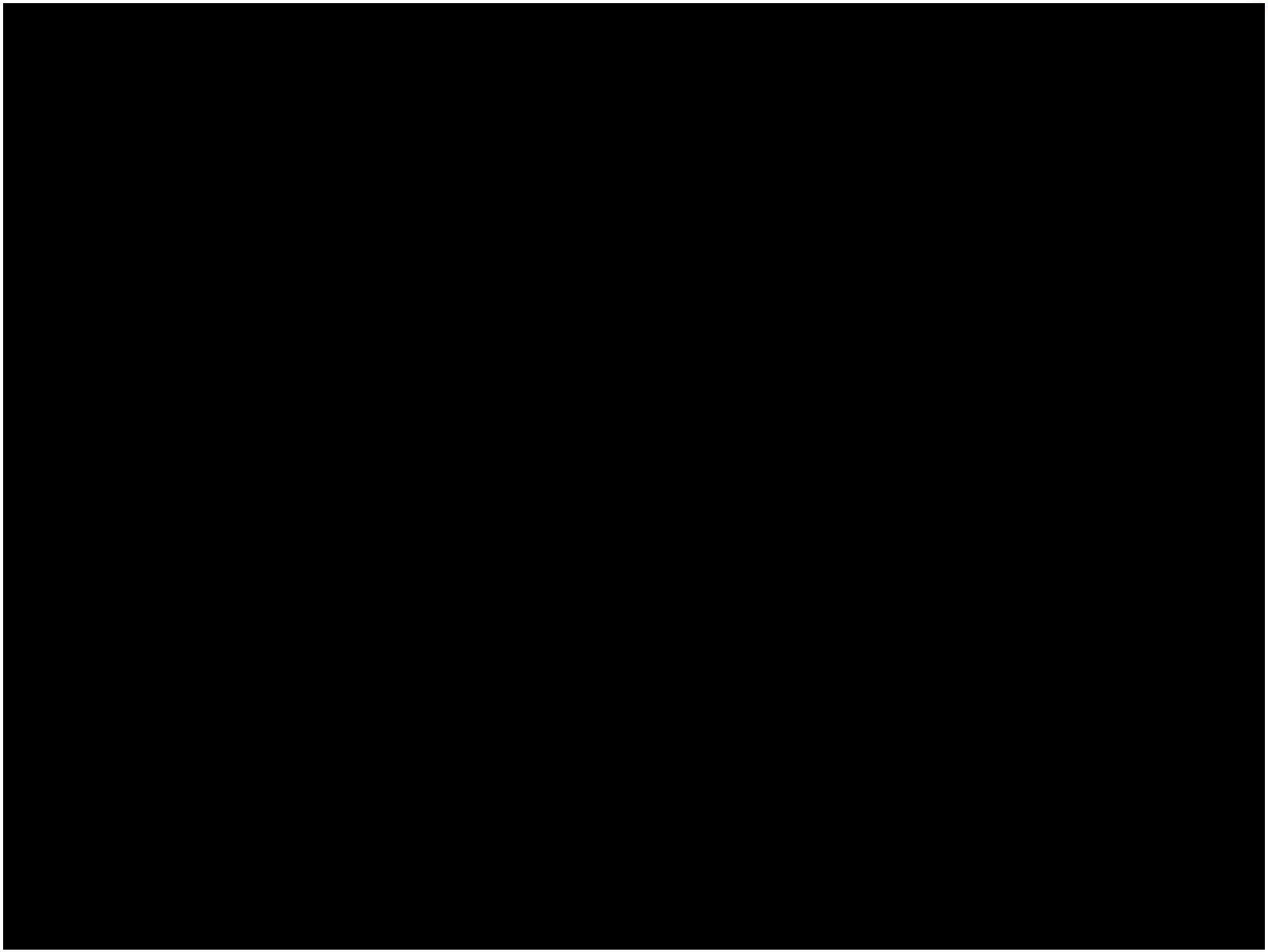
Appetite for Destruction

Eat plants, Plant trees survive – and thrive

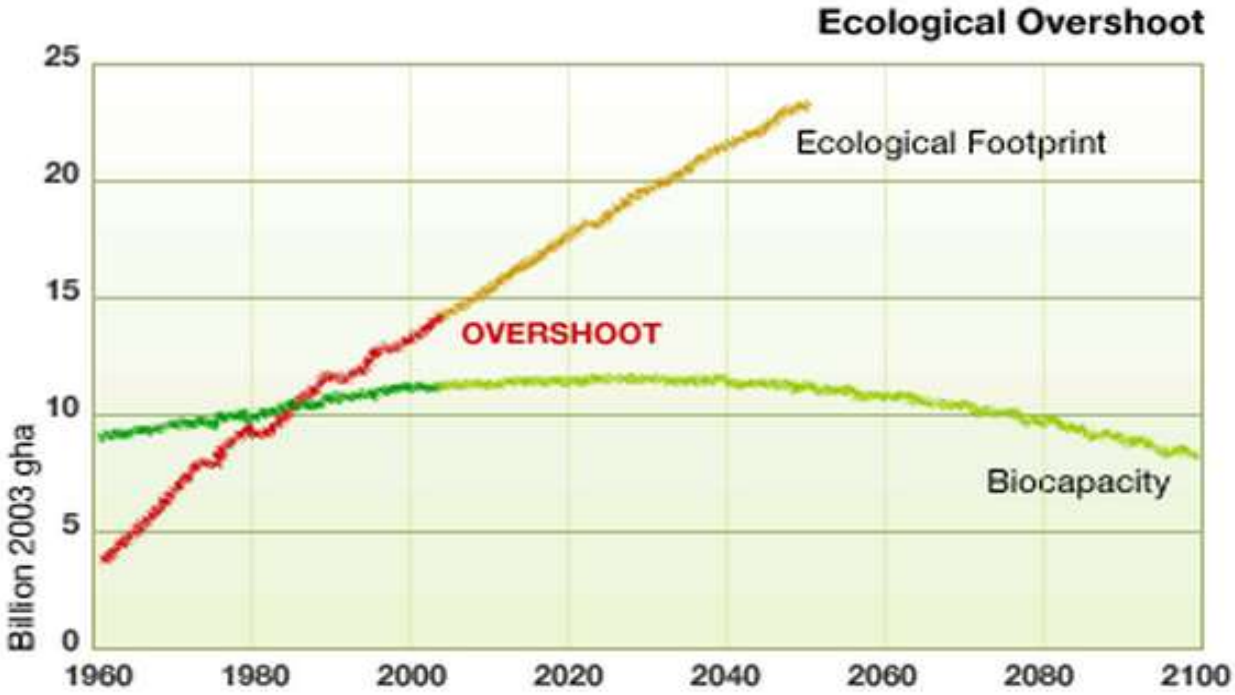
Gerard Wedderburn-Bisshop

Sept 2020

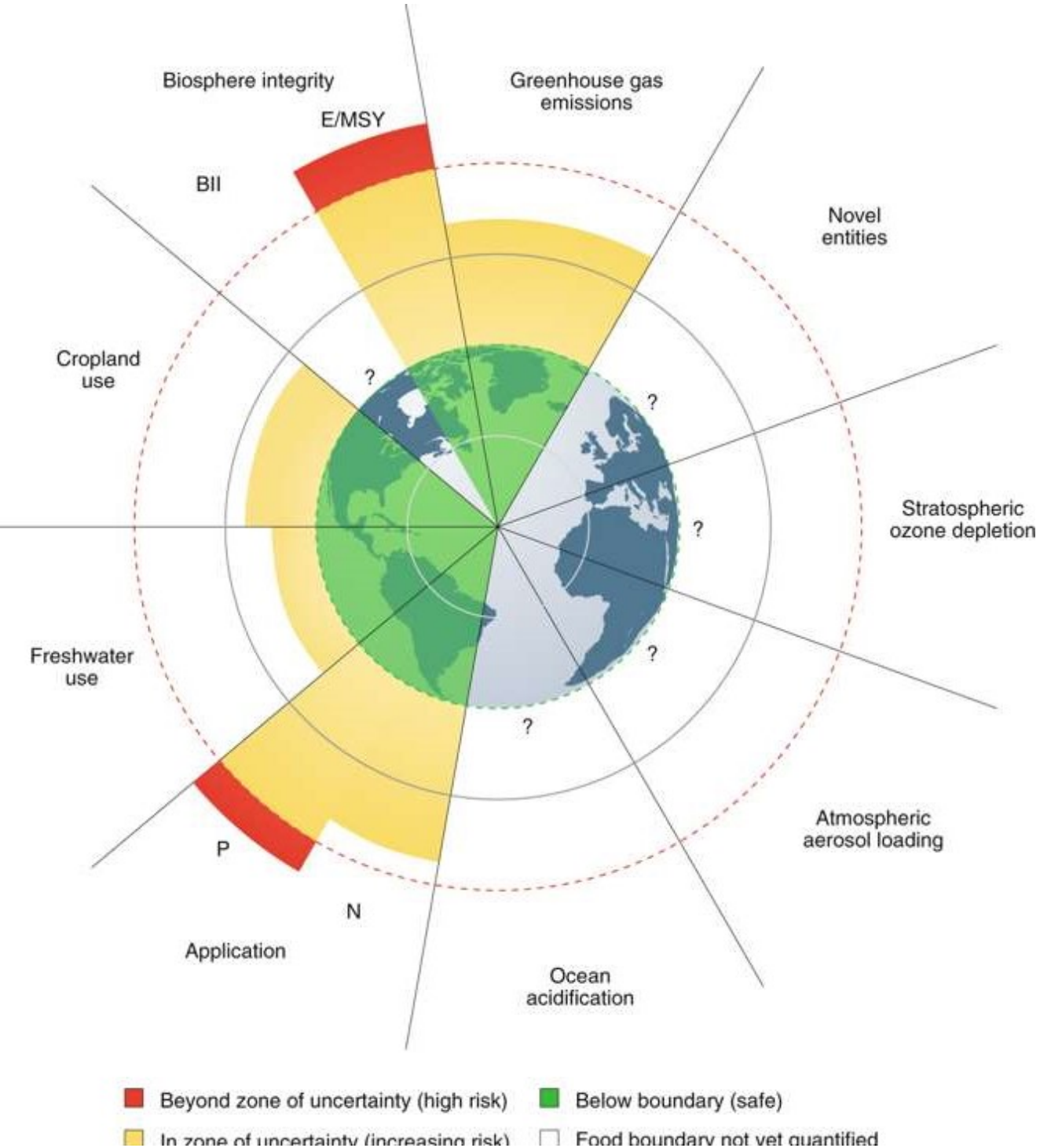


Footprint and Planetary Boundaries


RESEARCH CONCLUDES:
WE ARE DESTROYING EARTH.
COULD YOU KINDLY REPHRASE THAT IN EQUIVOCAL, INACCURATE, VAGUE, SELF-SERVING AND ROUNDABOUT TERMS THAT WE CAN ALL UNDERSTAND?
GOVERNMENT
©2008 Union of Concerned Scientists



The earth now needs 1.7 years to generate what we use in a year ***(WWF Living Planet Report, 2018)***



Already exceeded:

- Biosphere (biodiversity loss)
- Nitrogen/phosphorous

Close to limit:

- Deforestation
- Climate change
- Water use

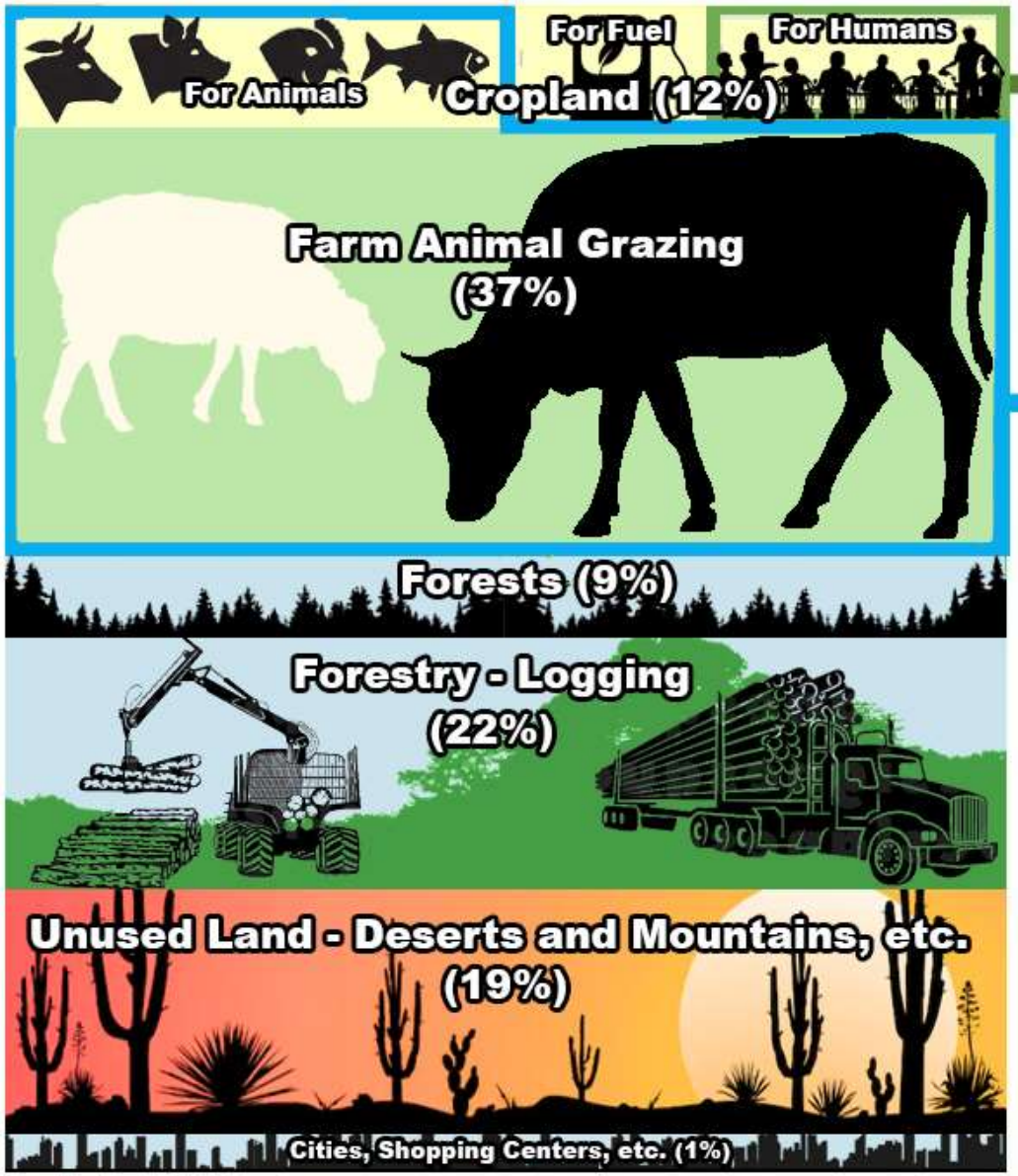
“Global food production is the single largest driver of environmental degradation and transgression of planetary boundaries.”

(Willett et al, 2019; EAT-Lancet Commission, 2019)

Diet change is essential for a habitable planet

It’s no longer a matter of personal preference

How we use Planet Earth



produces

1.35 GT

78%

produces

0.19 GT

meat, dairy, eggs

12%

Land Use Solution

- Re-wild grazeland and crops for animals
- Increase cropland for human foods
- Halt animal extinctions
- Stop encroaching of Indigenous lands
- Reduce pollution and pesticides
- Resolve our climate crisis by sequestering CO2 and reducing methane in freed up land
- Store 20% carbon vs only 2%

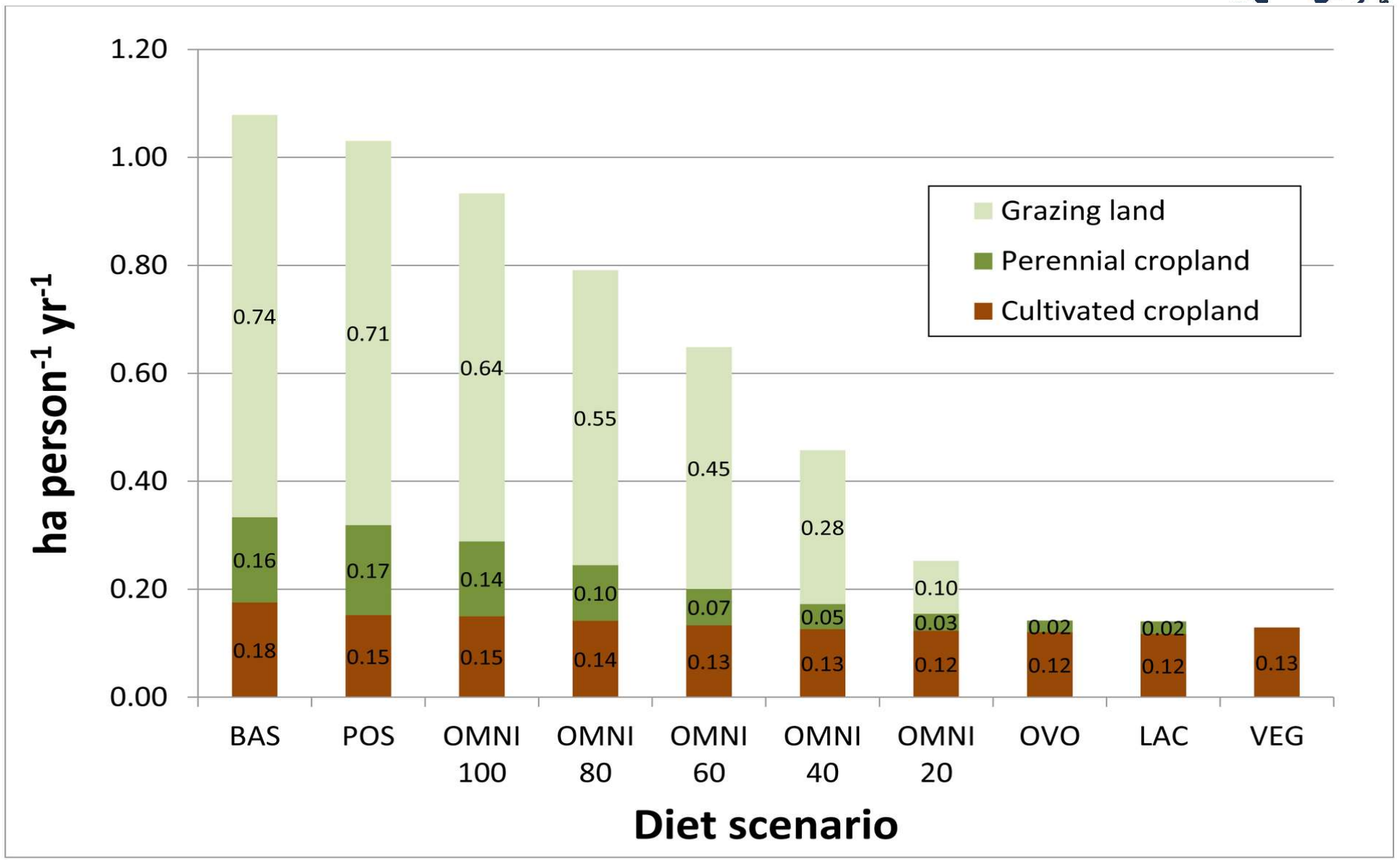
Going vegan does this!

Total Ice-Free Land: Source: 2019 IPCC Special Report

www.ClimateHealers.Org

A vegan diet reduces land use by 3.1 billion ha - 76%

Poore & Nemecek, 2018



Peters et al, 2016

Deforestation

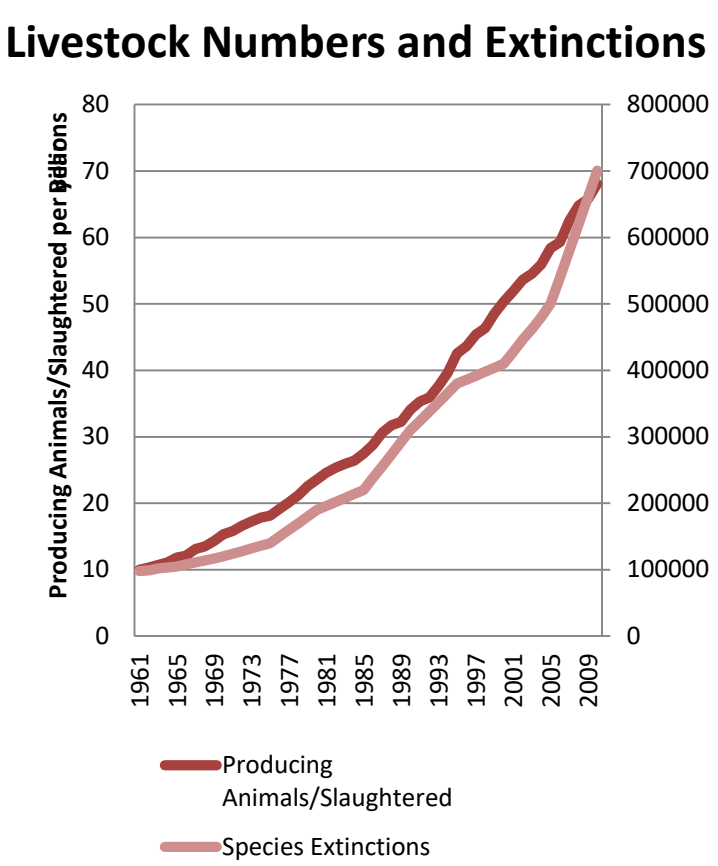
Deforestation for soy crops in Argentina (Greenpeace)

130,000 km^2 tropical forest destroyed each year

85% of forests now gone, degraded or fragmented

One fifth CO_2 emissions from deforestation

UNEP, 2012; WRI 2015



Planetary boundary will be exceeded by 2025-2035

Ecological footprint boundary hit in 2050

Result is ecological collapse

McBain et al. 2017; Turner et al, 2007

Cause:

84% of South American deforestation is for pasture and livestock feed (Sy et al. 2015)

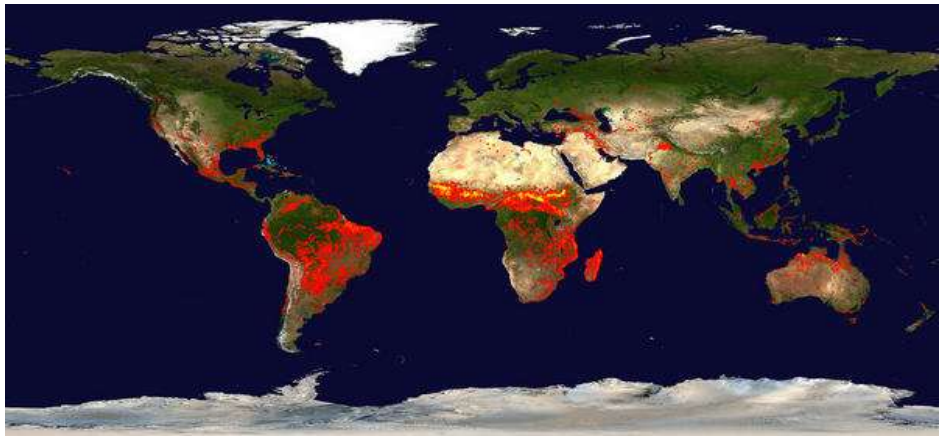
23% Indonesian deforestation for palm oil, 20% for pasture (Austin et al 2019)

Logging does not kill forests

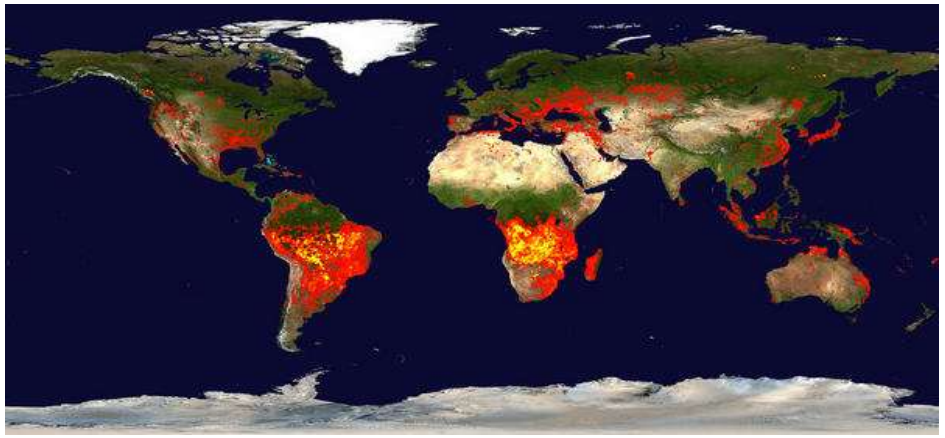
Food kills forests

(Hosonuma et al, 2012; Chomits & Thomas, 2001, WorldWatch 2004)

How to kill a forest



MODIS fire map 08/19/2010 to 08/28/2010



MODIS fire map 11/17/2010 to 11/26/2010

Switching from animal protein to plant protein can stop deforestation

(Worldwatch Institute, 2004)

Returning 41% of pastures to forest will draw down 27 years of current emissions

(Rao et al. 2015)


Here son, I saved all this money for your future
$
O2
©Eco-Resilience Ontario
Einat Danieli

Biodiversity Loss

Humans are causing the 6th great extinction

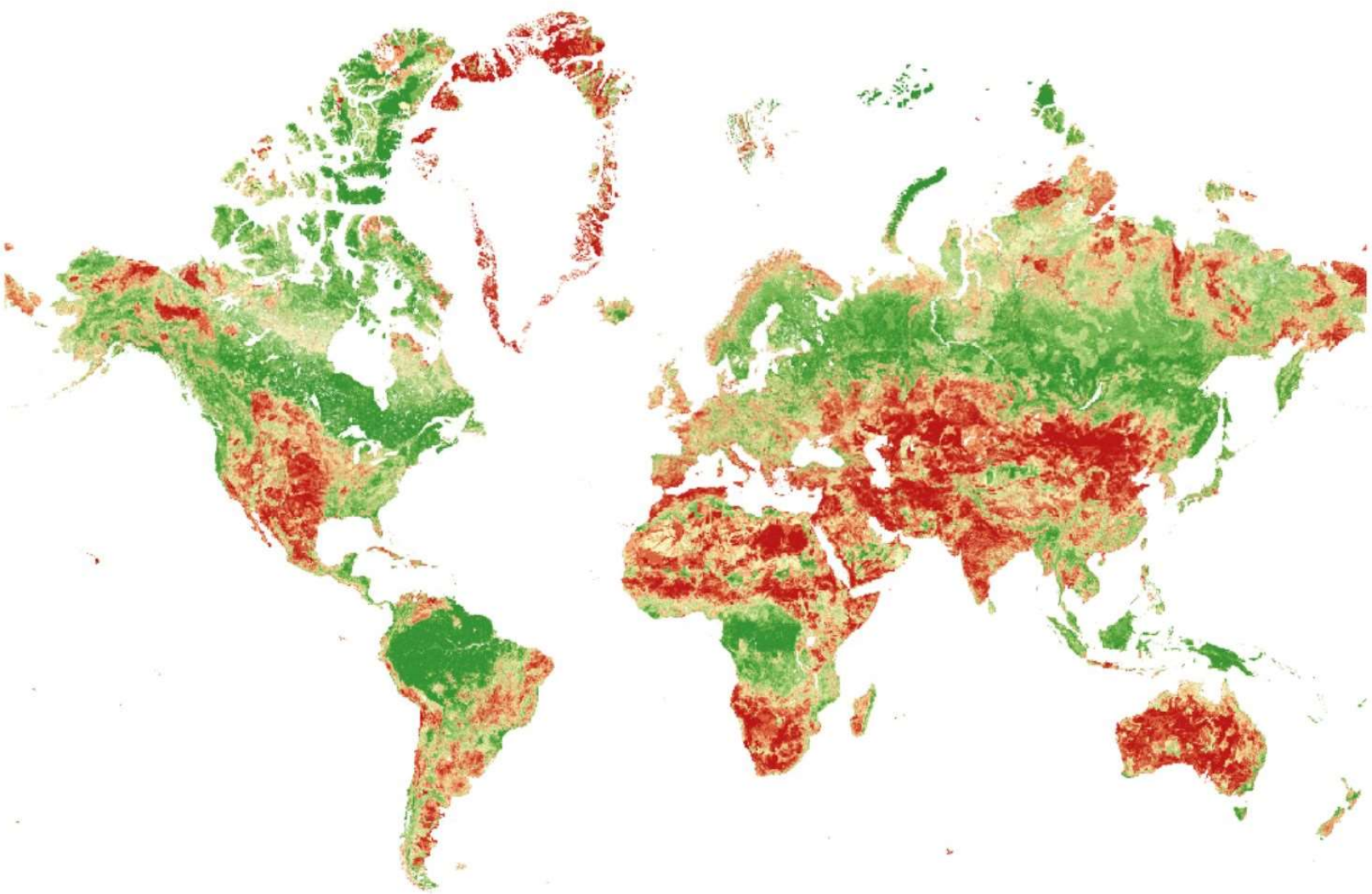
"Humans are responsible….the sixth mass extinction is already here and the window for effective action is very short"

(Ceballos et al, 2015)

Species loss 1,000x faster

(Hopkin, 2005)

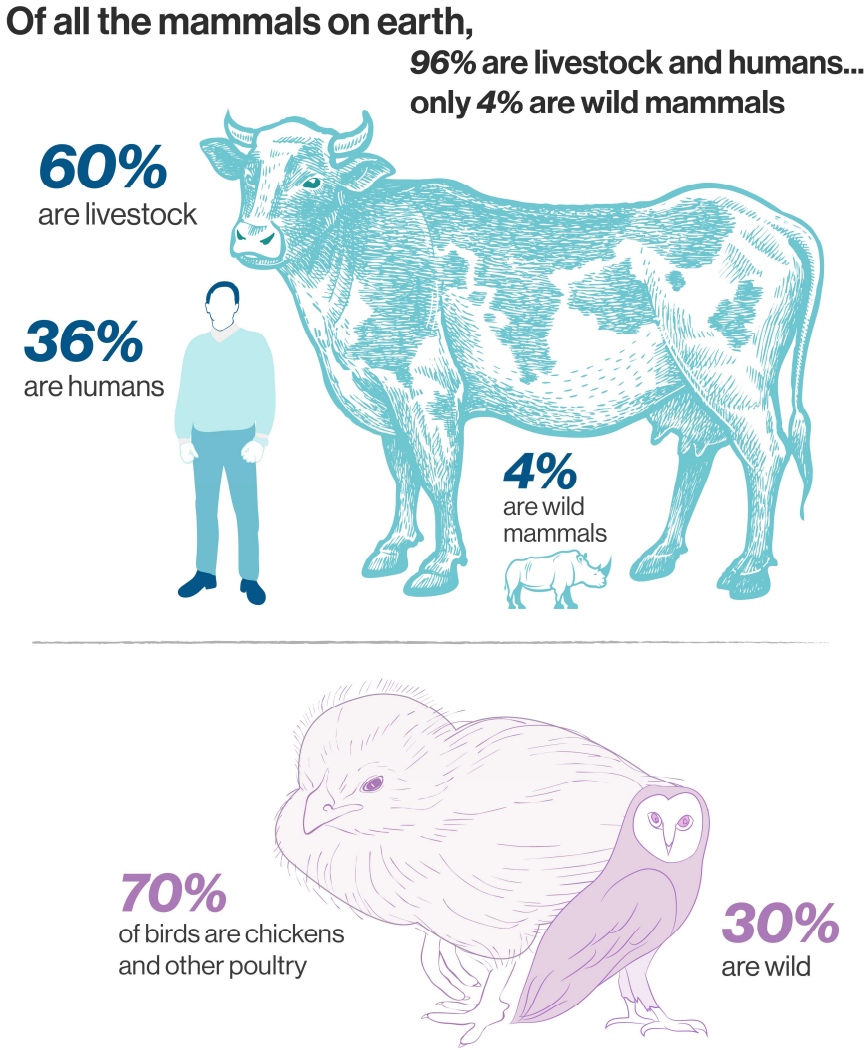
Global SRI BES Index map at 1 km^2 resolution



Biodiversity & Ecosystem Services (BES) Index

- Very Low (<15)
- Low (15–30)
- Moderate (30–45)
- Moderate (45–60)
- Moderate (60–75)
- High (75–90)
- Very High (>90)

Source: Swiss Re Institute and multiple data sources



6th mass extinction

96% of mammals livestock/human

83% of wild mammals gone

58% of wildlife gone

50% of plants gone

50% of fish gone

(Ceballos et al. 2015, WWF 2016, Bar-On et al, 2018)

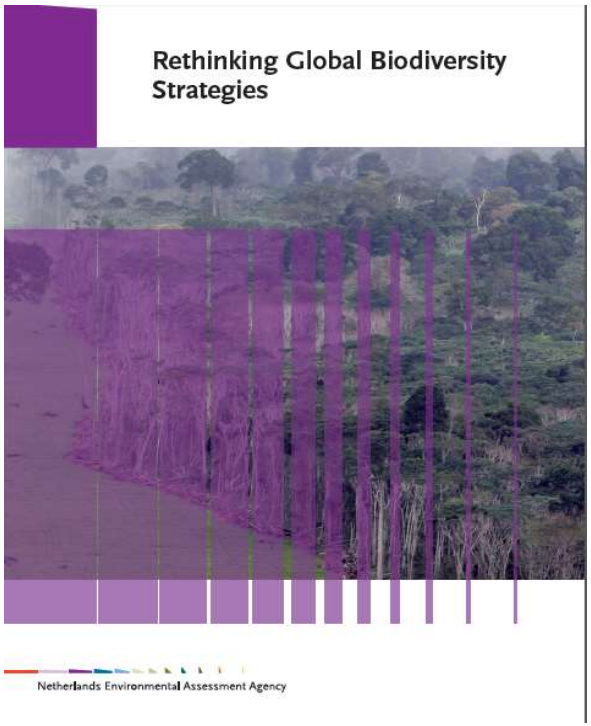
Cause

Agriculture the greatest driver of species loss

80% of agricultural land devoted to livestock & feed

Meat the biggest threat to wildlife

Tilman et al, 2017; WWF 2016; UNFAO 2006; Machovina et al, 2015, NEAA PBL 2010; Ripple et al, 2019



A "No Meat Diet" most effective, will prevent 60 percent of biodiversity loss.

(Ten Brink et al, 2010)

Protein Pollution

Reactive nitrogen from animal waste:

Acidifies & eutrophies fresh water

Decreases biodiversity

Greatest coastal water polluter (nitrates)

Postel, 2013; Steinfeld et al, 2006; EWG, 1996; UN DESA, 2006; UNEP, 2010; Sutton et al, 2011

Nitrogen pollution must be halved by 2050

Or suffer toxic tides, lifeless rivers & dead oceans

UNEP International Nitrogen Management System, 2018

Reactive nitrogen builds protein

But is the greatest cause of water & air pollution

30%-40% of nitrogen in fertilizers are taken up by plants (Smil, 2013)

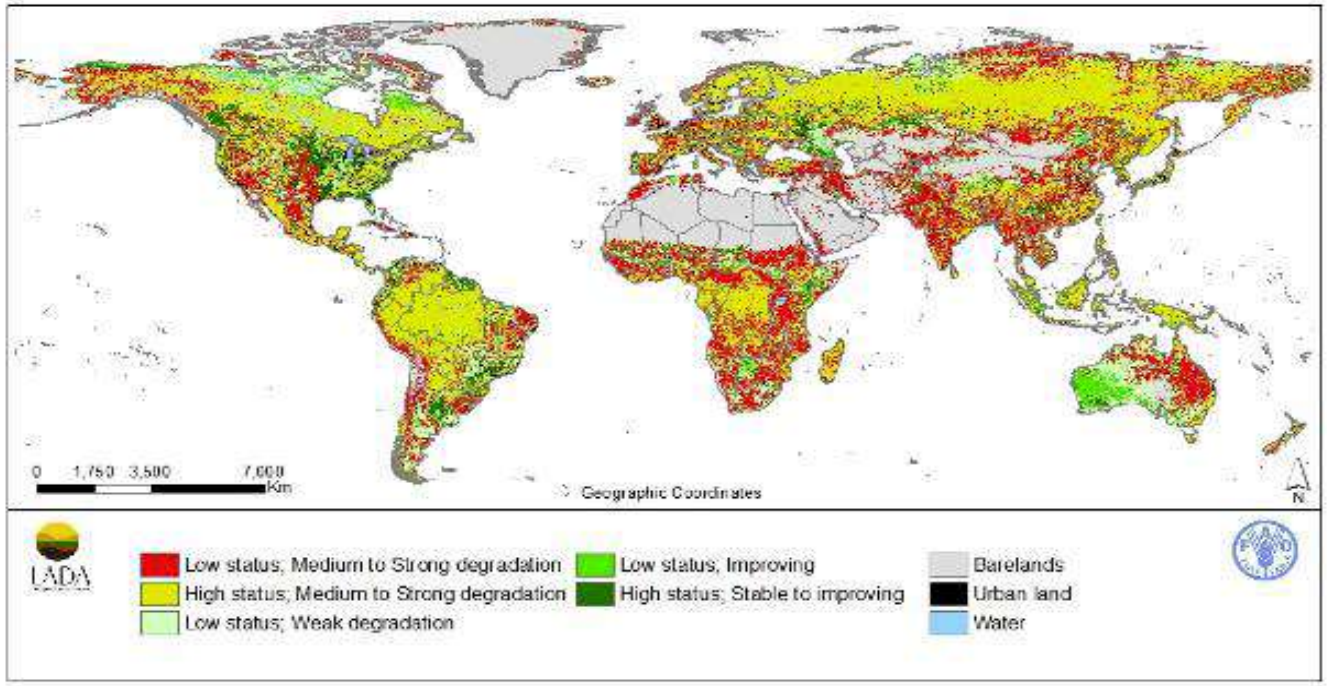
When we eat livestock, only 4% of protein is available to humans (Smil, 2013)

The rest is animal waste & pollution (Postel, 2013)

Nitrogen pollution in NE Atlantic halved if plant proteins replace half animal proteins

Desmit et al, 2018

Land degradation & desertification



69% of land is degraded

25% highly degraded

(FAO SOLAW, 2011; ISRIC, 2009)

20,000 square km lost each year from soil erosion

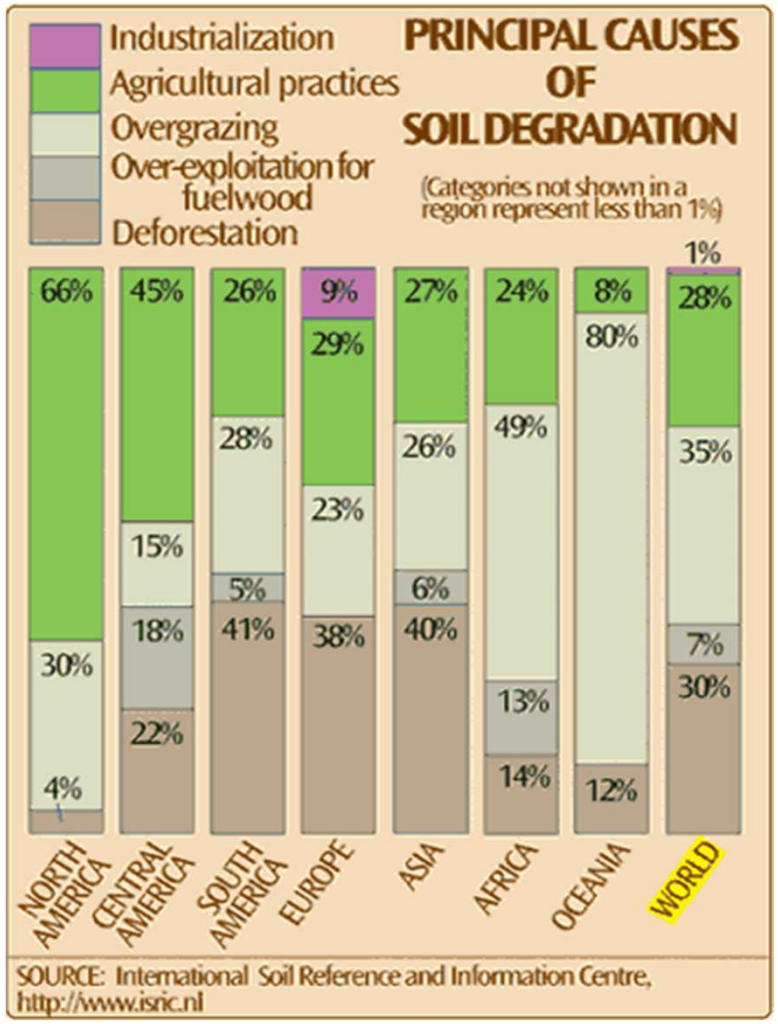
4 million km^2 of cropland now abandoned

(Scholes et al, 2018. (IPBES))

50% of world's ag soils gone

60 years of farming left if soil degradation continues

(WWF, 2016; Arsenault, C, 2014)



Overgrazing, Deforestation and Ag practices the principal causes of soil degradation

(GLASOD; Kendall & Pimental, 1994; WRI 1994; Scholes et al, 2018)

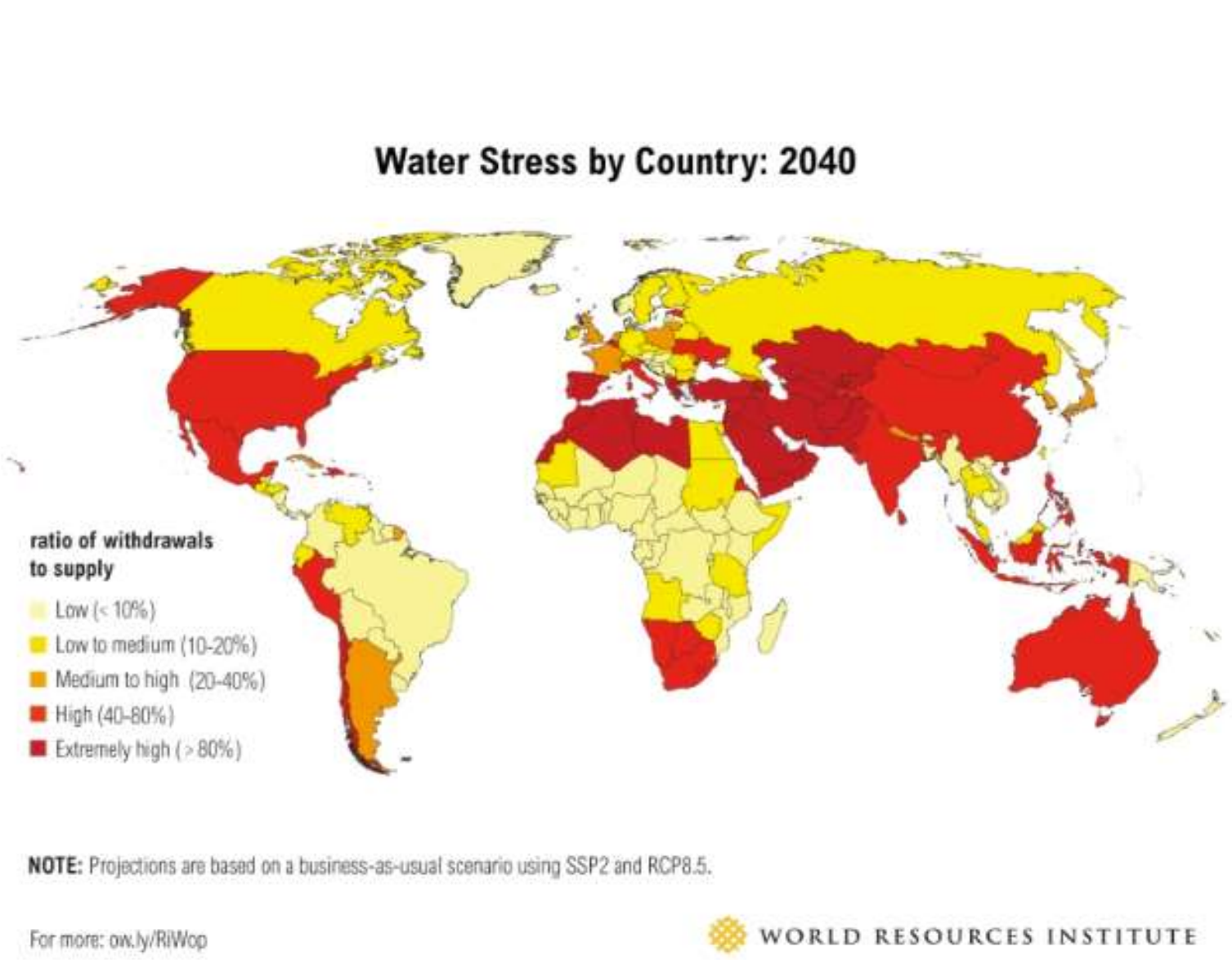
Fresh Water

By 2030 the world will need 40% more water

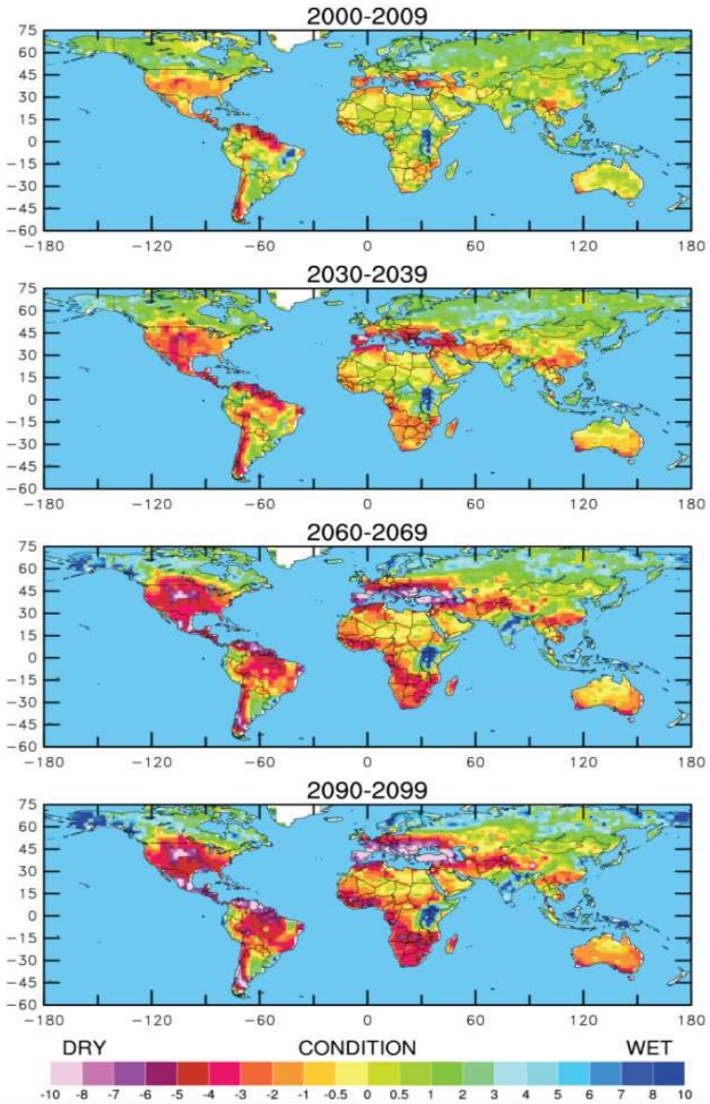
UN WWAP, 2015

Over half the world's largest aquifers are threatened

Richey et al, 2015



(Luo et al. 2015)



Water shortage projection

(Dai, A 2011)

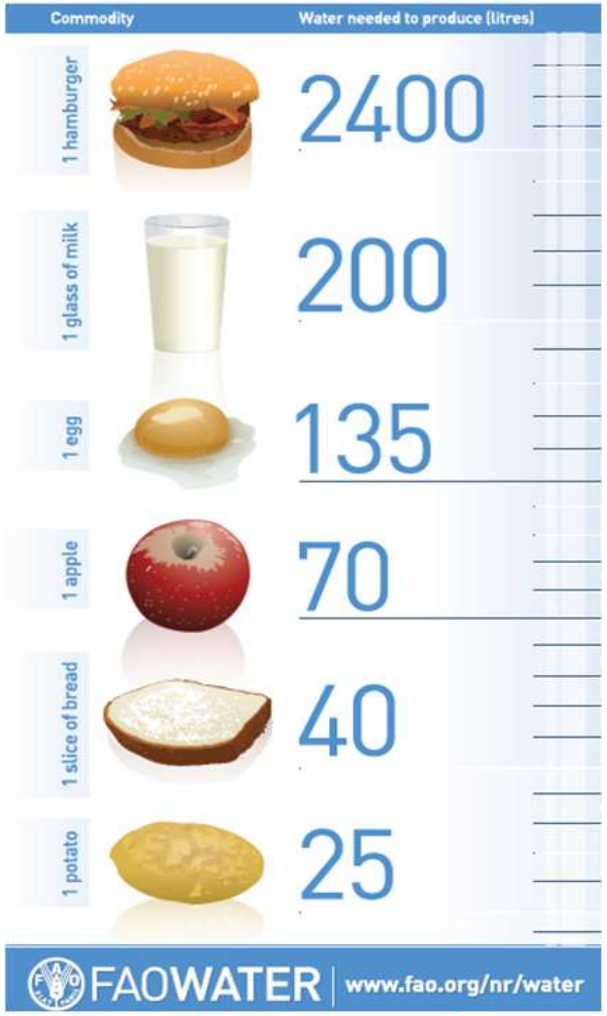
70% of water for irrigation

90% in developing countries

(Willett et al, 2019; UN WWAP, 2014)

22.5 million climate refugees per year since 2008

(GRID, 2018)

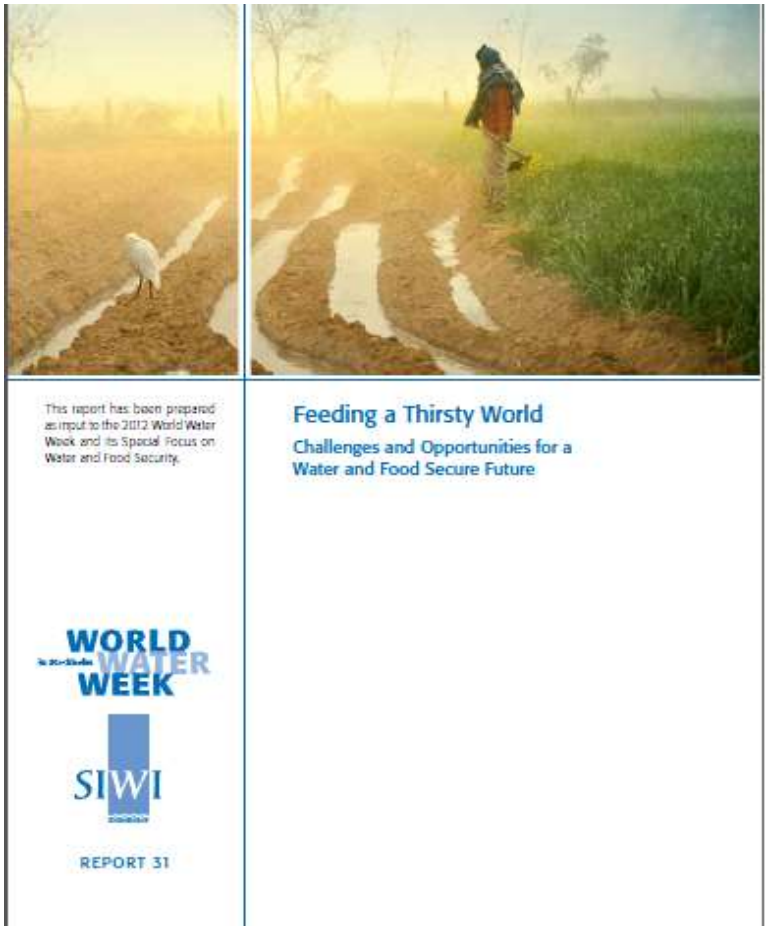


Meat & dairy heavy water users:

6x more water to grow a kilogram of protein from animal sources

20x more water to grow calories from beef than from grain or potatoes

(FAO, 2012, Ercin et al, 2011)



Enough water by 2050:

If animal food consumption is reduced to 5% of total calories.

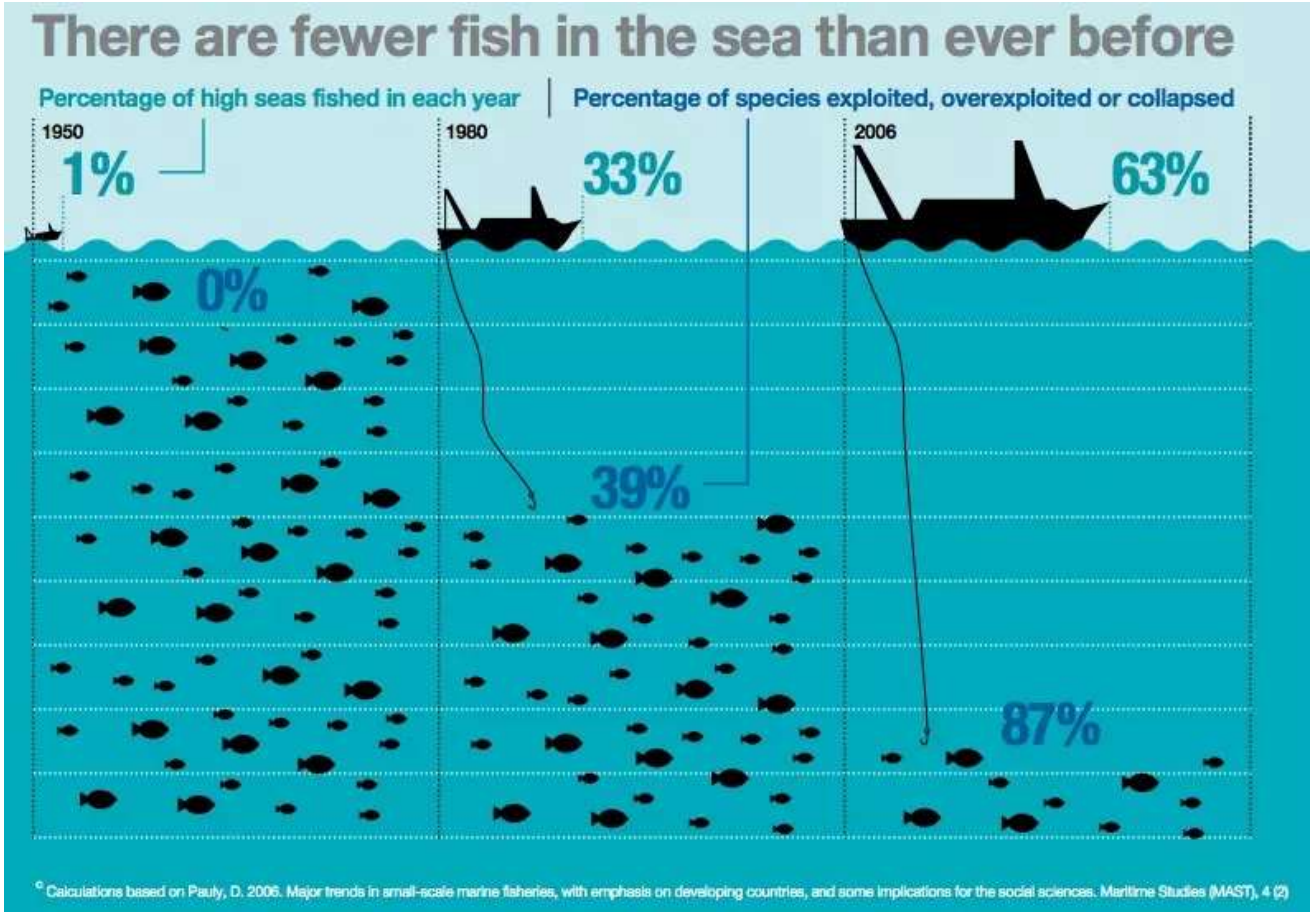
75% reduction of animal foods.

(SIWI, 2012)

Oceans

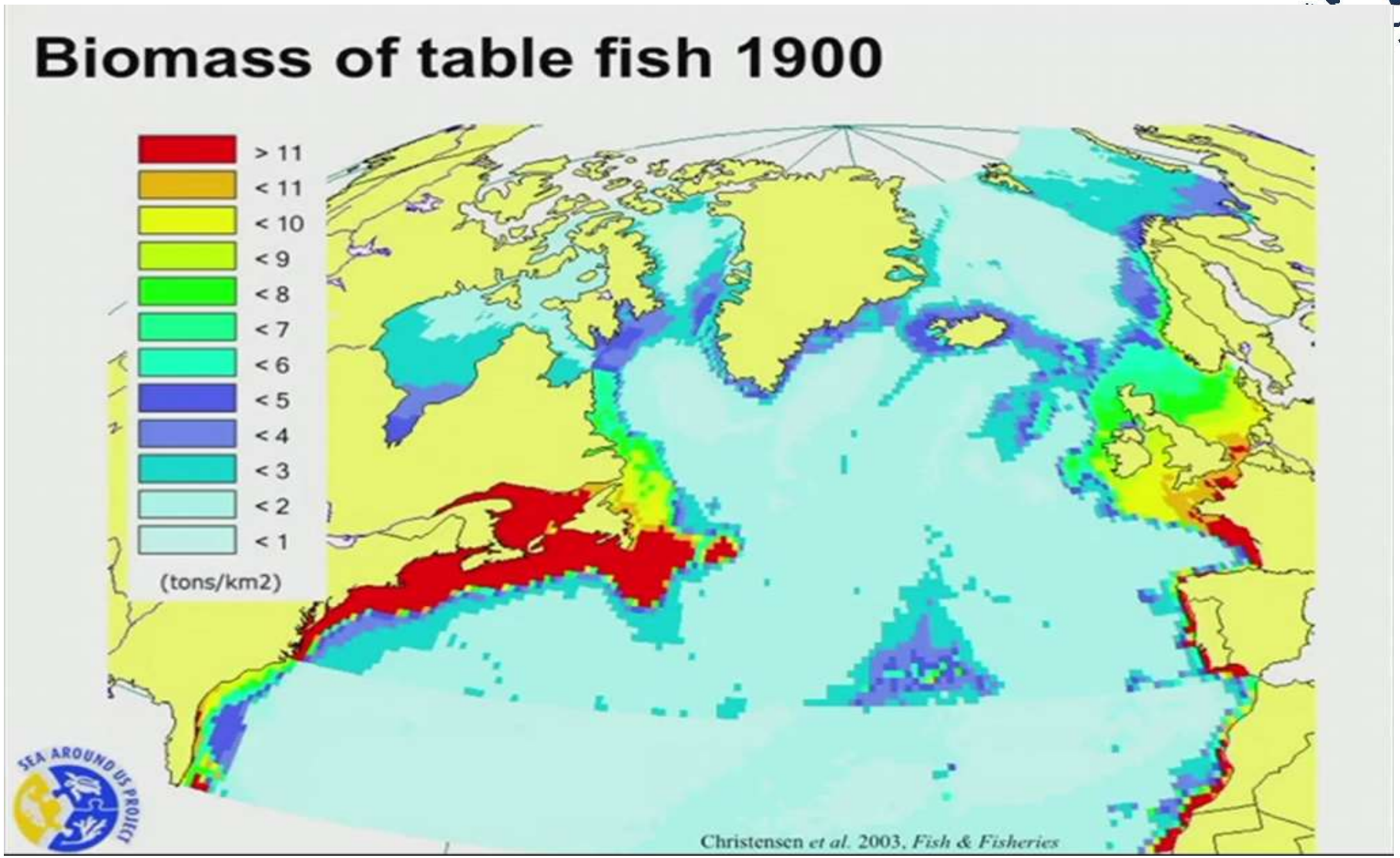
Overfishing has wiped out 90% of big fish (Myers & Worm, 2003; WWF, 2015)

Bottom trawling has ‘plowed’ continental shelves (Oberle et al, 2016)

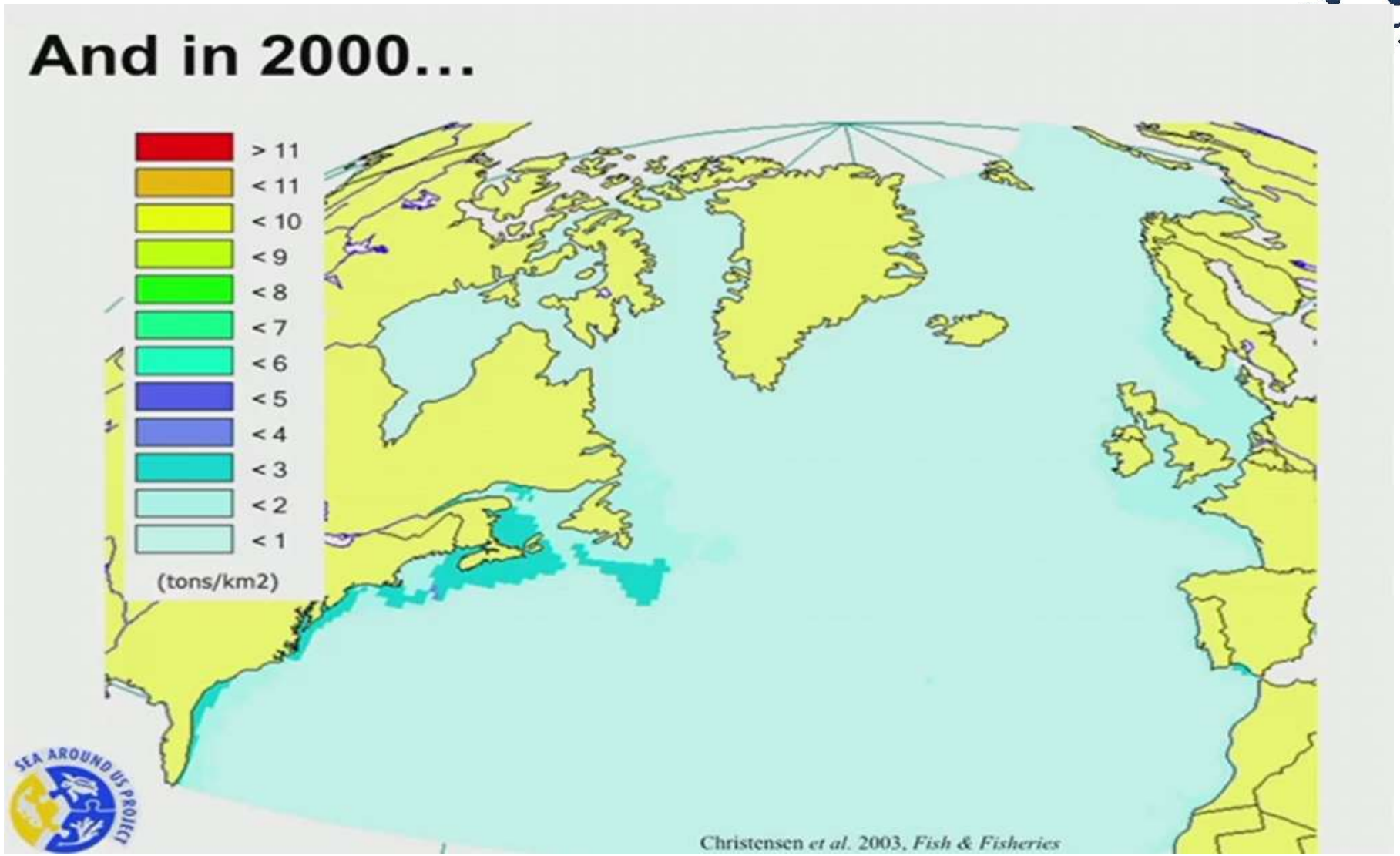


Fishing fleet up 10x since 1950's, catch down 50%

(Global Ocean Commission, 2016)

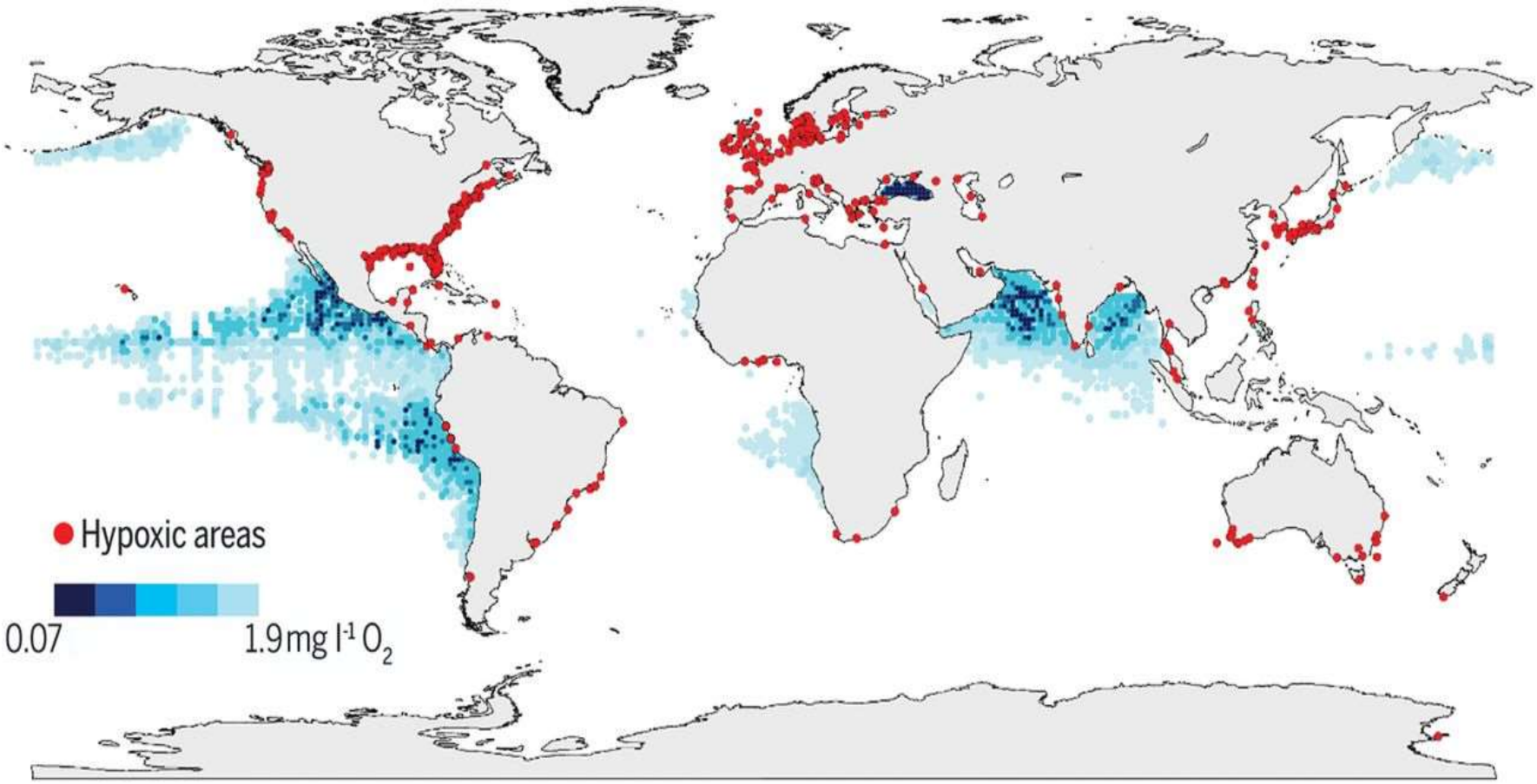


North Atlantic fish wiped out (Christiansen et al, 2003)



North Atlantic fish wiped out

300-400 ocean dead zones from nitrogen pollution (Welch, 2012; Roberts, 2012; Lam & Kuypers, 2011)



Ocean dead zone sites and spread (Brietburg et al. 2018)

Hypoxic oceans a driver in past mass extinctions

(Bartlett et al, 2018)

Climate

Half major extreme weather 2011-2015 ‘climate boosted’ (WMO, 2016)

37 cases of regional tipping points (abrupt, irreversible change)
(Drijfhout, et al, 2015)

Iraqi/Syrian refugee crisis due to climate change (Kelley et al, 2013)

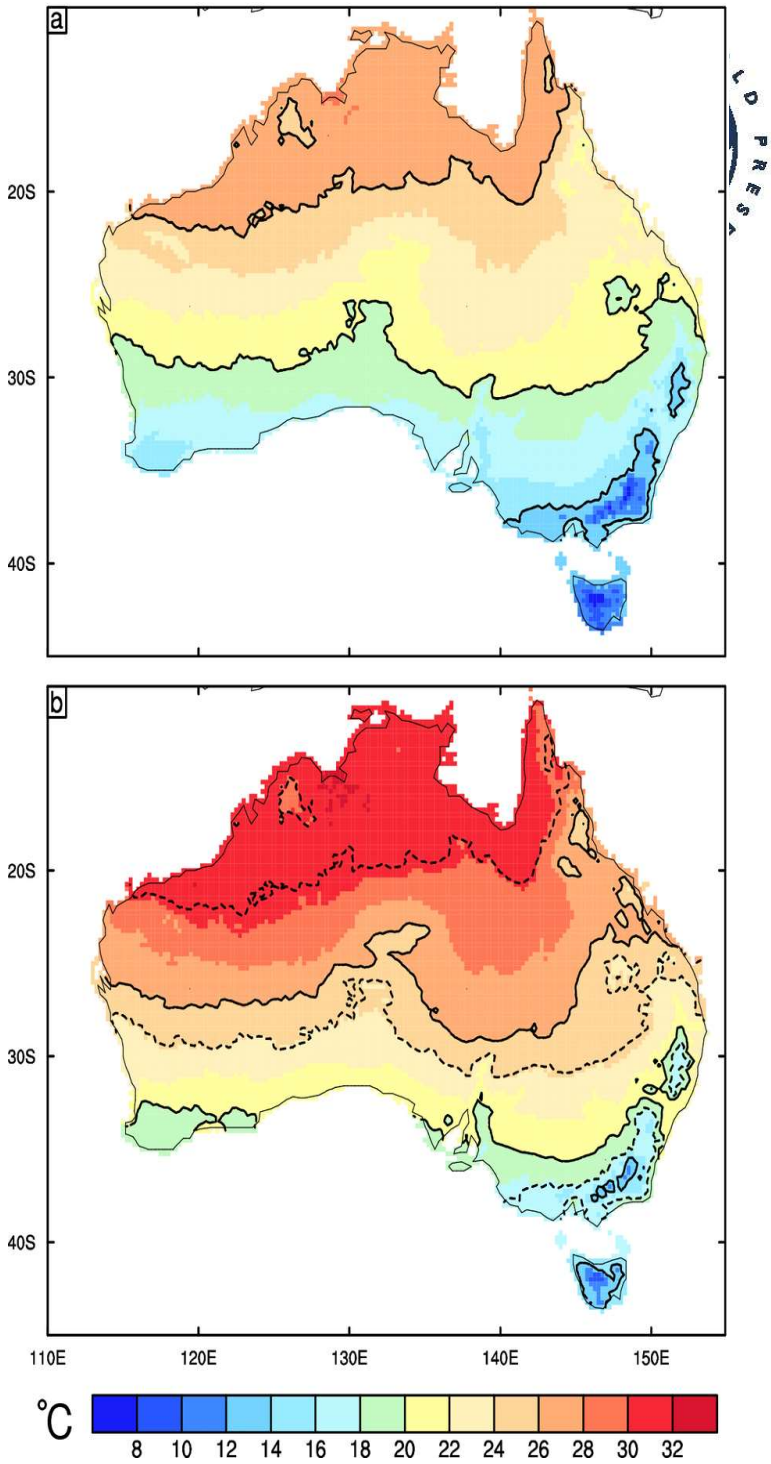
150 million climate refugees by 2050 (EJF, 2009)

Victoria Falls, December 2019


Positive proof of global warming.
18th Century
1900
1950
1970
1980
1990
2006

CSIRO projections

- By 2090
  - 0.6 to 1.7C (low emission scenario)
  - 2.8 to 5.1C (high emission scenario)
- Rangelands warm by 2.9-5.3C
- East Coast, including Sydney and Brisbane, warms by 2.7-4.7C
  (CSIRO, 2018)



- This map shows the annual mean temperature for present climate (A), and late 21st century (B). In each panel the 14C, 20C, and 26C contours are shown with solid black lines. In (B) the same contours from the original climate are plotted as dotted lines to provide the clearest depiction of the shifts in climate. CSIRO

Opinion Bushfires

This is climate changed. Pray for rain. Pray harder for leadership

We had a bushfire two months ago that burned most of our property. It didn't matter. It burned again

Badja Sparks

Fri 15 Nov 2019 12.07 AEDT

396 563

▲ 'Wytaliba has lost two lives and more than half our homes, our school, our bridge, our wildlife and 40 years of work to build a community. What was our paradise is now ash.' Photograph: Steve Evans

Methane has surged, livestock responsible
(Saunois et al, 2016)

Methane will cause 1.5^{o} – 2^{o} even if CO_2 cut to zero (Howarth, 2014)

4-legged methane factory

A vegan diet reduces land use by 3.1 billion ha - 76%

Poore & Nemecek, 2018

Converting 41% of pastures to native forest would draw down 27 years of current emissions or 265 GtC

(Rao et al, 2015)

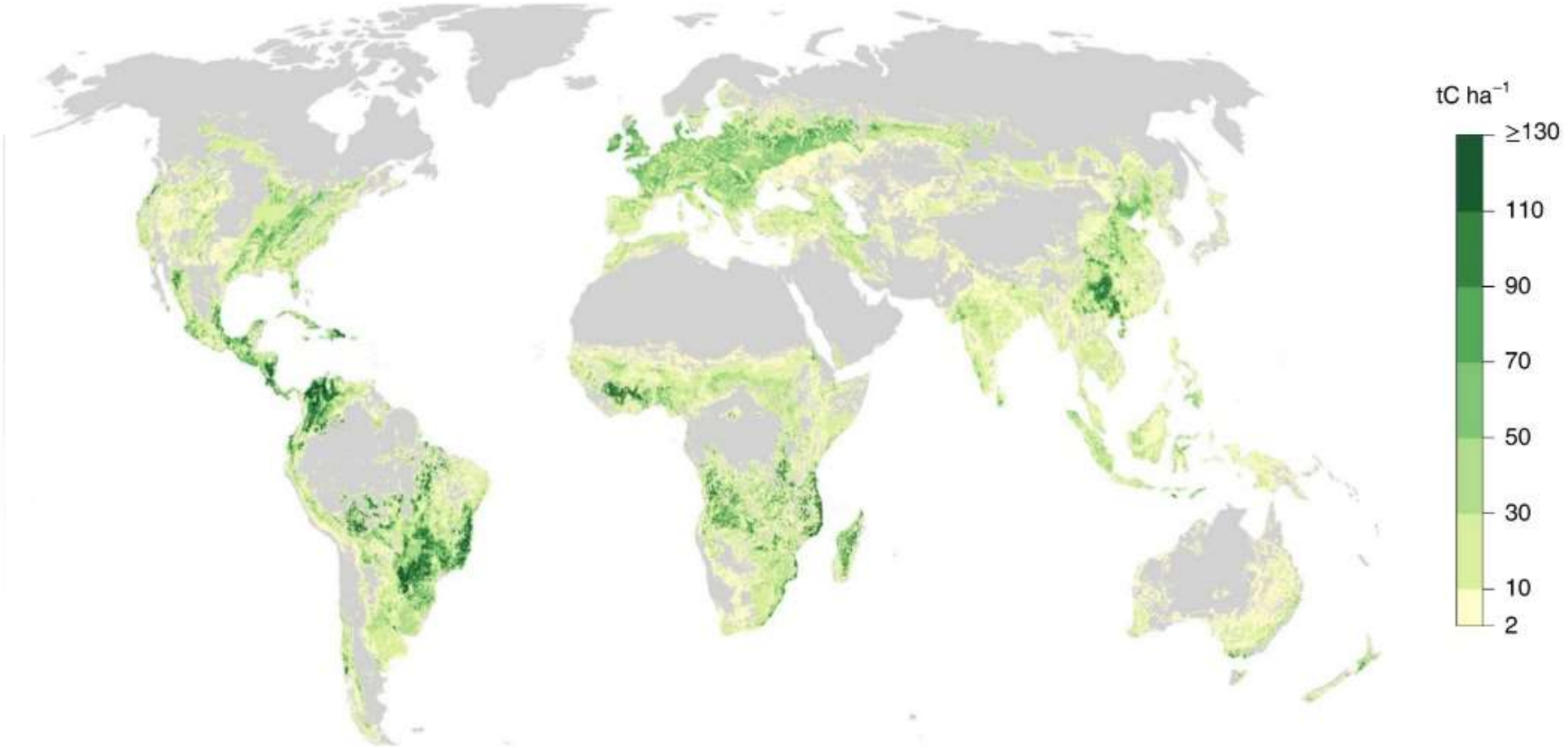


Fig. 1 | Distribution of carbon in potential vegetation in areas of present-day animal feed croplands and pastures combined for each 5 arcmin grid cell. Colour corresponds to the product of land area presently under cultivation multiplied by the potential vegetation carbon density, minus the quantity presently stored in agricultural vegetation.

Vegan diet could sequester 332-547 GtCO2 by 2050

(Hayek et al, 2020)

Long term climate fix:

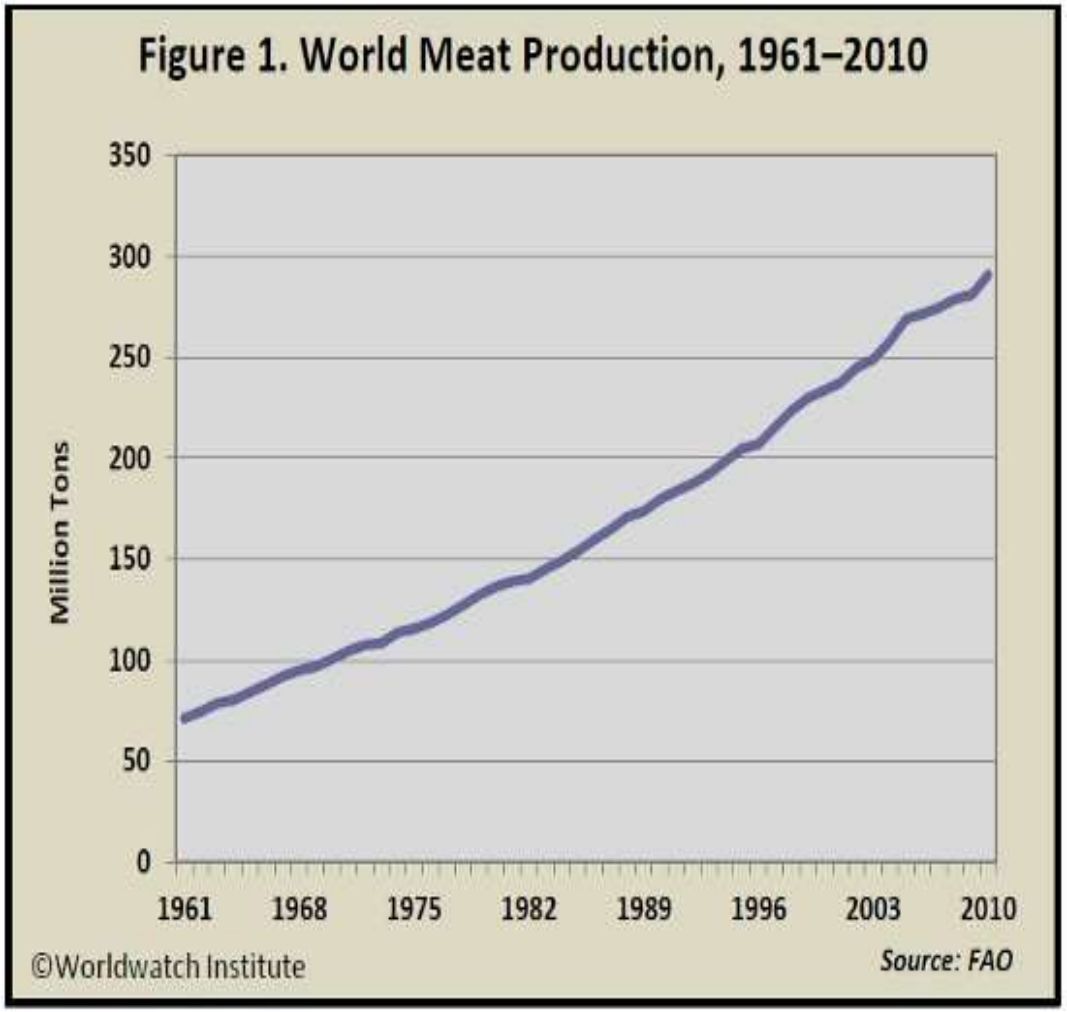
- Netherlands EIA: Lowest cost mitigation - Grow vegetation
- Retire grazing lands and feed crops, through
  - Low meat diet – 50% cost saving
  - Animal free (vegan) diet – 80% cost saving

(Stehfest et al, 2009)

Overpopulation?

- 7.5 billion people
- 64 billion livestock each year
- Western diet – 2,000 animals, 100,000 eggs eaten in a lifetime
- Livestock outweigh wildlife 18:1
- Livestock outweigh humanity 2:1

(FAOStat, 2013; Smil 2013)



Feedlot intensification has boosted production

Doubling production is not possible without severe environmental damage

(UNEP, 2010)



meat, aquaculture, eggs, and dairy

- use ~83% of the world's farmland
- provide 37% of our protein
- and 18% of our calories

(Poore & Nemecek, 2018)

Without livestock to feed, we would have a 50% surplus of food

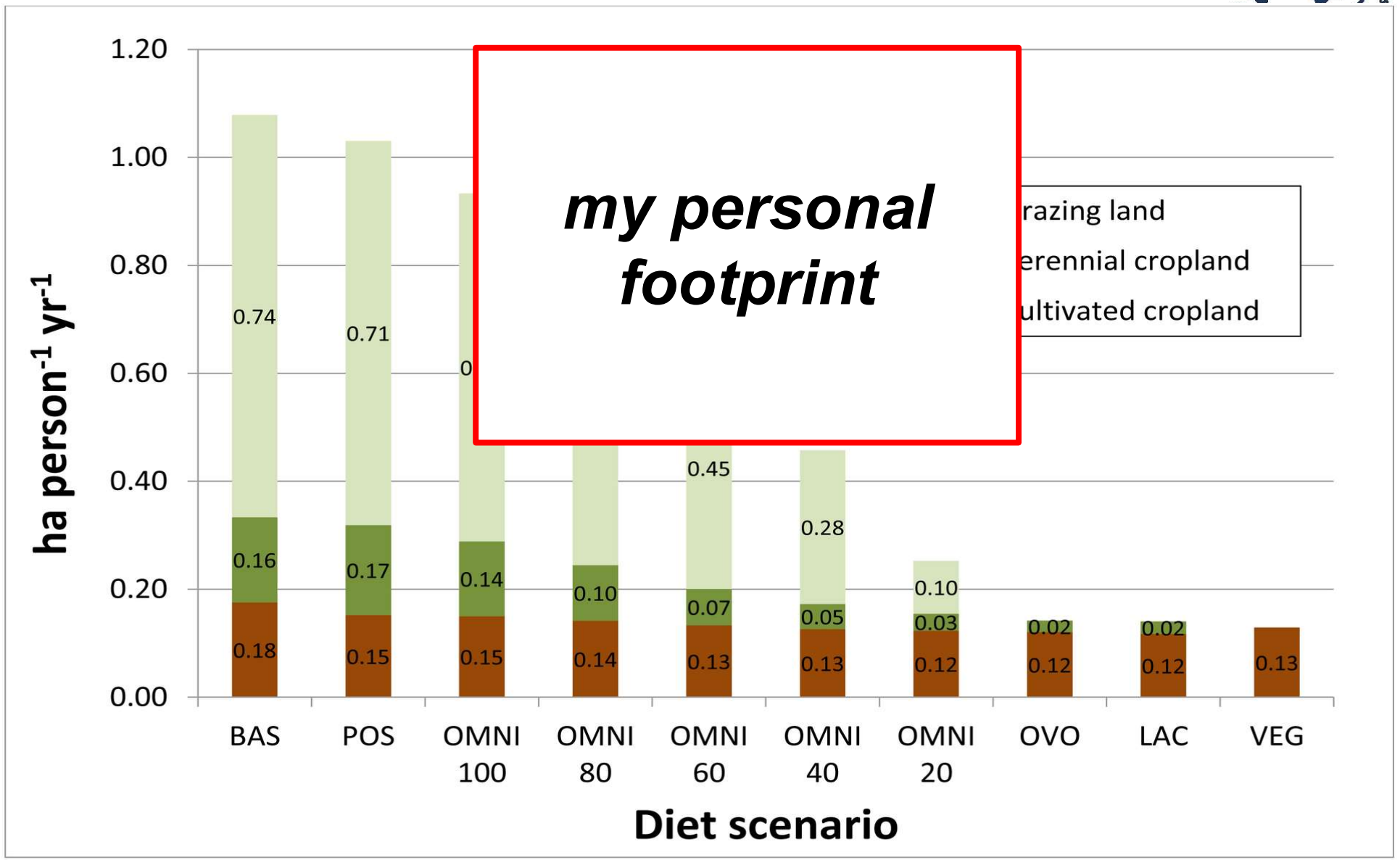
(FAO, 2006)

Current food system can feed only 3.4 billion sustainably

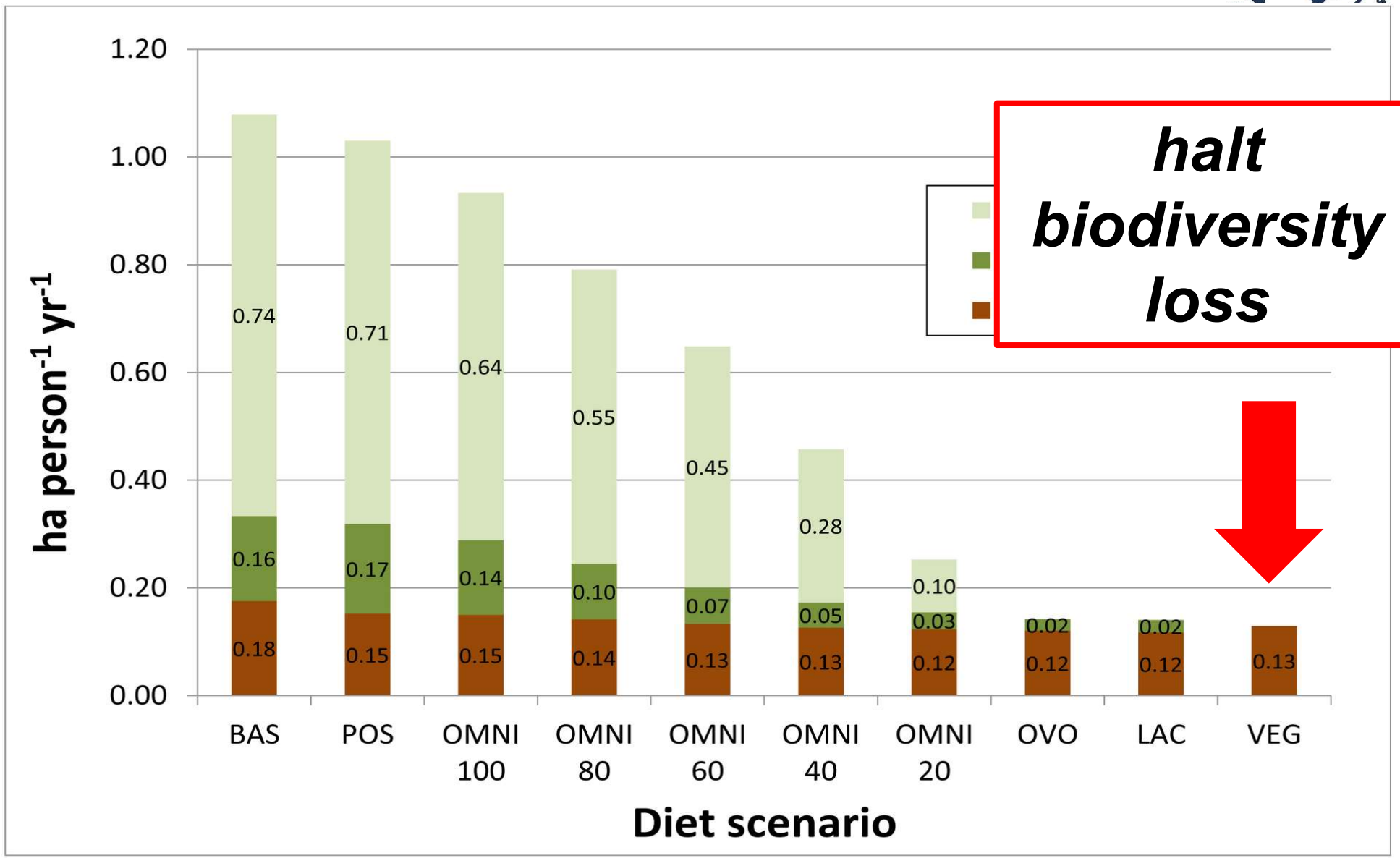
To stay within planetary boundaries:

- Move to healthy diets
- Reduce food waste 50%
- Reduce water use
- Reduce fertilizer use

Gerten et al. 2020



Peters et al, 2016



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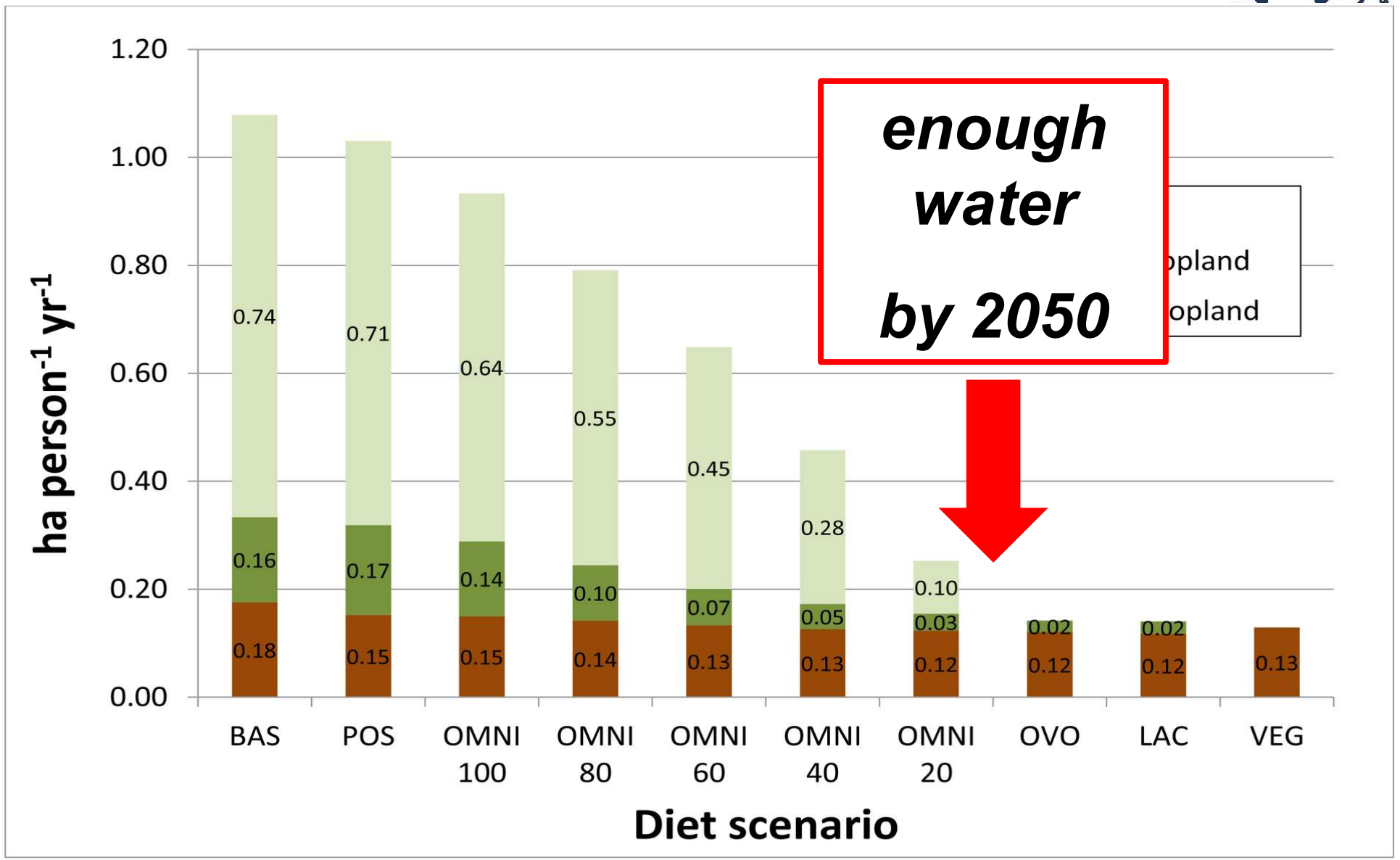

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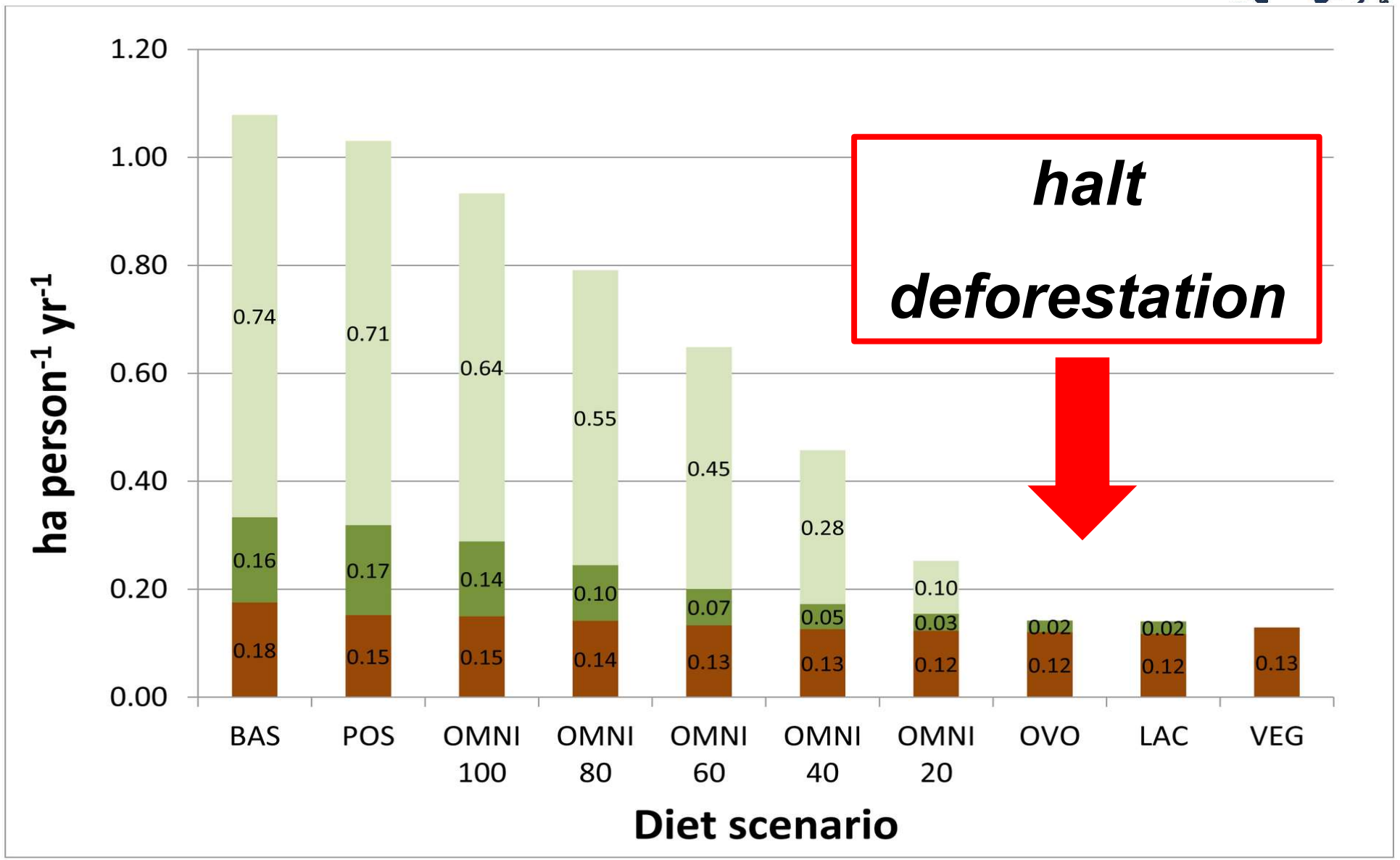

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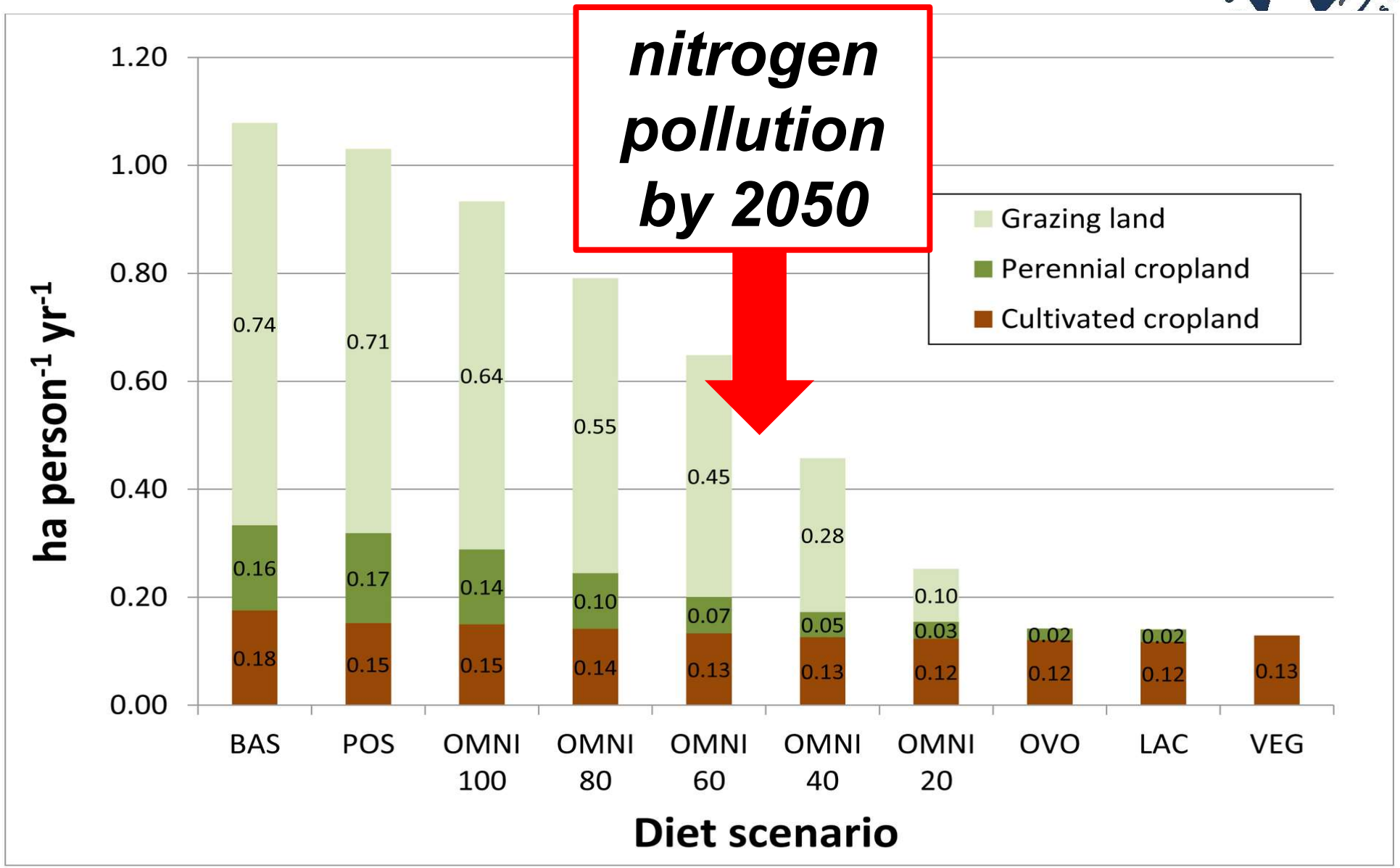
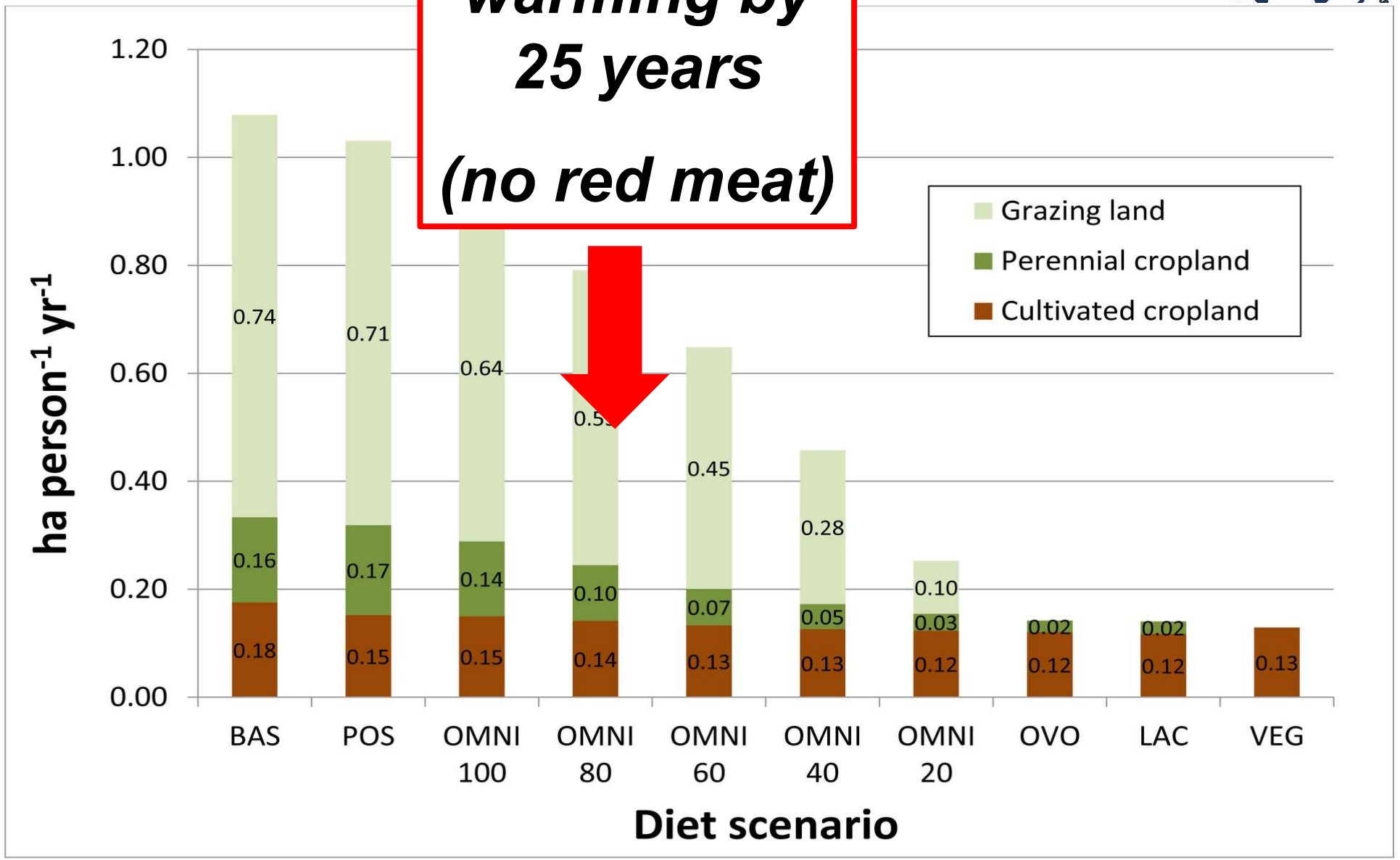


Peters et al, 2016

slow global warming by 25 years

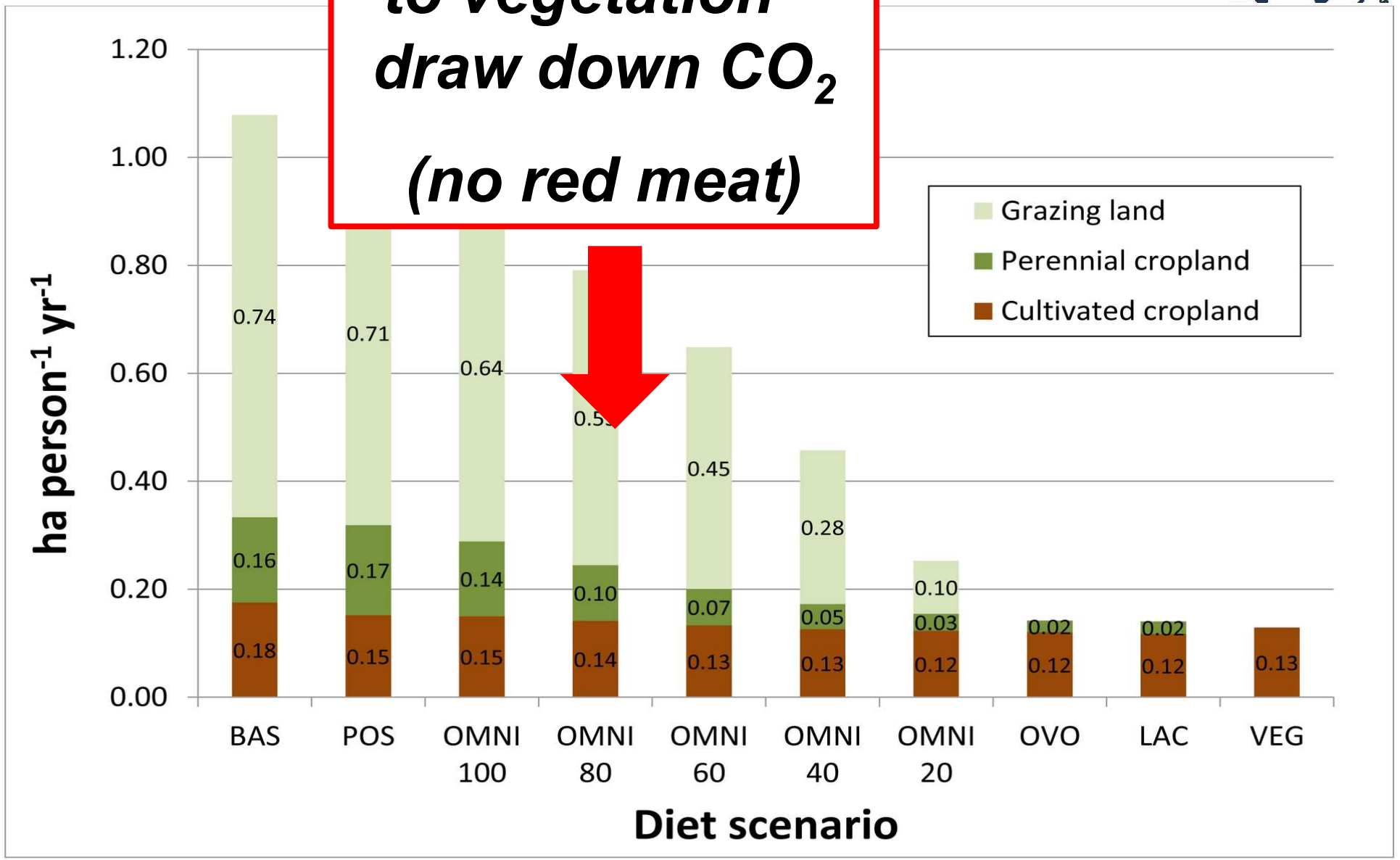
(no red meat)



Peters et al, 2016

return pastures to vegetation – draw down CO_2

(no red meat)



Peters et al, 2016

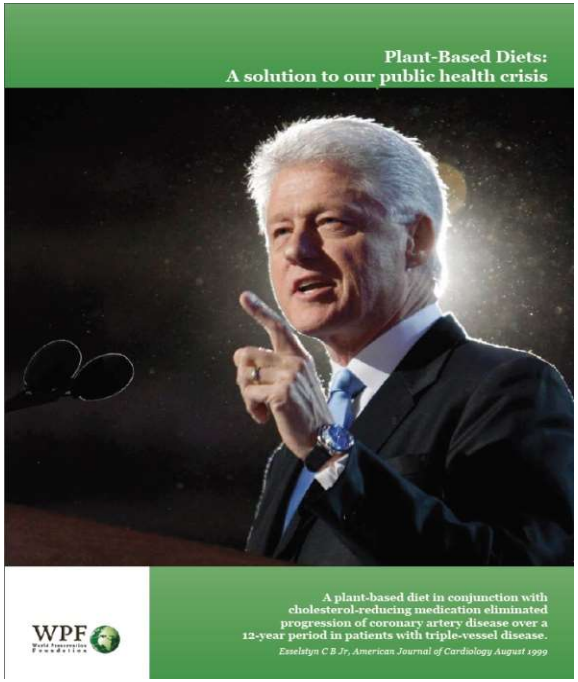
Lifestyle diseases: will boomers bankrupt our country?

Today there are about 4,000 Australians over 100.

By mid-century it will be 70,000.

“Unhealthy diets … pose a greater risk to morbidity and mortality than does unsafe sex, alcohol, drug, and tobacco use combined.”

EAT-Lancet Commission, 2019



"It is time to tell the truth. Family history and genetic background do not cause this illness. Genes load the gun, but lifestyle pulls the trigger."

"a switch to a diet free of meat and dairy products will dramatically reduce … obesity, cancer, heart disease and diabetes."

Dr Caldwell Esselstyn

(WPF 2013; Esselstyn, 2008; Barnard et al., 2014; Boeing et al. 2012)

Chronic disease responsible for 60% of deaths

- 40% less likely to develop cancer in vegetarians
- 32% lower risk of heart disease in vegetarians
- 70% reduced risk of diabetes in vegans

(Levine et al. 2014; IARC, 2015; PCRM, 2010; Crowe et al, 2013)

"…vegetarian diets are appropriate for individuals during all stages of the life cycle, including pregnancy, lactation, infancy, childhood, and adolescence, and for athletes."

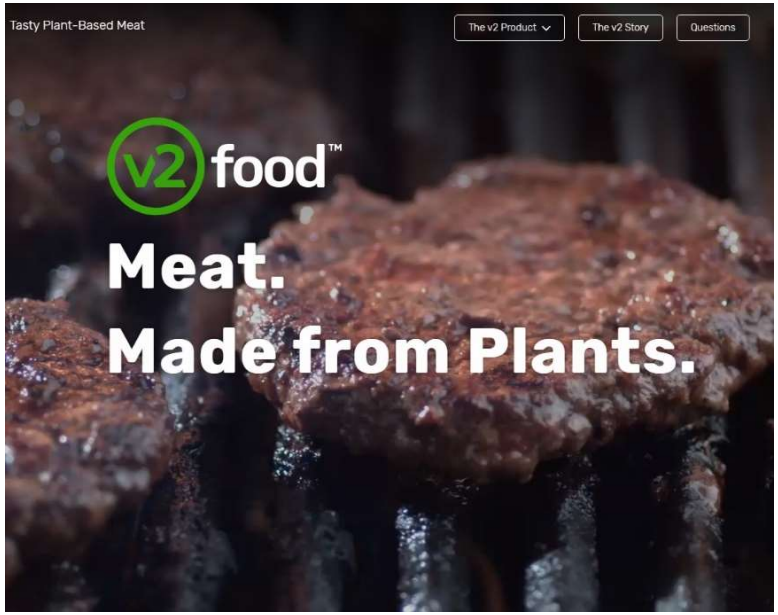
ADA, 2009

Vegan endurance athletes performance advantages:

- Leaner body mass
- Reduced blood viscosity
- Reduced oxidative stress
- Reduced inflammation
- Increased VO2 max

(Barnard et al, 2019)

Convincing meat substitutes have surged



CSIRO startup with Hungry Jacks $22m investment

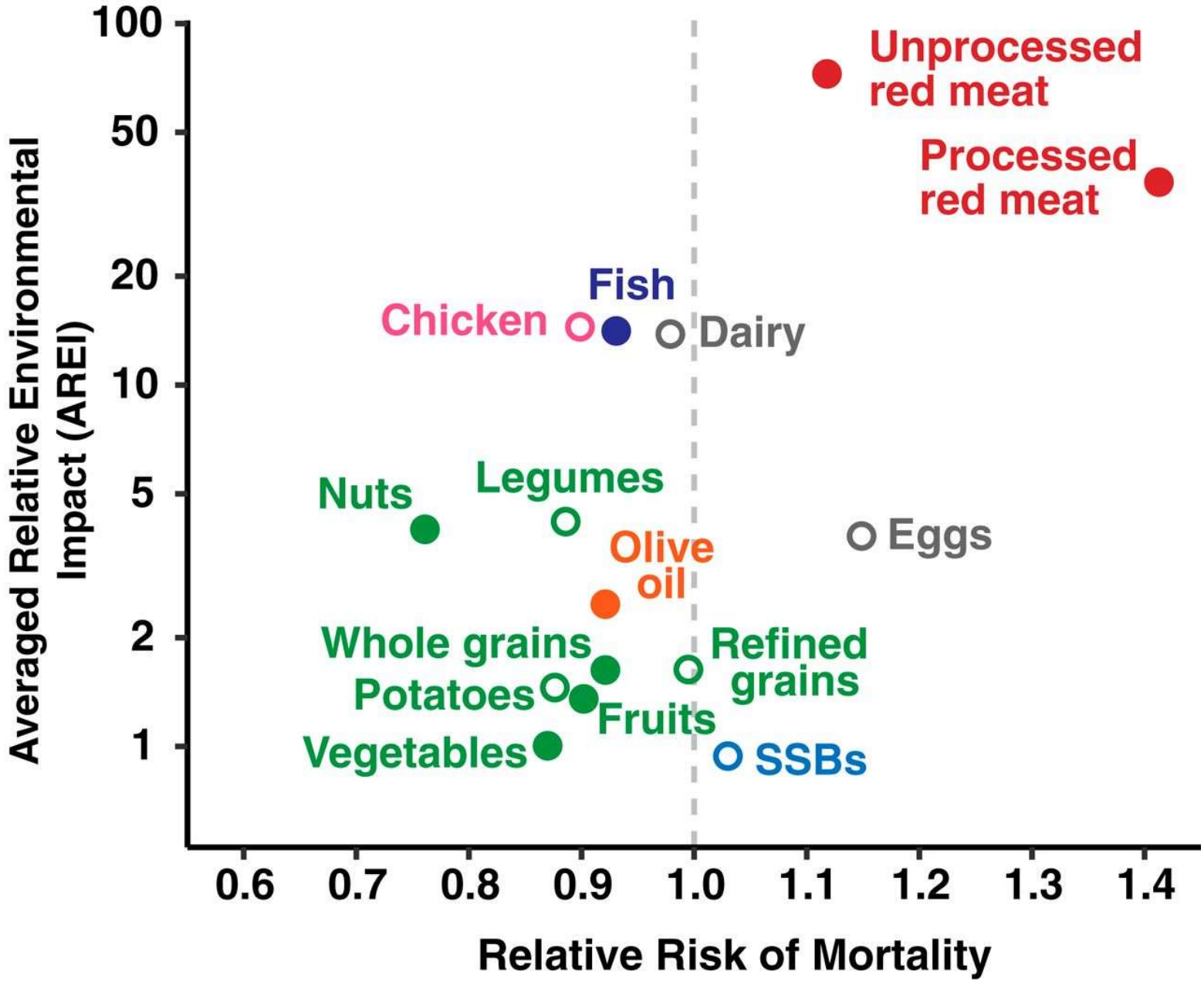
What To Do?

- **Personal:** Diet change
- **Community:** Plant Trees
- **Local Government:** Climate Alliance/Power Partnership, support local vege producers
- **Federal Government:** meaningful carbon price, government purchasing, awareness campaigns

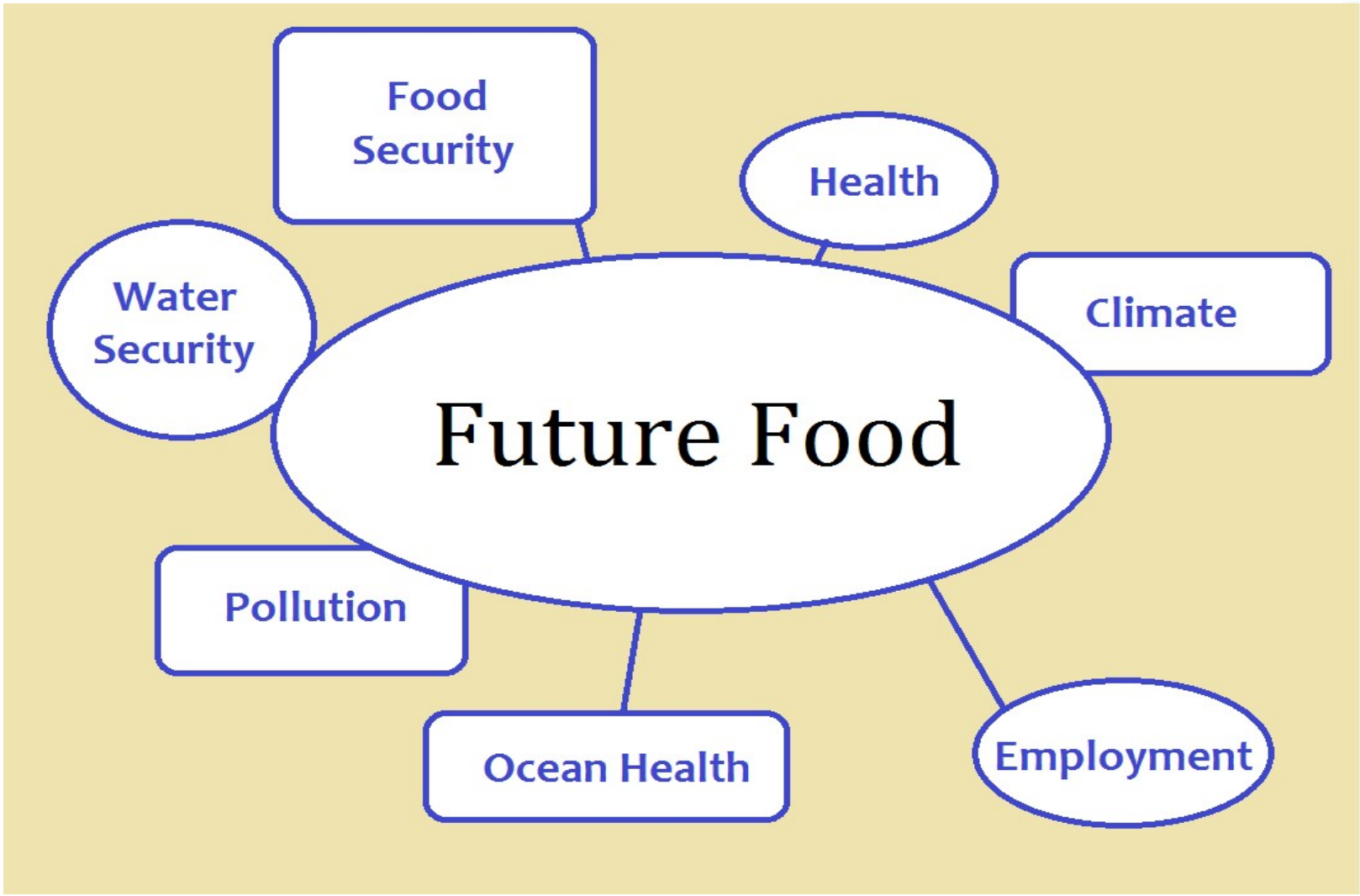
The end

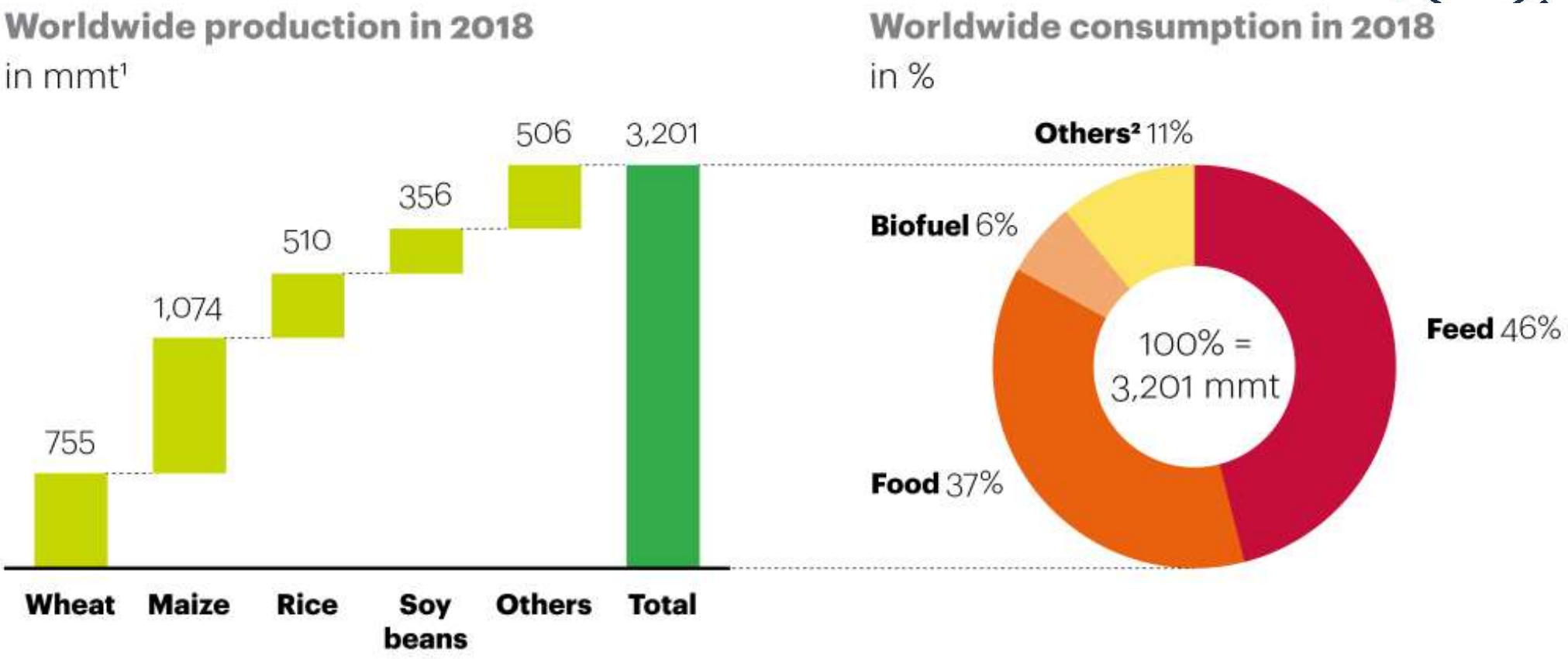
WPF

WORLD PRESERVATION
FOUNDATION



Clark et al, 2019


Food Security
Health
Water Security
Climate
Future Food
Pollution
Ocean Health
Employment

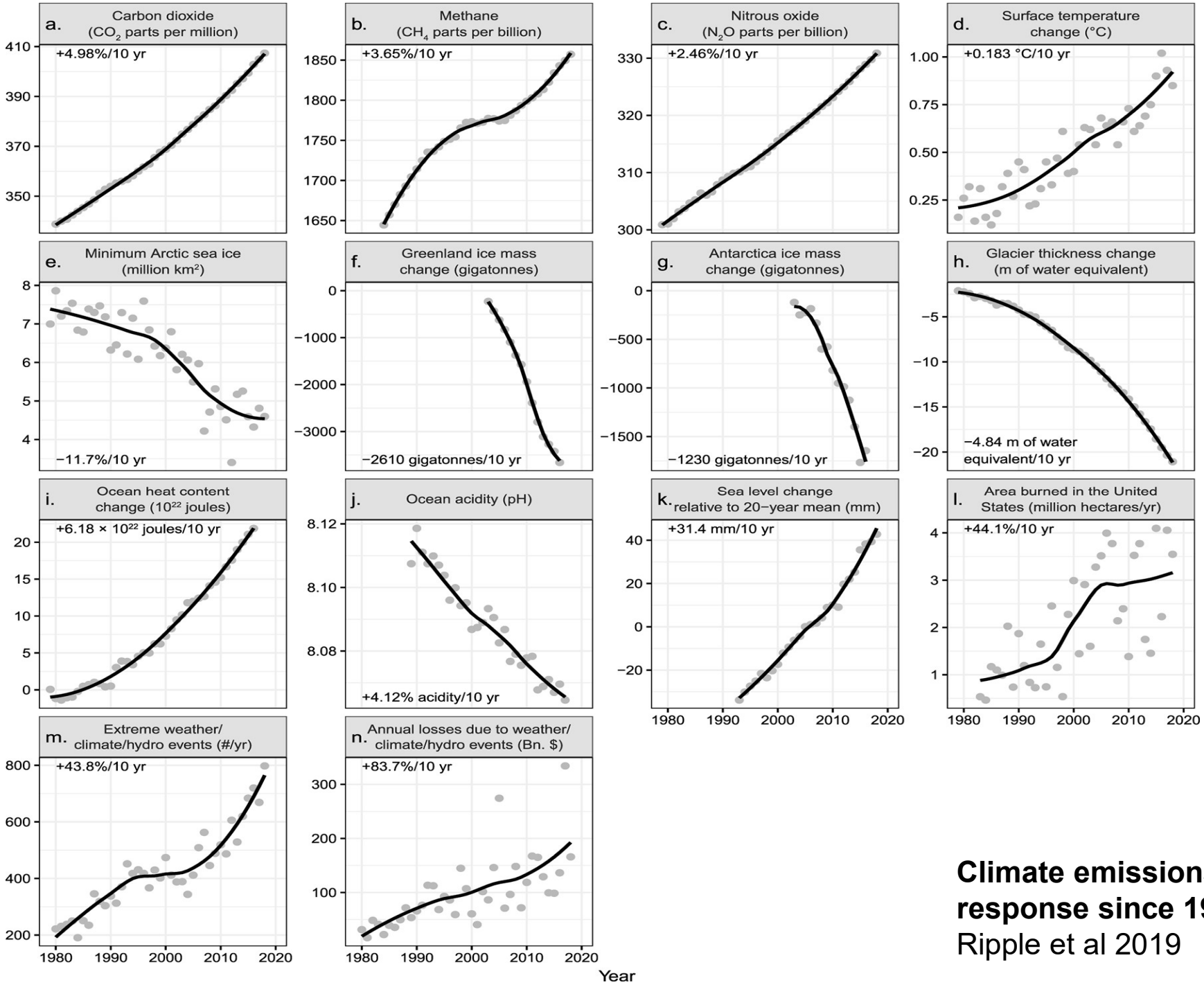


¹ mmt = million metric tons
² Others = industry consumption and deterioration

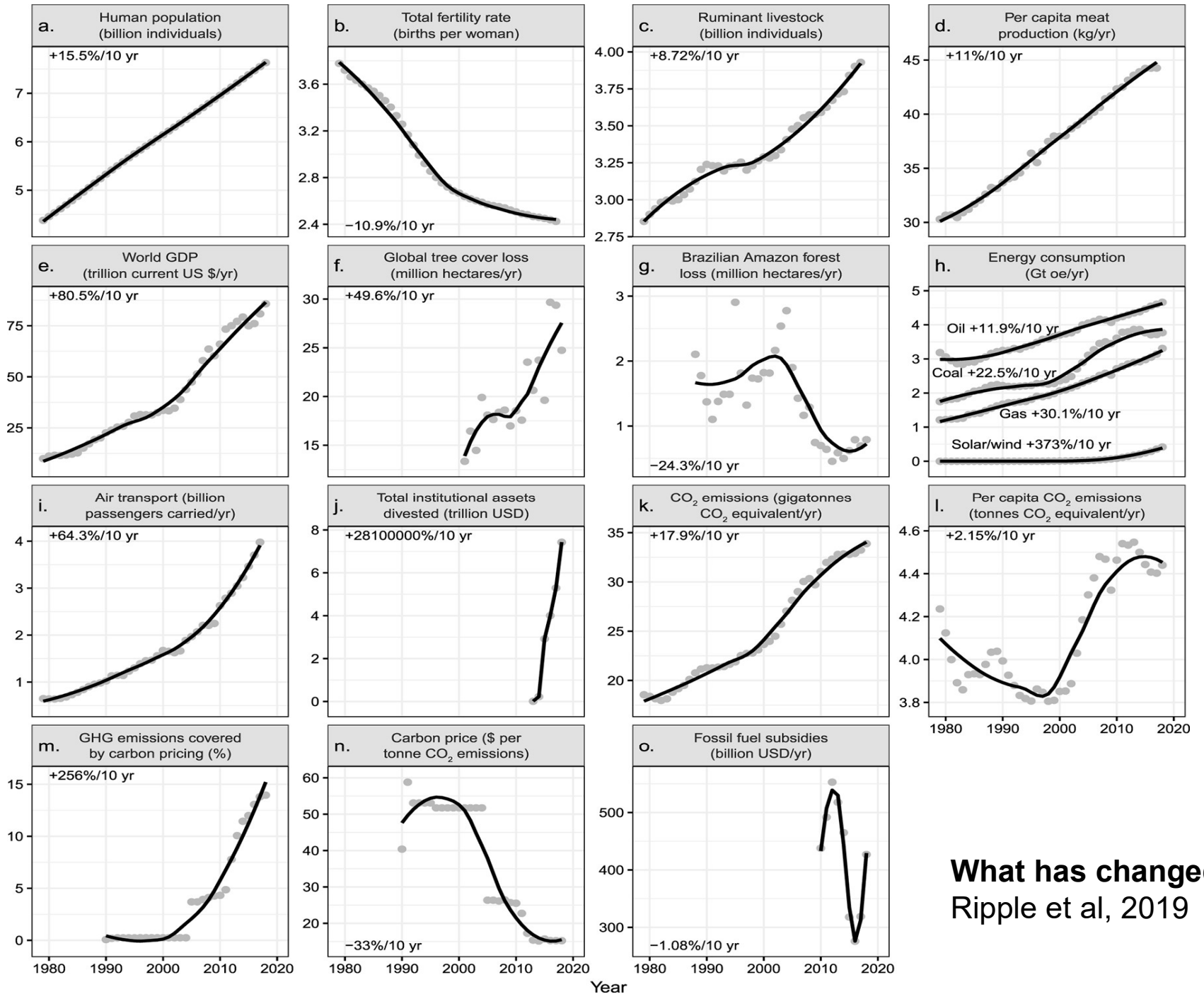
Sources: OECD, FAO; A.T. Kearney analysis

A vegan diet reduces land use by 3.1 billion ha - 76%

Poore & Nemecek, 2018

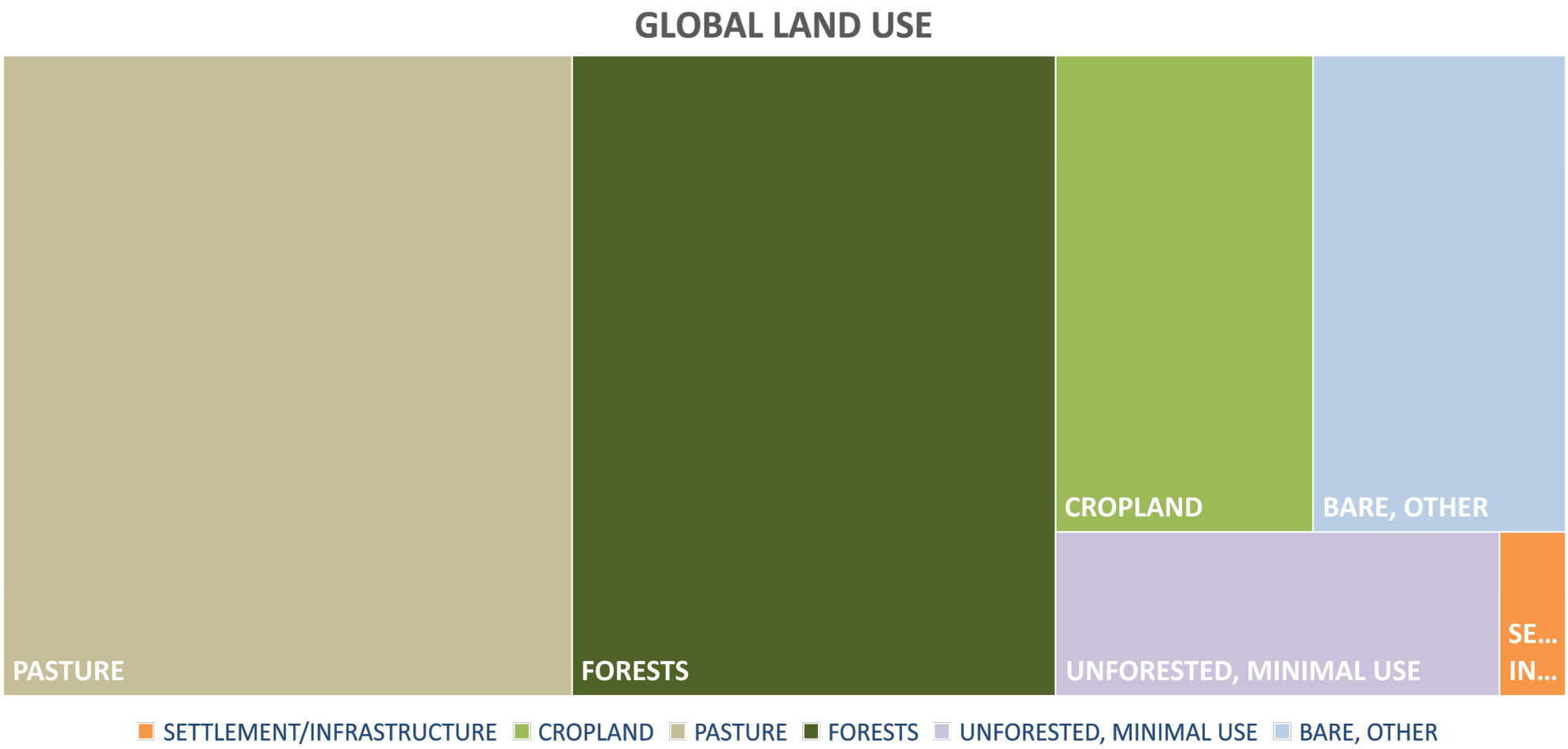


Climate emissions and response since 1979
Ripple et al 2019

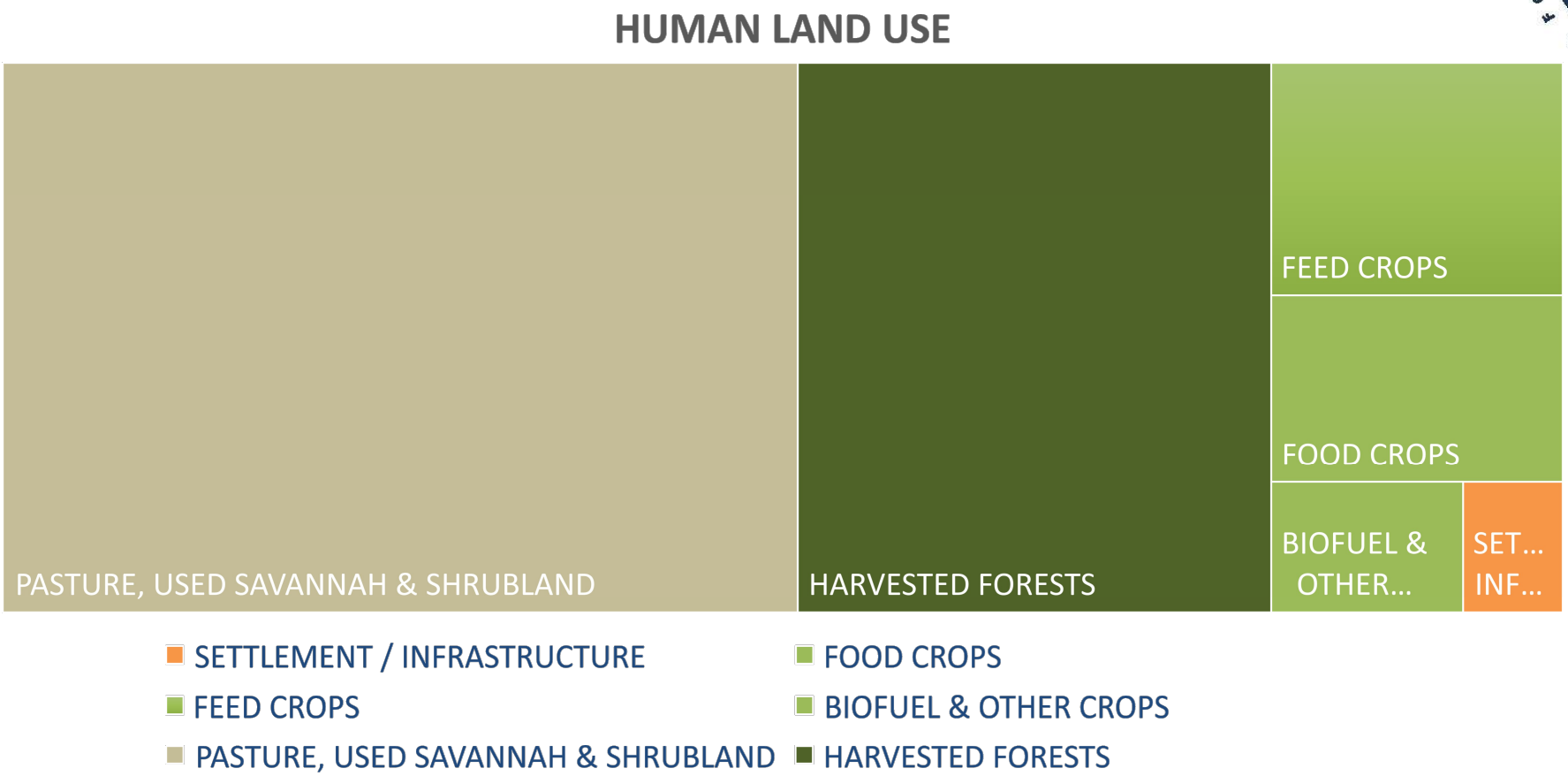


What has changed since 1979?
Ripple et al, 2019

How we use our planet



(IPCC, 2019)



(IPCC, 2019, crop proportions from Gerhardt et al, 2019)

A vegan diet reduces land use by 3.1 billion ha - 76%

Poore & Nemecek, 2018