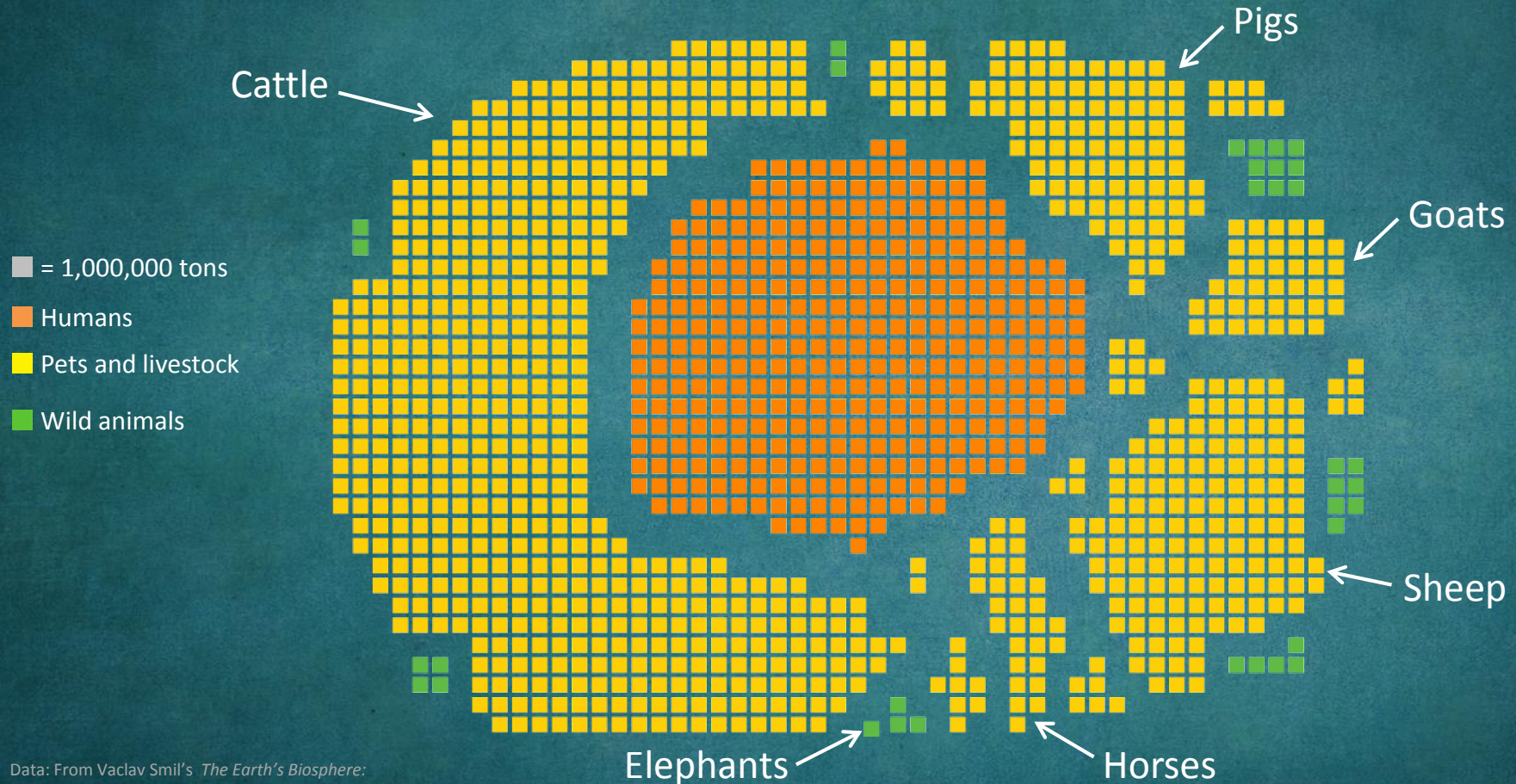




■ Countries where parks have been downgraded or taken off the books entirely (1990-2013)



# Earth's land mammals by weight



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





# Freeze

the footprint of food



The issue isn't  
**what** to think,  
it's **how** to think



Productivity & efficiency  
**and**  
waste & consumption



On a finite planet,  
should consumers  
have a **choice**  
about sustainable  
products?

Or should  
**all choices**  
be more sustainable?





# 1 out of 3 calories





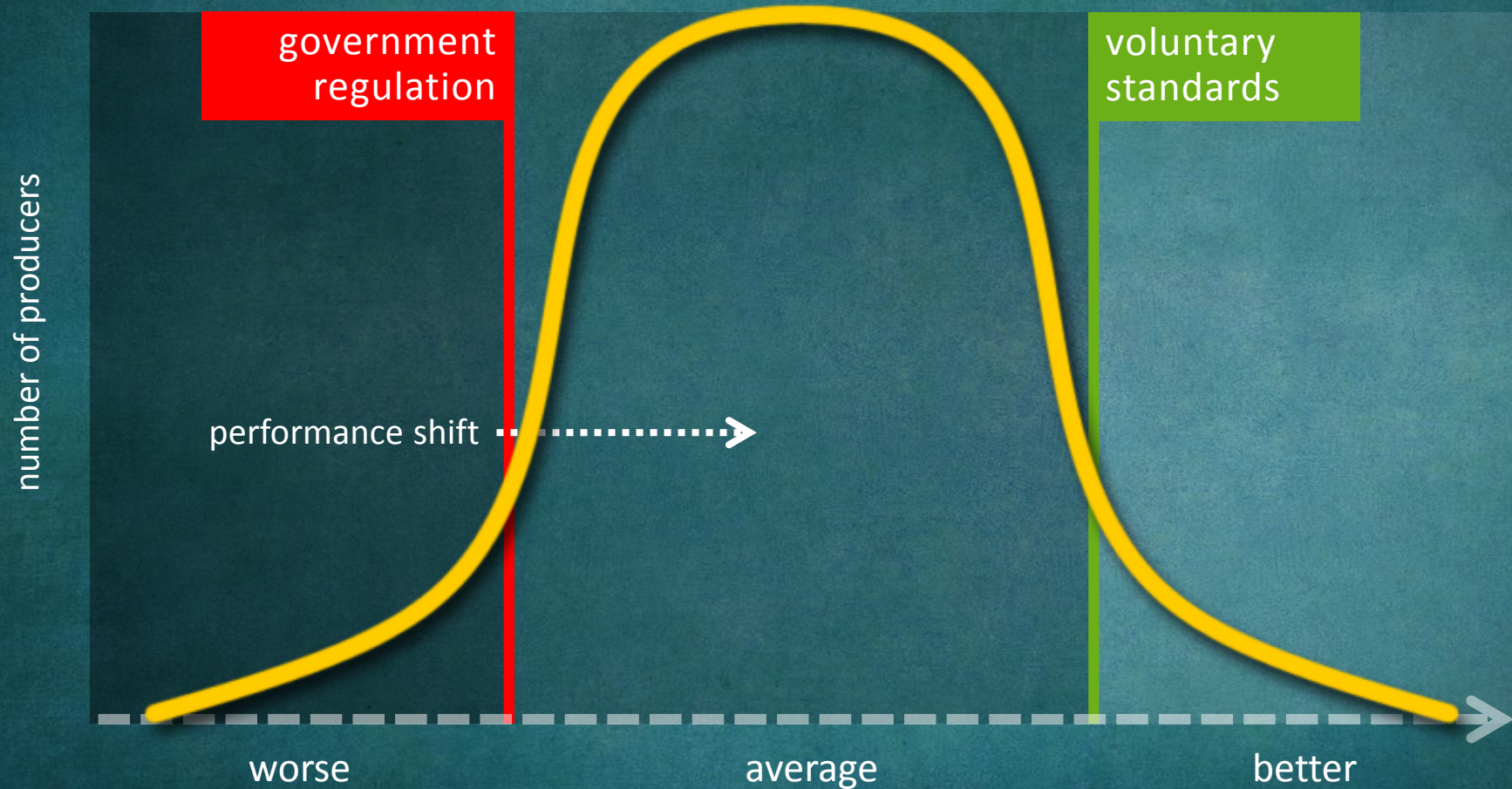


# Rebuild soils

250 M hectares  
by 2030



# Reward the best or move the rest?





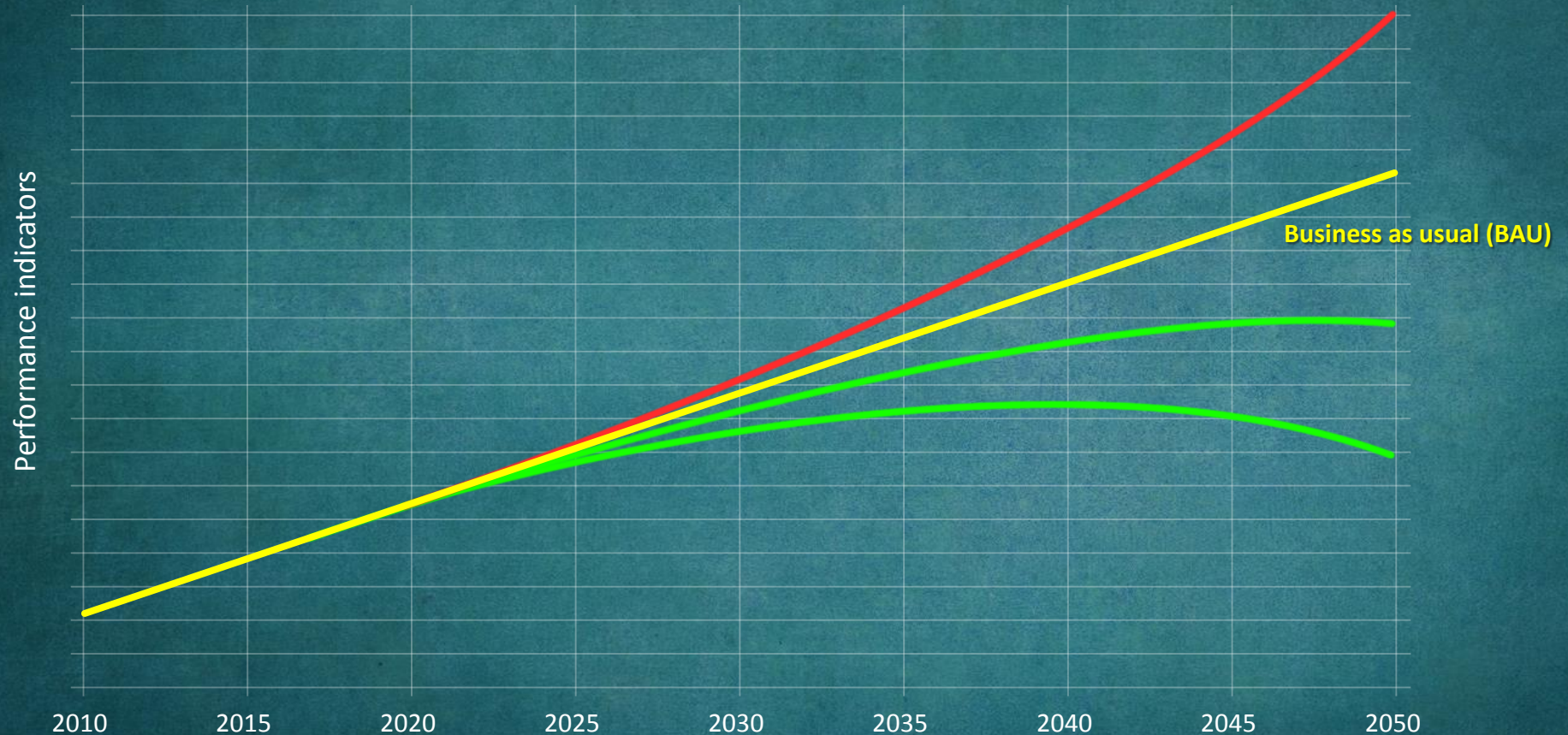


# The Gigaton Challenge

- GHG emissions are in primary production
- Use the supply chain to drive change
- Can quantify even if we don't know exactly how
- Metrics are important; methodology even more so
- Bring externalities into commodity pricing



# Is Business as Usual (BAU) a stretch goal?





# Cocoa – is it “broken?”



Cocoa in Cote d'Ivoire, what is continuous improvement?

	1945	1965	1985	2005	2015
Yield / hectare					Down
Illegal deforestation					Up
% pods on a tree that mature for harvest					Down
% producers above SDG poverty					Down
% trees infected with CSSV					Up
% C in soil					Down
% farmers under 40					Down
Use of child labor					Up

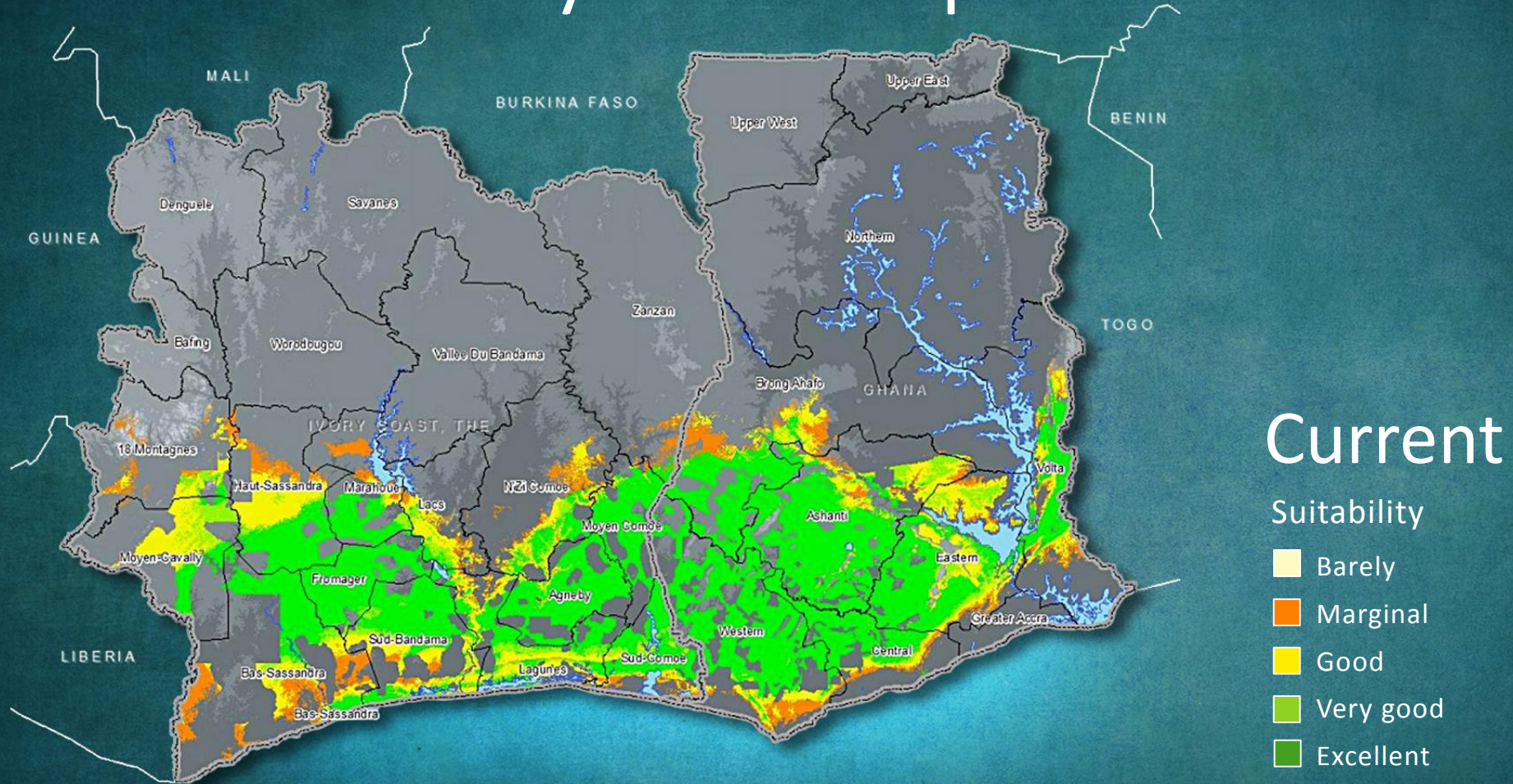




# Climate change & **food production**

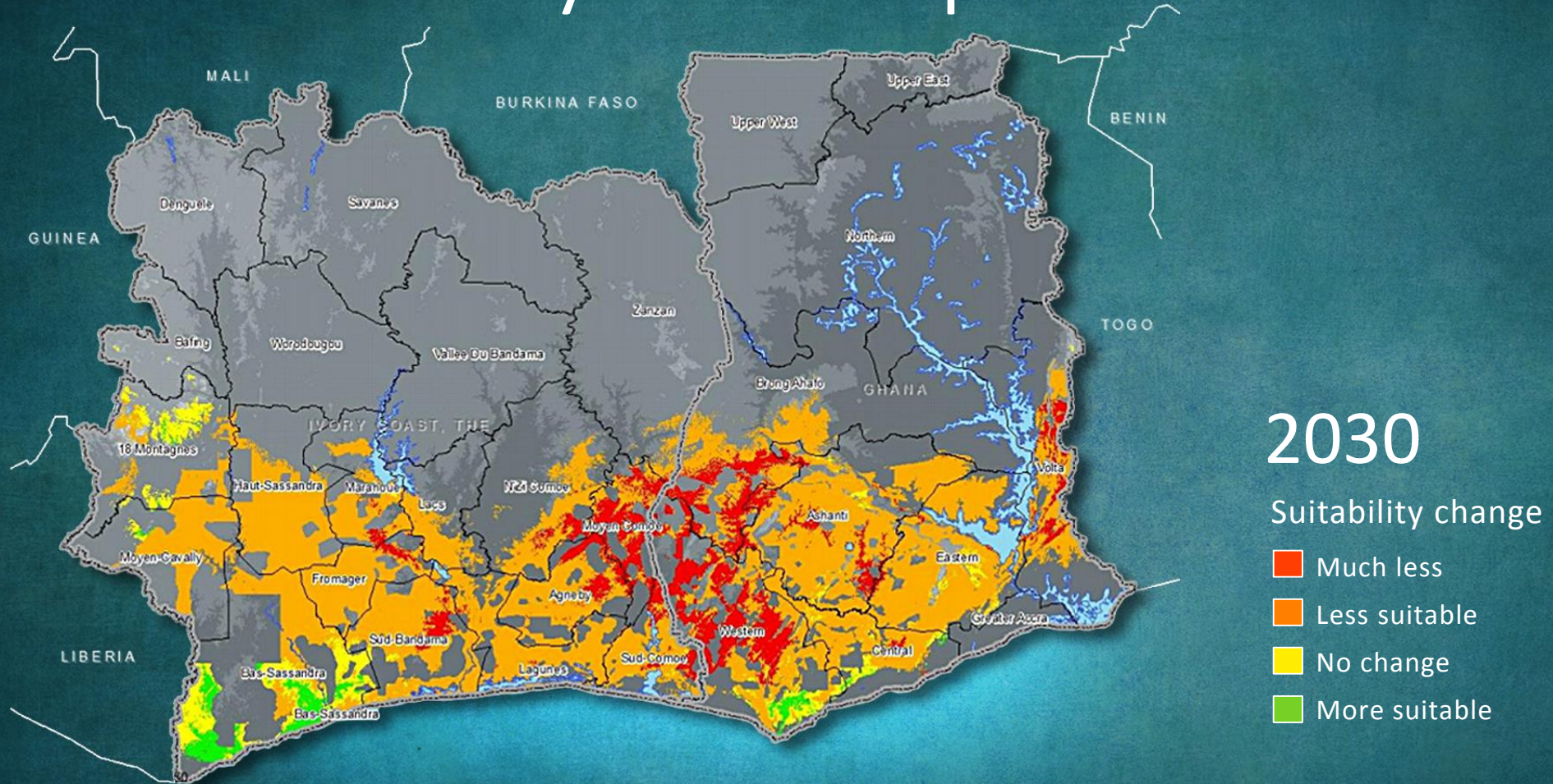


# Suitability of cocoa production





# Suitability of cocoa production





In the short term  
climate smart agriculture =  
**efficient** production



In the medium term, producers  
**change genetics**



# African Orphan Crops



oil palm



millet



shea nuts



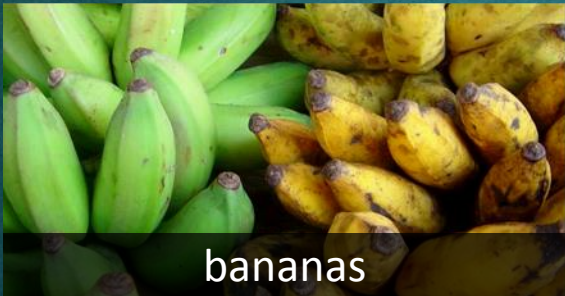
yam bean



safou fruit



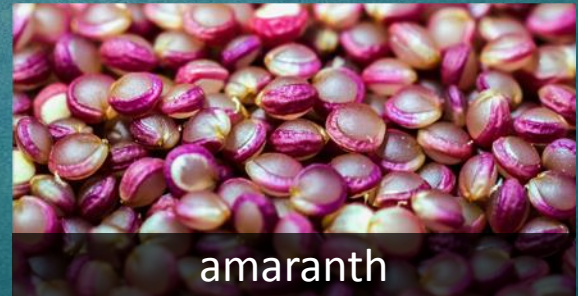
vine spinach



bananas



coco yam



amaranth





# Challenges for animal protein



# Poultry – efficiency matters



## Chicken – Global 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

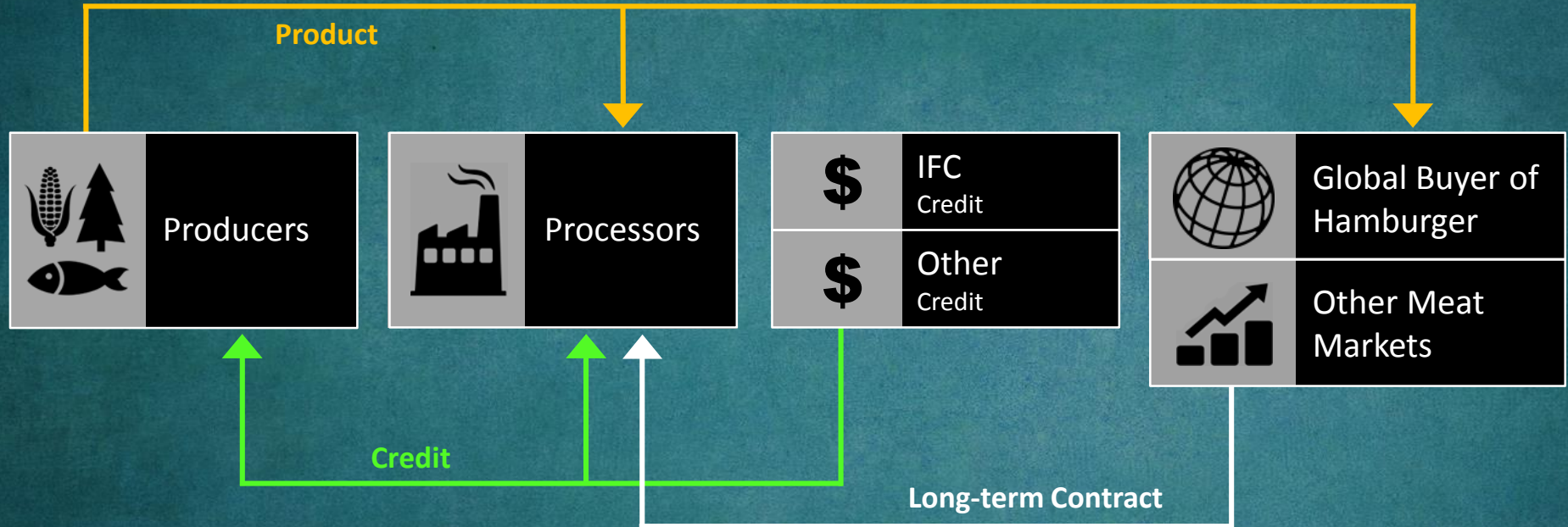


Shift from  
**maximizing** one variable...

...to **optimizing** key ones



# Long-term contracts





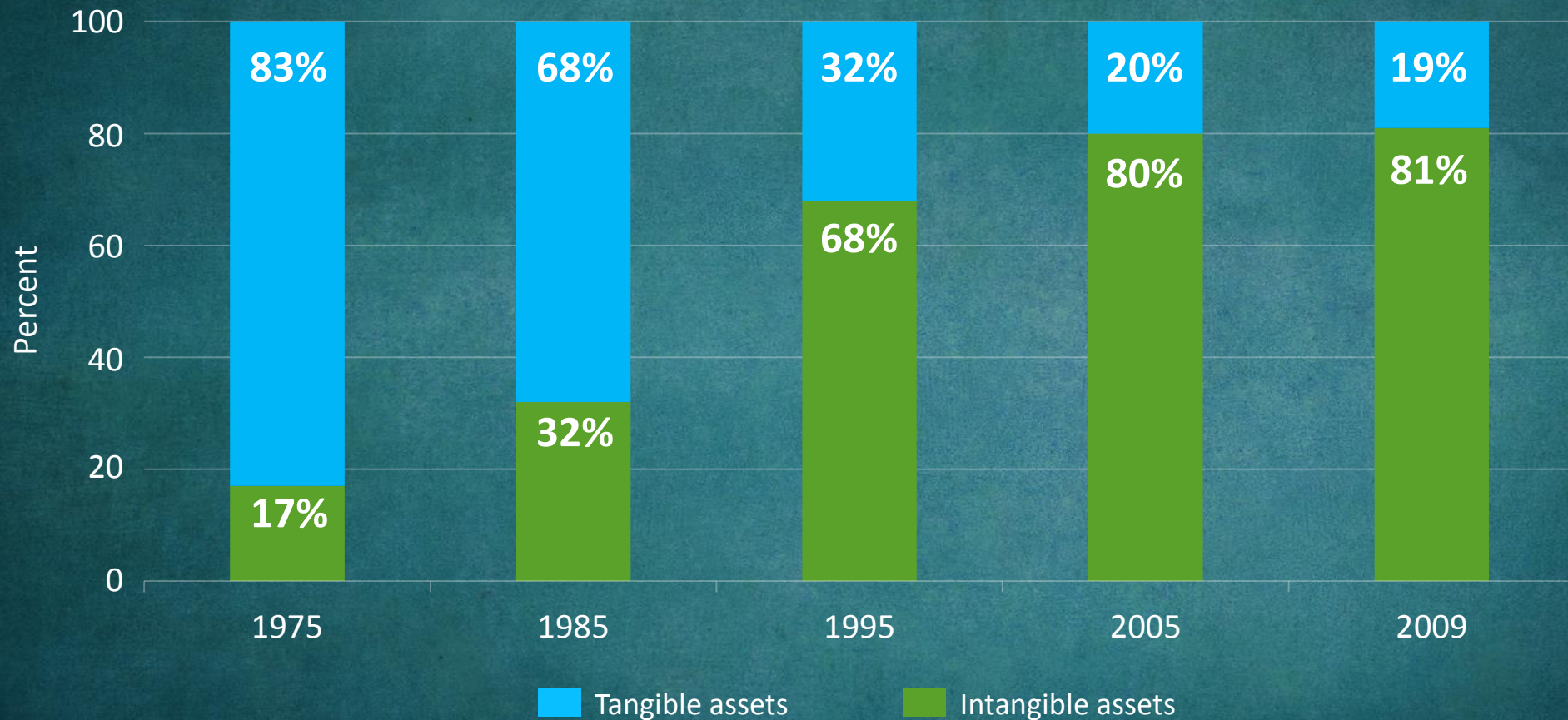
The issue is

**risk**

both availability and reputation



# Components of S&P 500 market value





# Illegally in food

## FISHERIES



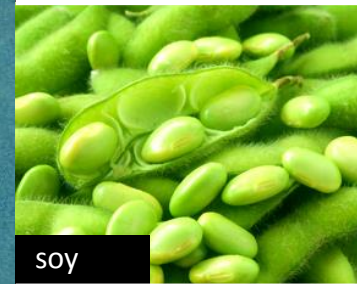
## AQUACULTURE



## LIVESTOCK



## FOOD CROPS



## NON-FOOD CROPS







# Illegality – key issues

- Resource rights, concessions
- Social issues
- Other laws and regulations
- Fraud
- Corruption



# Illegality can occur throughout the supply chain







# Research – Is illegality important for you?

- 8 companies' supply chains
- 9 commodities, 8 countries
- All data in the public domain
- White paper drafted in September
- Goal: make illegality pre-competitive





# What the research suggests

- 5 to 44% of target globally traded commodities are produced illegally
- Even greater % of domestic consumption produced illegally
- Using only one source of illegality, one country and data in the public domain



If a product is produced **illegally**,  
can it be **legal**?



If a raw material is produced  
**illegally**,  
can a product made with it be  
**legal**?



If a feed ingredient is produced  
**illegally**,  
can animal protein made from it be  
**legal**?





# Think about it.

[Jason.clay@wwfus.org](mailto:Jason.clay@wwfus.org)

