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MACRO FORCES IMPACTING THE GLOBAL FOOD INDUSTRY

BY LAIN JAGER



MACRO FORCES

GLOBAL FOOD

AVOCADO'S



MACRO FORCES



Ten Dangerous Trends That Imperil Our Future,
and How to Survive Them



MEGATHREATS

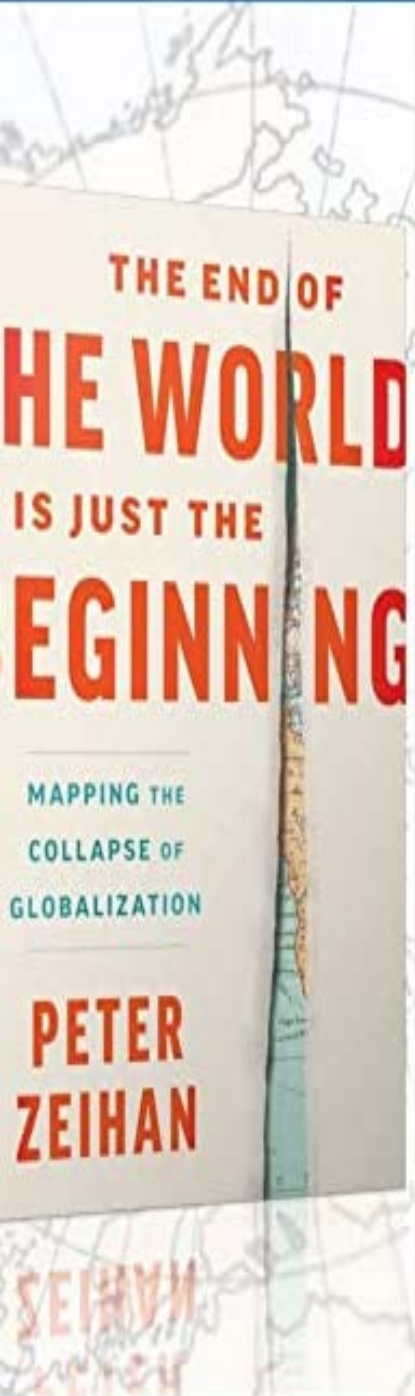
NOURIEL ROUBINI, Ph.D.

BESTSELLING AUTHOR OF *CRISIS ECONOMICS*

MEGA THREATS

- Deglobalisation and protectionism / Re shoring of manufacturing/ Regionalisation / decoupling of the US and China / Cyber warfare
- Aging populations/ de-saving is inflationary/ labour scarcity
- The mother of all debt crises/ the bailout trap/ easy money and cycles of boom and busts/ stagflation/ currency meltdowns/ severe recession and financial crises
- Backlash against liberal democracy and populism on the left and the right /inequality/ restrictions to immigration
- Climate change/ pandemics
- AI / employment

More Friction, higher costs of production, less economic growth



STRUCTURAL CHANGE

- Globalisation shapes every aspect of our lives
- America's Cold War strategy turbocharged global trade
- America's strategic calculus and demography mean we are moving into a new era
- Everything will change:
 - Global trade security
 - Transport
 - Finance
 - Energy
 - Industrial Materials
 - Manufacturing / technology
 - Agriculture/ inputs/ finance/ climate change/ demography

Raymond McCauley

Contact me

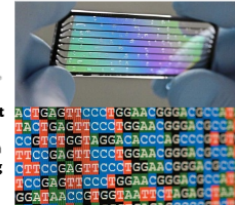
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former scientist
illumina
on the team that
created
next generation
DNA sequencing



bio
CURIOS

co-founder, chief architect

world's first biohackerspace

Singularity
UNIVERSITY
founding faculty
chair of
digital biology
department



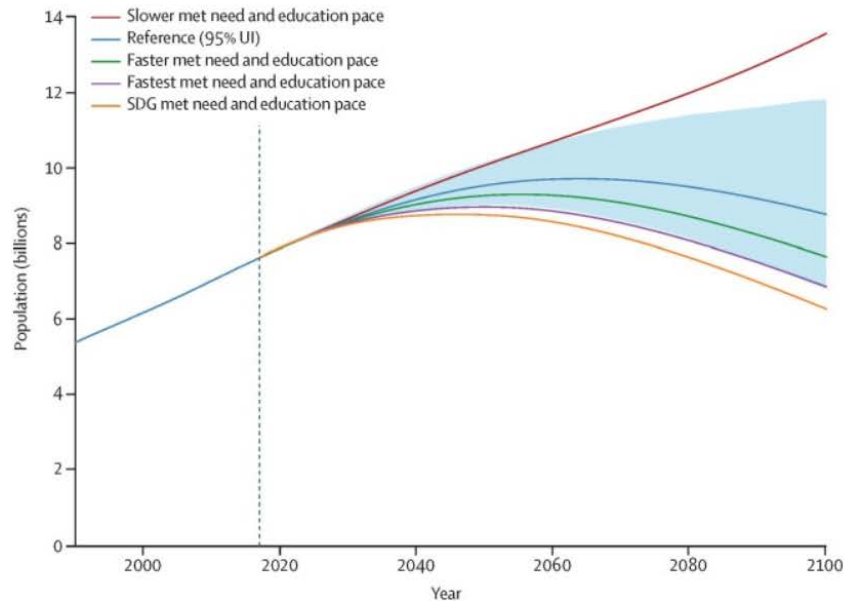
advisor
ARK
INVEST

New ARK Venture Fund





The Big Blue Ball

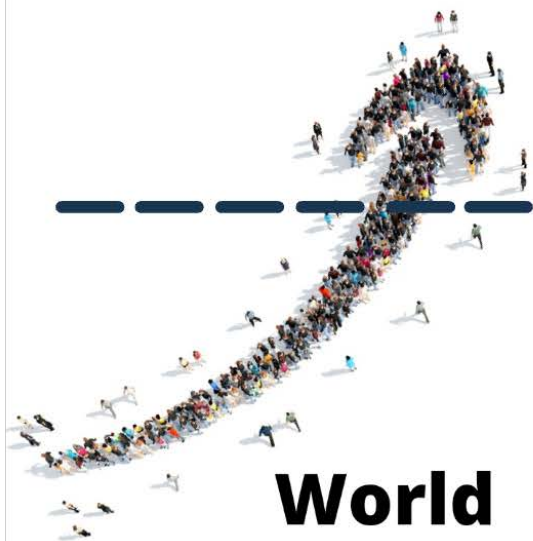


Population Peaks in ~2050 at ~10 Billion
 High Mortality *to* Low Fertility *to*
 Longevity

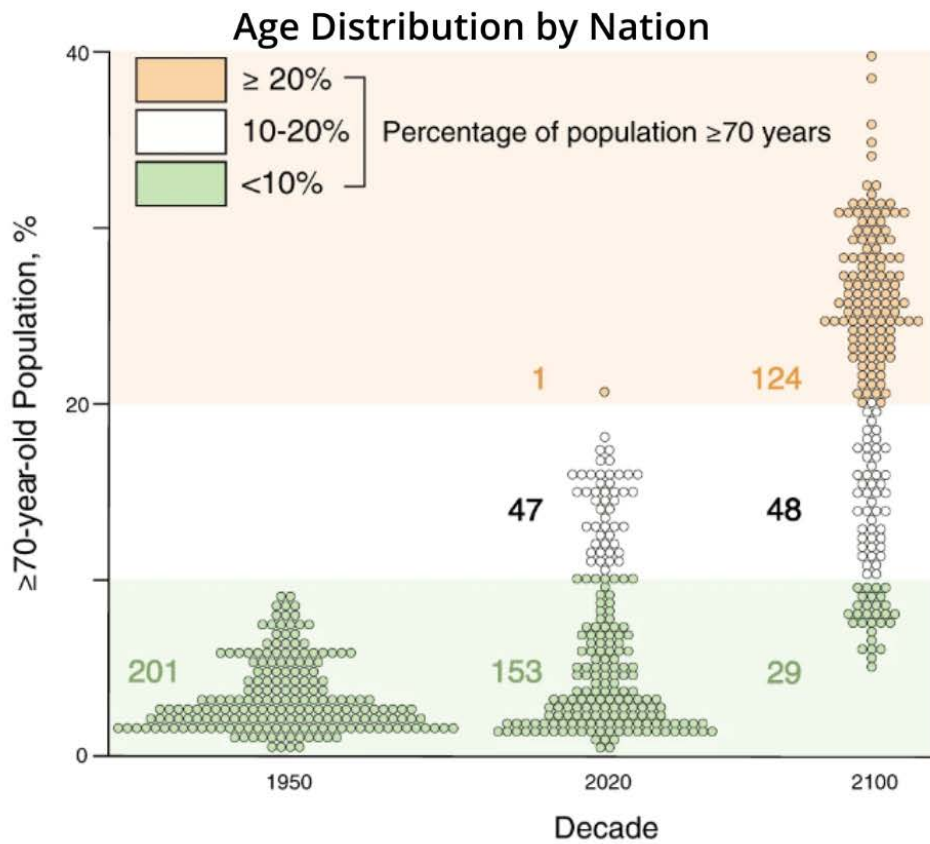
SE Vollset et al. "Fertility, mortality, migration, and population scenarios for 195 countries and territories from 2017 to 2100" *The Lancet*, July 2020.



World Population



World Population



Longevity & Demography

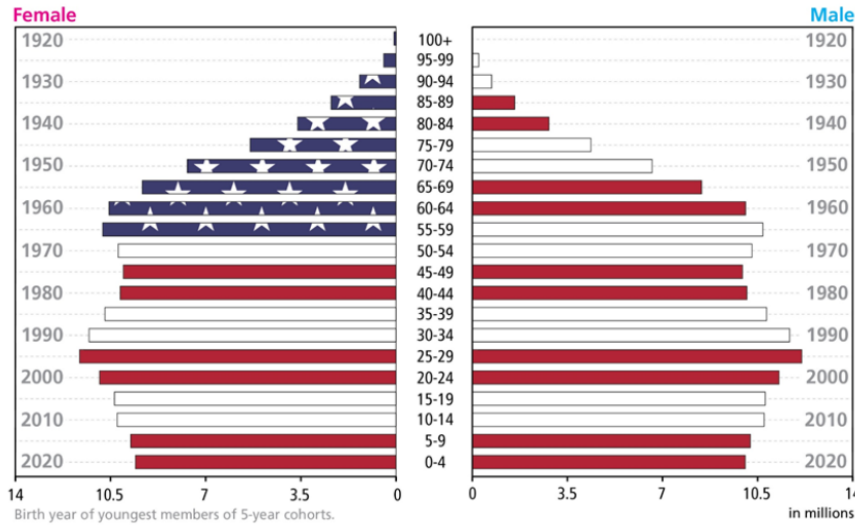
Overpopulation or Underpopulation?

United States 2020

Elderly Die...



Replacement Babies Born



Tornado Plot



Most Savings & Wealth

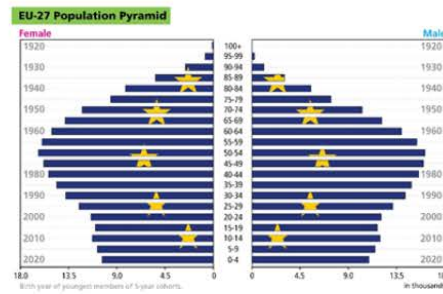
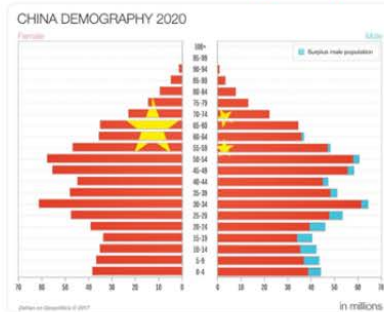


Most Wages & Purchasing

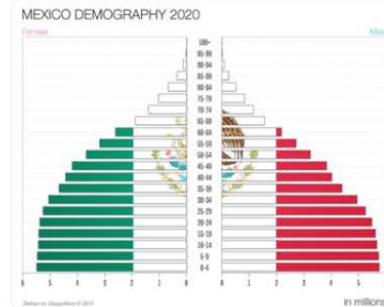
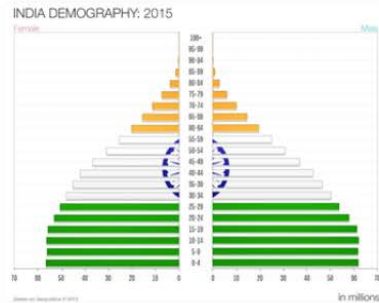
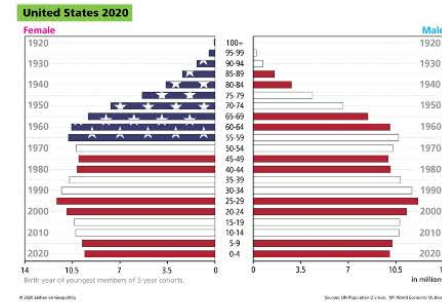
© 2020 Zeihan on Geopolitics

Sources: UN Population Division, IMF World Economic Outlook

Longevity & Demography Overpopulation or Underpopulation?



Longevity & Demography Overpopulation or Underpopulation?



Farewell to Expanding Market Economics...?

Sources:
Peter Zeihan on Geopolitics, 2013, 2020.
 UN Population Division.
 IMF World Economic Outlook.

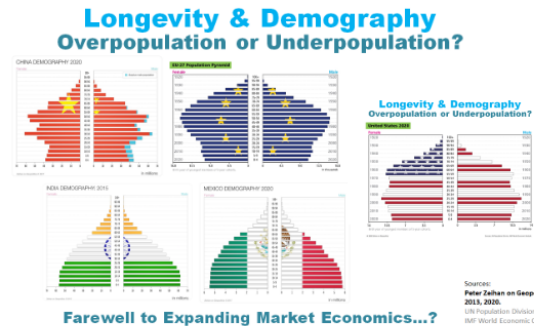
Demographics is Destiny

The problem is *not* too many people (we hope).
But *all* countries will have *many* older people
And *some* countries (without immigration) will have

- too few working age people
- too few wage earners

Markets

- Skew older
- India beats China
- Americas beat Europe



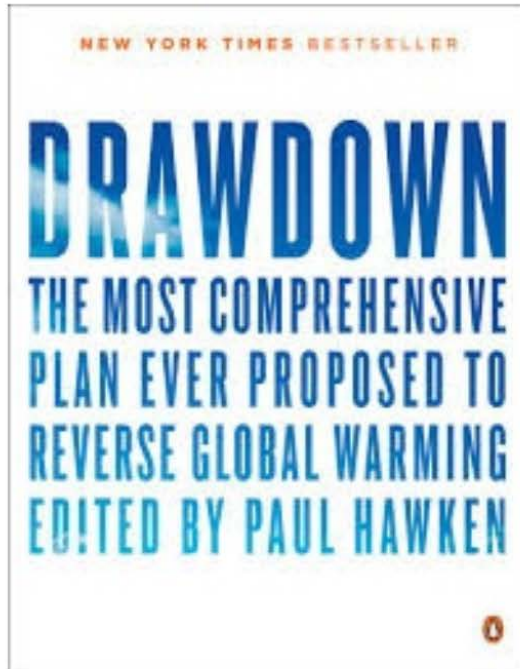
Environmental Crisis



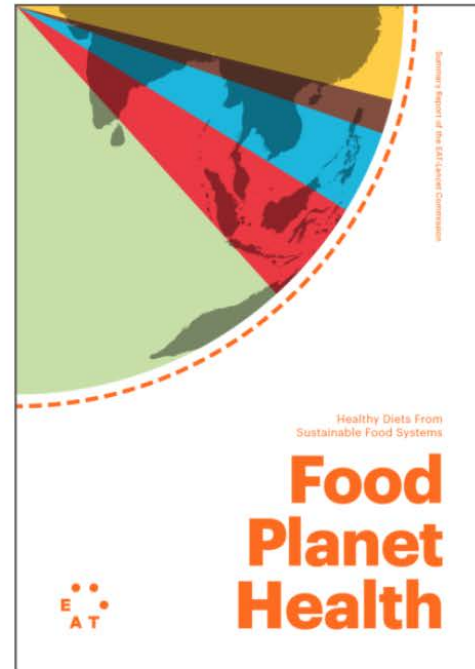
Climate Change
Ocean Acidification
Biodiversity Loss
Soil Degradation
+ Water Access

 **Food Production**

Drawdown

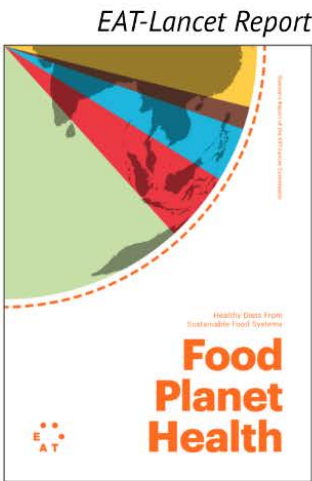


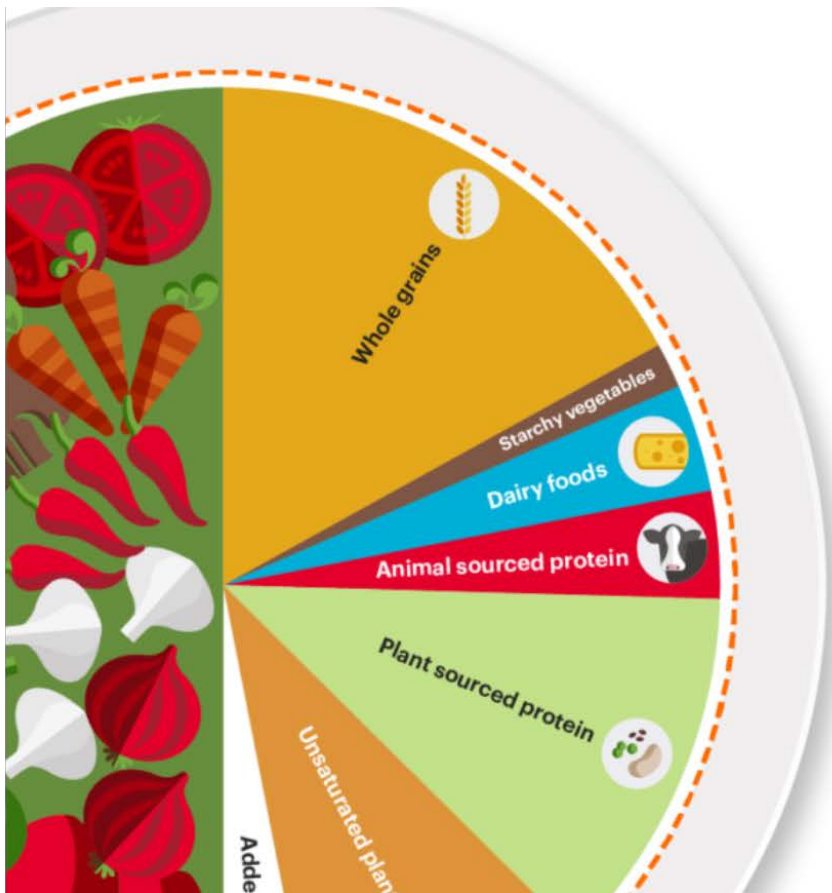
EAT-Lancet Report



Planetary Health Diet

Healthy People
Sustainable Food Production

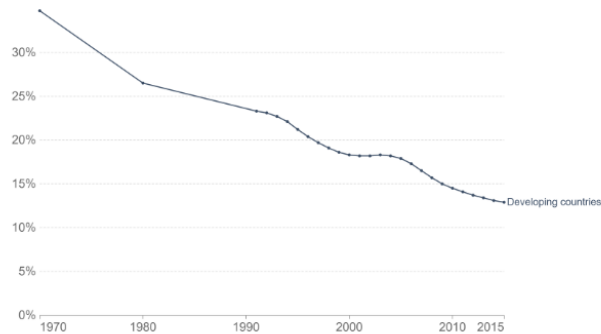




Plants ↑
Animals ↓

Scarcity versus Abundance

Undernourishment in Developing Countries, 1970 to 2015

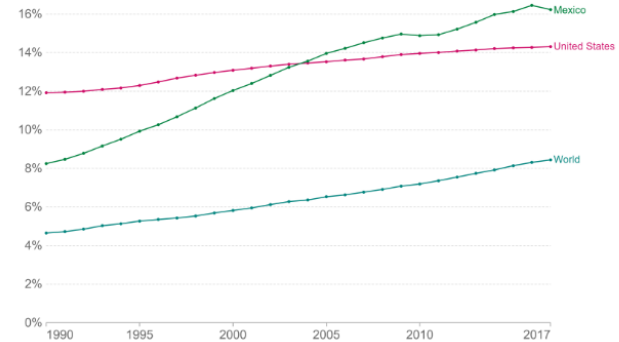


Source: FAO and ESS indicators
OurWorldInData.org/hunger-and-undernourishment/ • CC BY
Note: Data from 1990 onwards is well-established within FAO estimates. Earlier estimates are significantly more uncertain.

Wasting, Underweight, Food Insecurity are rising again...

too little

Share of Deaths from Obesity, 1990 to 2017



Source: IHME, Global Burden of Disease
OurWorldInData.org/obesity • CC BY R10z

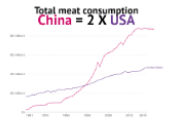
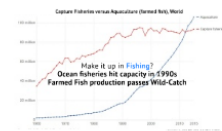
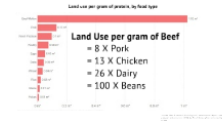
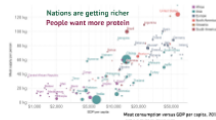
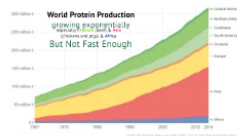
Obesity-related deaths are on the rise, in some regions more than others...

too much

access to wrong foods

World Protein Crisis

ourworldindata



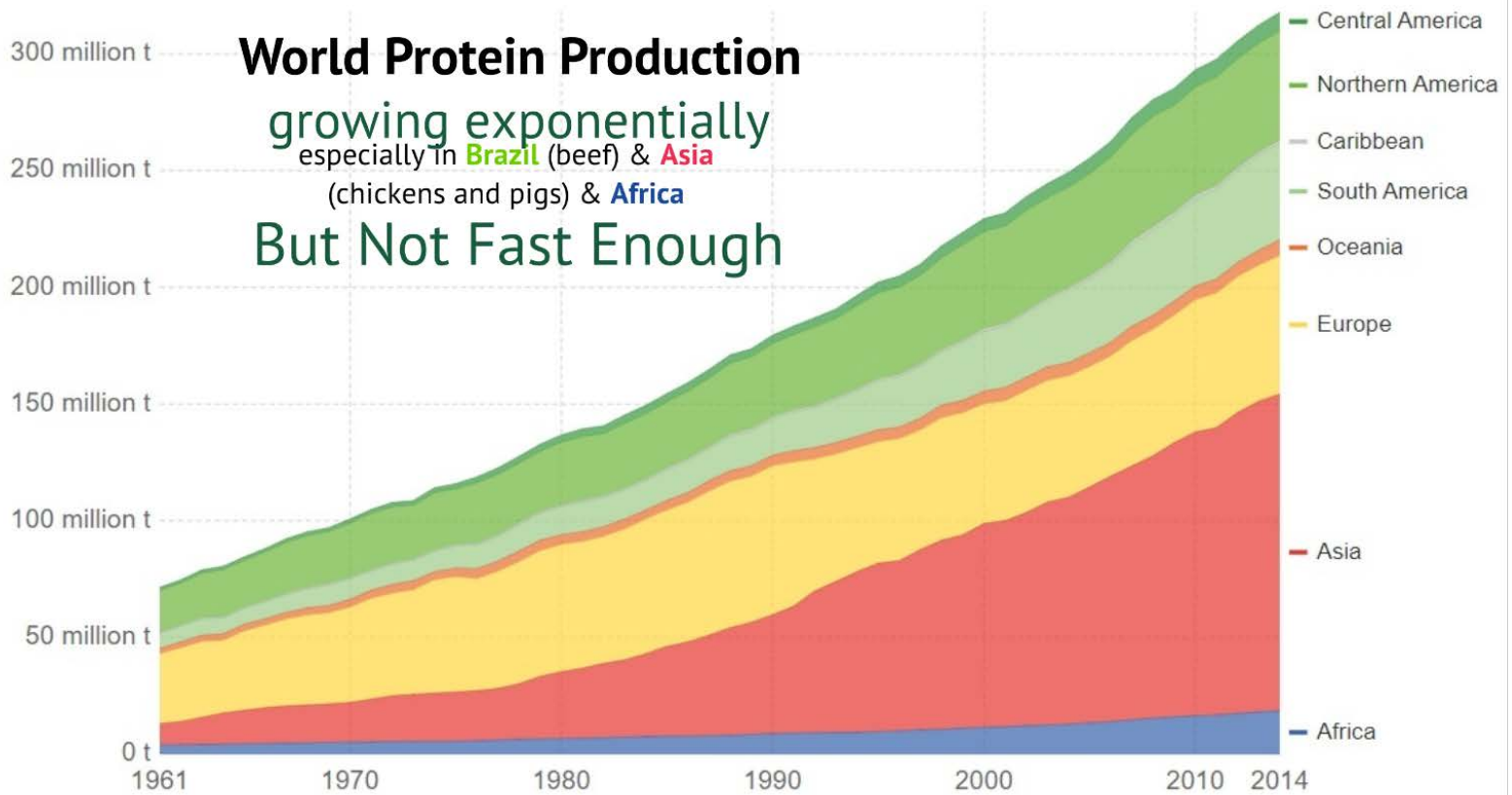
growing exponentially
 but not fast enough
 Nations are getting richer,
 people want meat,
 soy & aquaculture can't keep up,
 beef gets expensive.

World Protein Production

growing exponentially

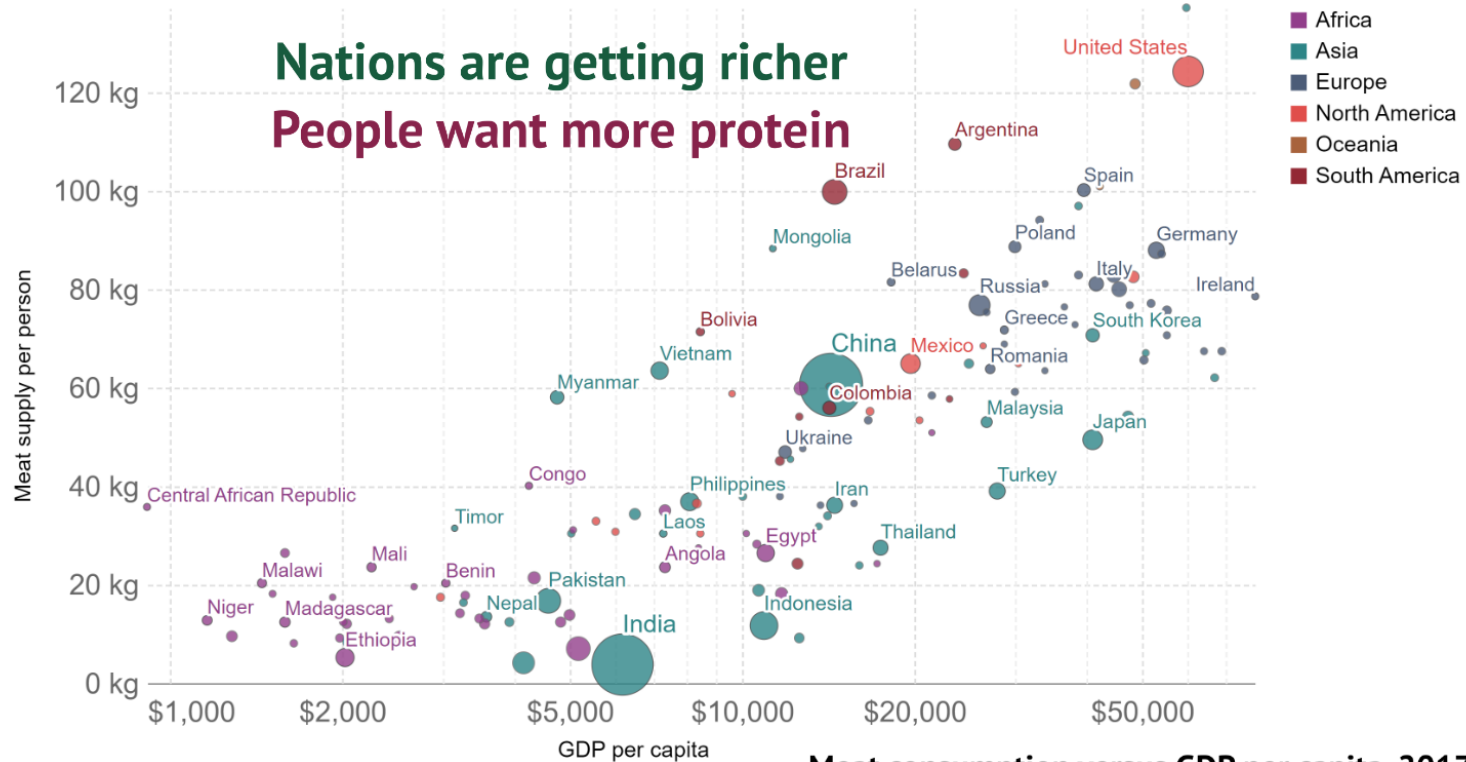
especially in **Brazil** (beef) & **Asia**
(chickens and pigs) & **Africa**

But Not Fast Enough



Source: UN Food and Agricultural Organization (FAO), ourworldindata.org/meat-production

Nations are getting richer People want more protein

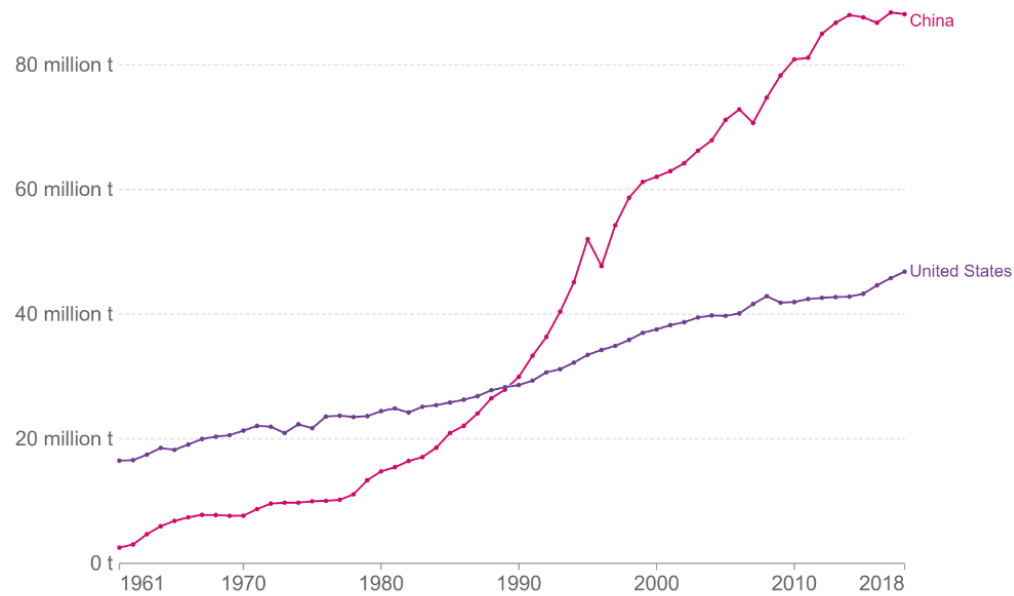


Meat consumption versus GDP per capita, 2017

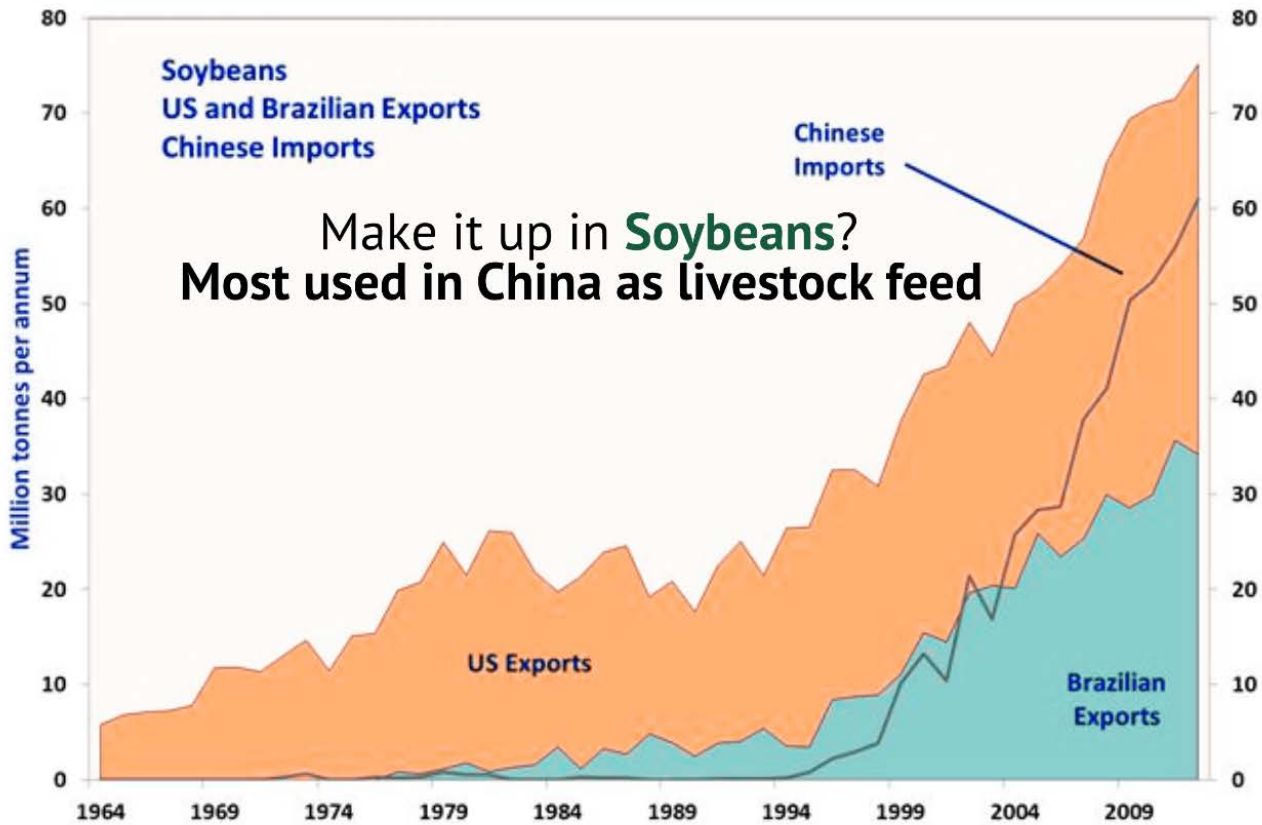
Sources: UN FAO, World Bank, World Development Indicators, OurWorldInData.org/meat-production

Total meat consumption

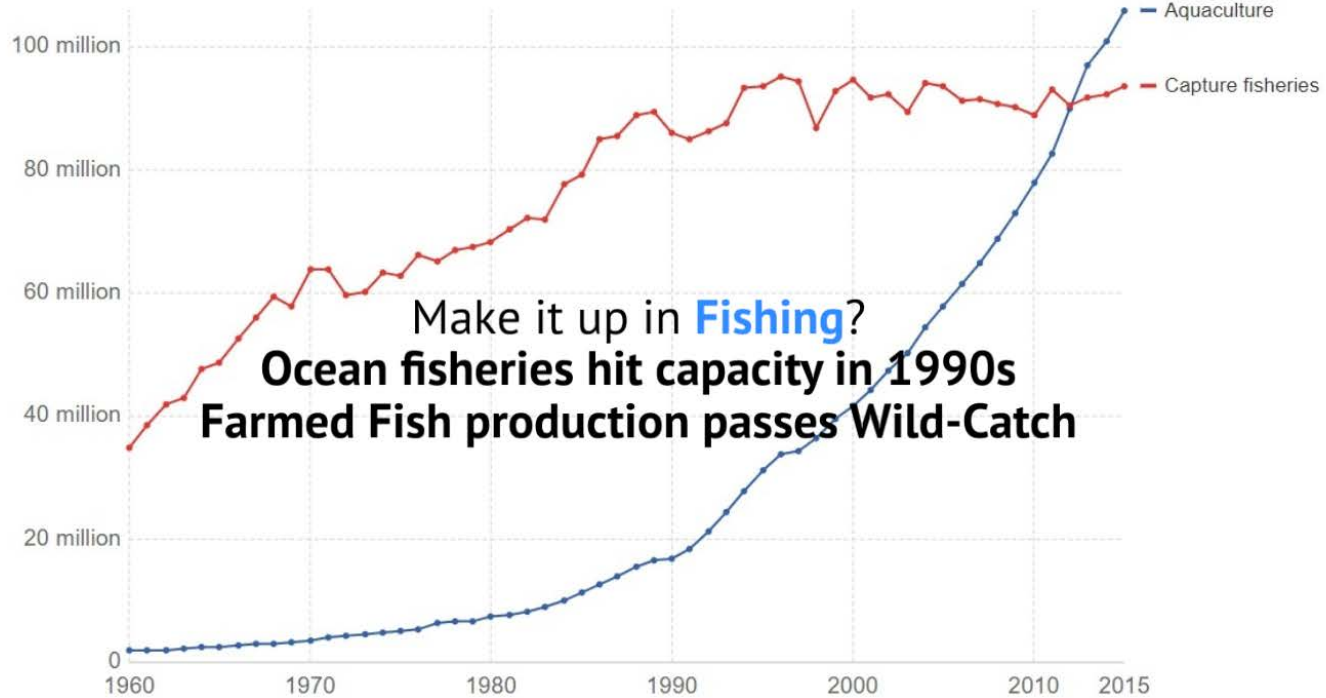
China = 2 X USA



Sources: UN FAO, World Bank, World Development Indicators, OurWorldInData.org/meat-production

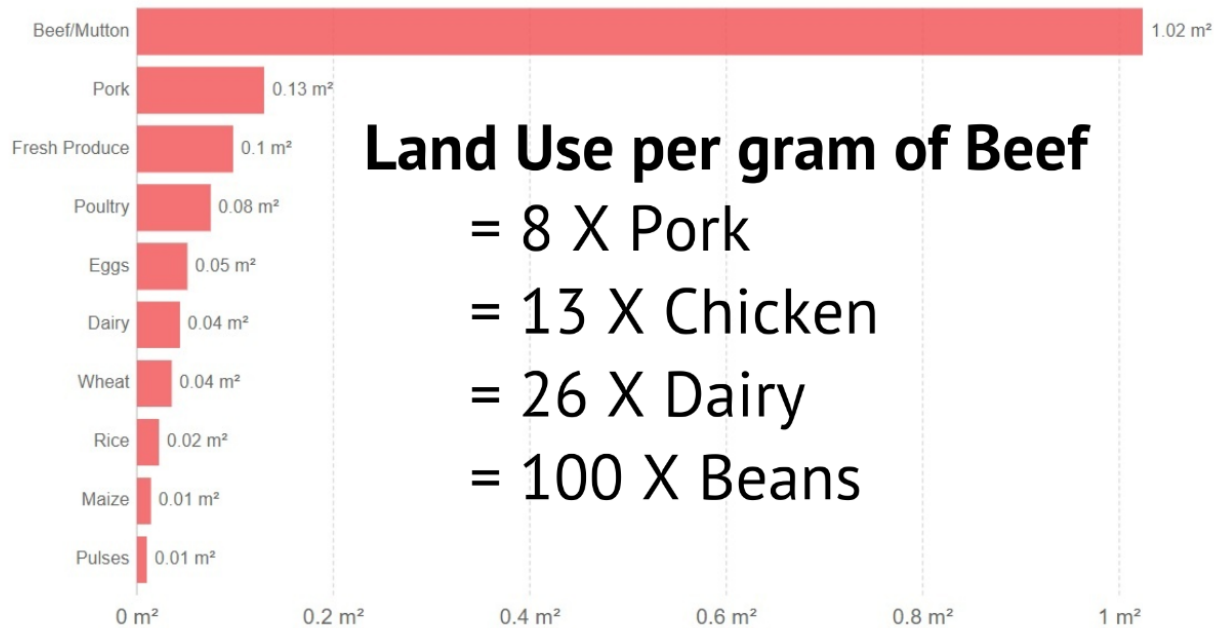


Capture Fisheries versus Aquaculture (farmed fish), World



Sources: UN FAO, World Bank, World Development Indicators, OurWorldInData.org/fish-qnd-overfishing

Land use per gram of protein, by food type



Sources: Poore & Nemecek, Reducing food's environmental impacts through producers and consumers (2018), [OurWorldInData.org/environmental-impacts-of-food](https://www.ourworldindata.org/environmental-impacts-of-food)

Global Tug of War

**Plant-Based
Diets**

**Increased
Meat Consumption**

- Health & Longevity
- Environmental Impact
- New Global Middle Class
- Perceived Status
- Food Security

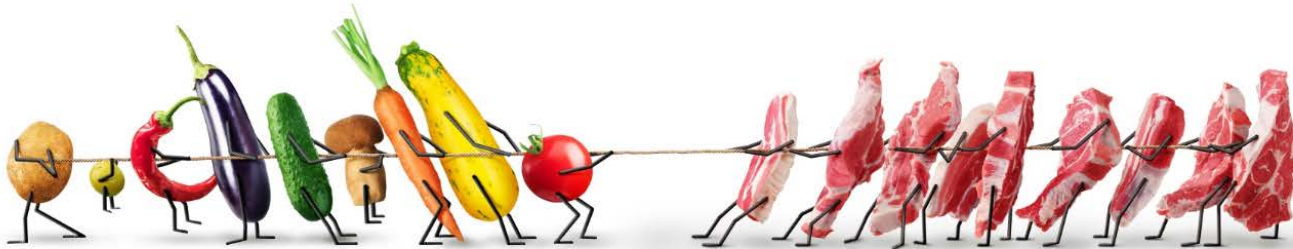


Photo 197432480. Copyright Igor Zakharevich, dreamstime.com

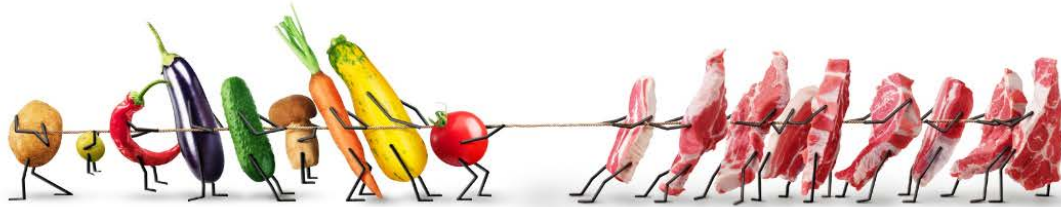


Photo 197432480 Copyright Igor Zakharevich, streamstime.com

"It is a tie!"

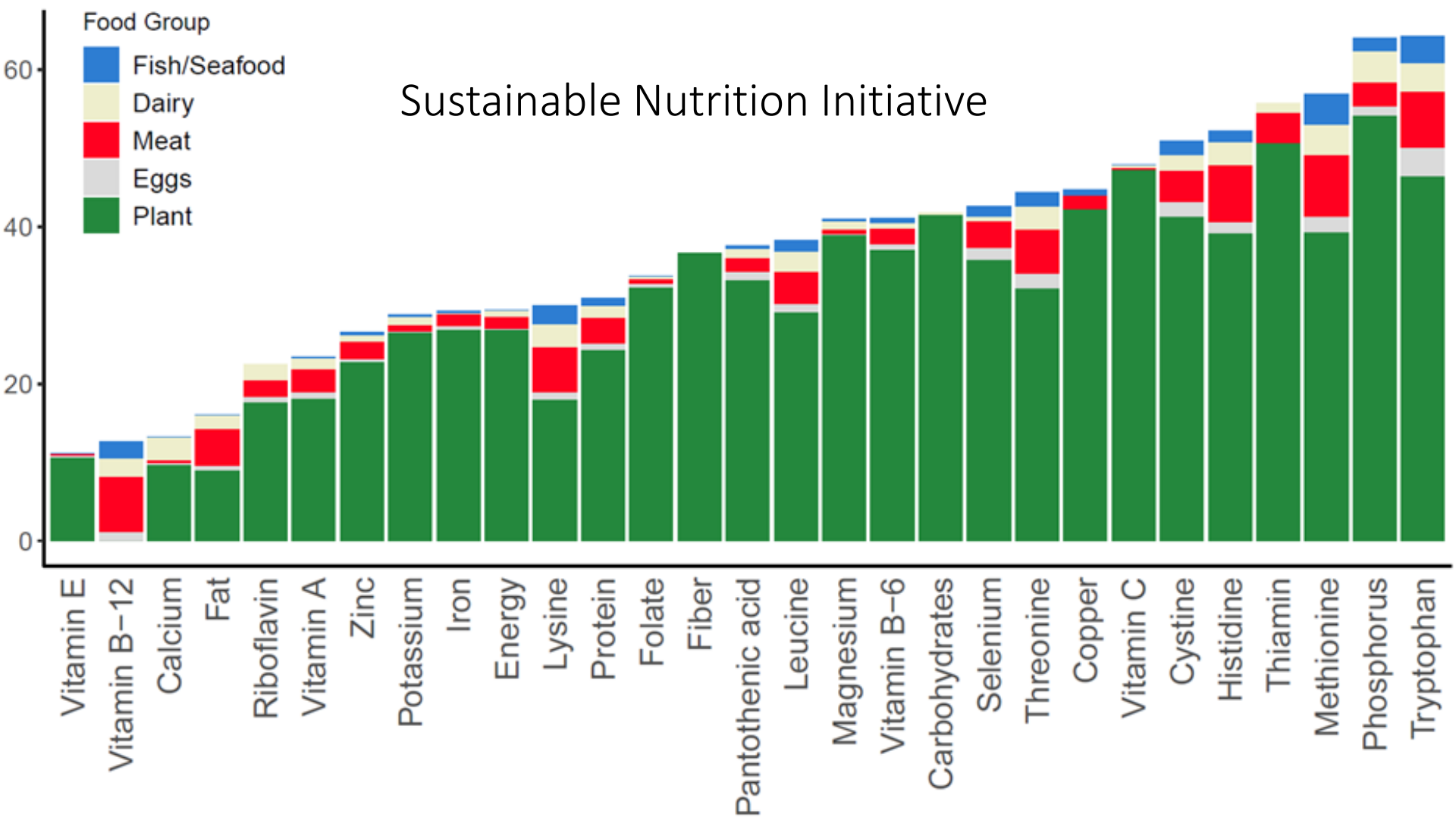


reducetarian

/ reduce-uh-tarian /

n. an individual who eats less meat (red meat, poultry, seafood) as well as less dairy and eggs, regardless of the degree or their motivation

Sustainable Nutrition Initiative



Fertilizer Crisis

Fertilizer = N P K



- transportability of natural gas for nitrogen
- differences in regional availability for NPK
- post-COVID-lockdown travel decrease
- Russia invasion of Ukraine
- export restrictions & macroeconomics

N = Nitrogen / Urea
(from Natural Gas)

Modern agriculture is the process of turning fossil fuels into food.

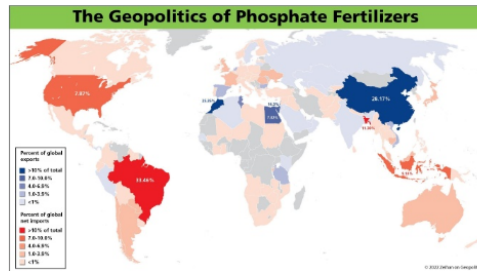


Moore's Law for Agriculture

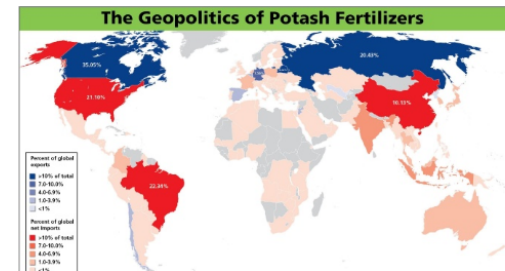
Regional Differences in Natural Gas Prices



P = Phosphorous



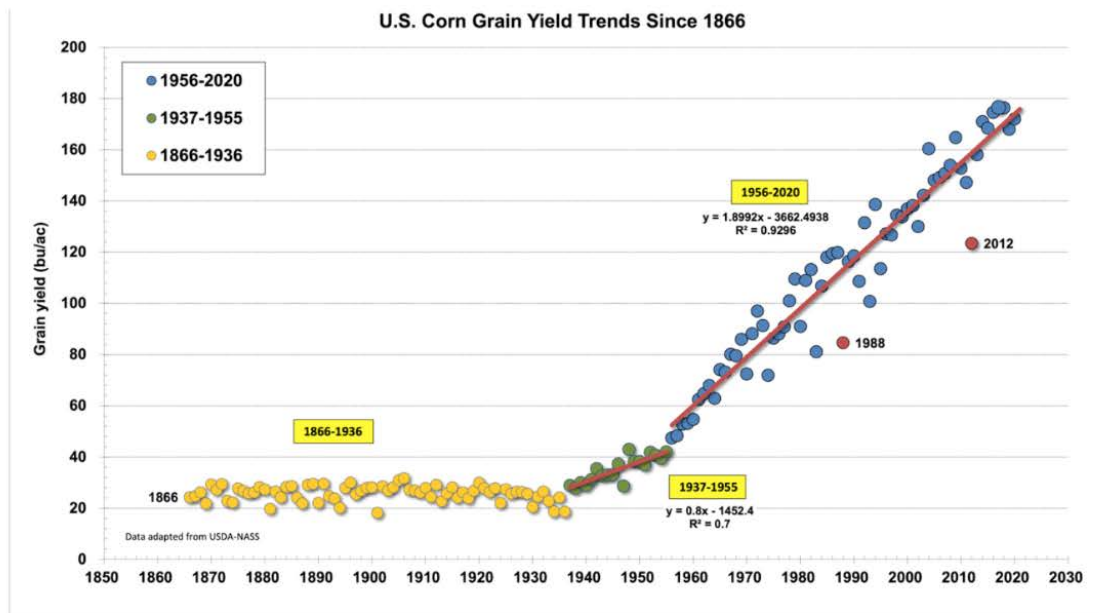
K = Potassium



Adapted from Zeihan on Geopolitics

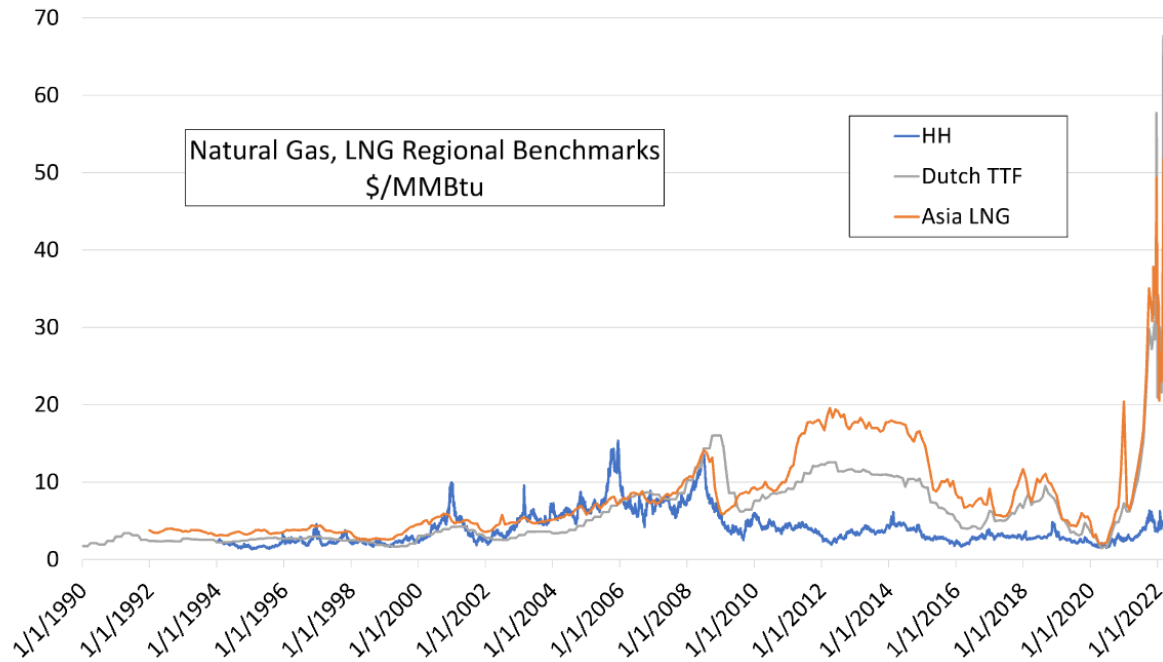
Modern agriculture is the process of turning fossil fuels into food.

Moore's Law for Agriculture



Regional Differences in Natural Gas Prices

lead to regional pressures on food production & pricing





Future of Food & Ag Technology

How New Foods?

Genetic Engineering

Cellular Agriculture *

Precision Fermentation *

Plant-Based Everything

Alternative Proteins

Why New Foods?

World Protein Crisis

Pandemics Not Just for People

World Fertilizer Crisis

How We Get Our Food

"Less Farm to Table
and more Ghost Kitchen to Couch"



Where We Get Our Food



Hyperlocal Farming Vertical Farming

Advantages
hyperorganic, hyperlocal,
pesticide & herbicide free
low transport cost
low water usage
urbanization
automatable



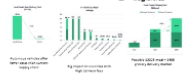
Disadvantages:
Real estate & energy economics
For now, only microgreens & specialties



Ghost Kitchens Meal Subscriptions Robot Delivery



Robot Delivery / Economics of Autonomous Logistics



How We Make Our Food

Kitchen Robots



- labor efficient
- less glamorous jobs
- robotic process automation (RPA)



Beware: remember the bread maker in the back of your cabinet!





Te Puna Whakaaronui

<https://fitforabetterworld.org.nz/partnership-groups/te-puna-whakaaronui/>



The macro environment

Climate change



Consumers



Technology



Geopolitics



Consumer needs

Markets are segmenting:



- Commodity/cost
- Health and wellness
- Natural food
- Climate conscious
- Ethical production
- Longevity seekers

Rapid change makes predicting the future impossible

Natural Food systems are facing unprecedented disruption from climate change globally.



Geopolitical change and supply chain disruption create a focus on food security.



Modern foods, produced locally sit alongside conventional products to ensure food security.

75% of global consumers are seeking customised nutritional products.



Implications for the Global Avocado Industry

Avocado - About to Embark on a Balancing Act

World Market Prospects for the Medium/Long Term (2021-2028)



Presented By:
ERIC IMBERT

CIRAD: French Agricultural Research Center for International Development

MORE VIDEOS

SITUATIONAL ANALYSIS

- An important and premium category at 3.6% of international fruit trade by volume in 2020/21 and but 8% by value
- A fast growing category with a growth rate of 12% vs. only 2.1% for the general fruit trade
- 82% of supply comes from Latin America with important volumes also from the Mediterranean Basin and Africa
- The USA is the biggest market absorbing 50% of the volume with the EU +UK absorbing another 30%. Together with Canada and Japan this makes up 90% of World trade. With the rest of the volume going to markets including Latin America, Eastern Europe, the Persian Gulf and China.
- Very strong supply growth coming
- The US has consumption per capita of 3.9kg per capita, a very strong promotional program through the HAB and strong potential to continue to grow
- The average consumption in the EU is much lower ranging between Italy and Eastern Europe .5 Kg up to France and Scandinavia at over 2 Kg with a much smaller promotional budget and some markets experiencing a lower growth rate
- Potential for oversupply
- Impact of climate change on yields/ new regulations and consumer trends focused on climate change
- Promotion will be overwhelmingly important

- Climate change
 - Water/ drought/ severe weather events
 - Heat and unseasonal cold
 - Pests and diseases
- Access to inputs and supply side cost increases: Fertiliser, pesticides, fuel, labour
- Economic and financial turmoil, lower growth, higher interest rates
- Depending on where your markets are - trade disruption
- **There is potential for significant volatility**



**WATCH THE
RISKS**

