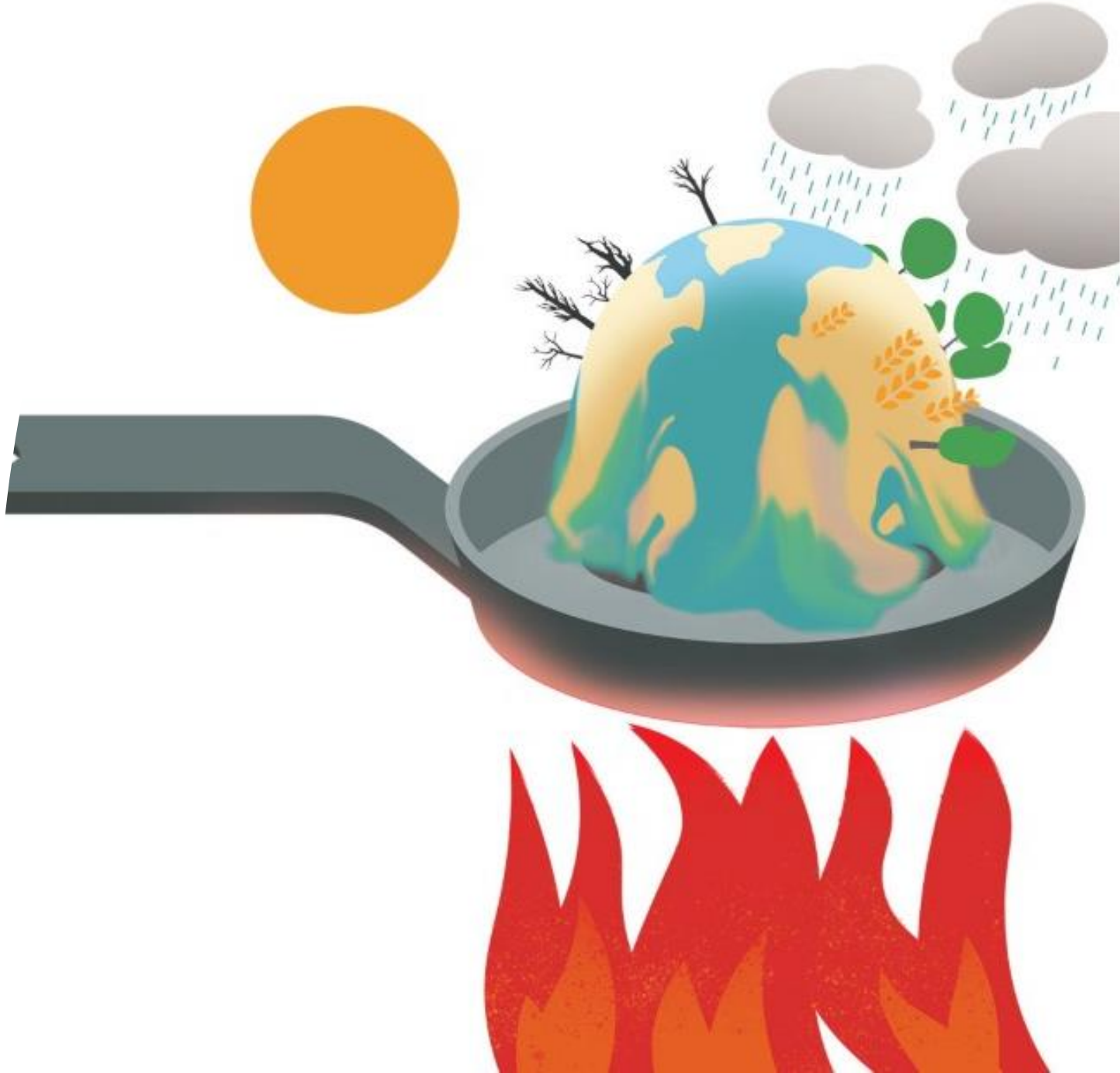
Food and Climate:

The role of schools in food system transformation

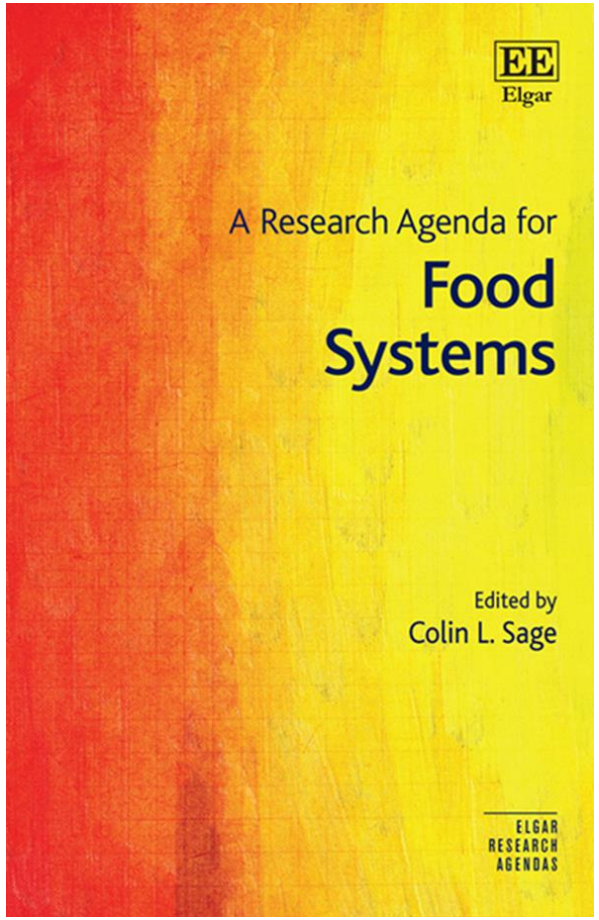


Colin Sage

c.sage@ucc.ie

Key points

1. The Food System
2. Environmental impacts of the food system
3. Climate impacts on food supply
4. Importance of food system transformation
5. Building a sustainable food system
6. How schools have a critical role to play in food system transformation



Food Systems

- A system of systems: multiple scales, interconnected, imports & exports; agriculture ⇨ consumption
- Paying attention to food *systems* reveals:
  - Shortcomings in feeding people nutritionally, sustainably & equitably;
  - Highlights resource use (water, energy) and waste streams (food, GHGe)
  - The extent of corporate power in shaping what & how we eat.
- Moving the food system toward sustainability = producing within ecological boundaries + nutritional security + social justice + resilience + agency

The Food System: an audit

- Diets link human & planetary health - but the food system threatens both
- Inadequate diets: 3b people lack access to affordable, healthy diets;
  - 850 m are severely undernourished;
  - 125m children stunted from malnutrition;
  - 2b suffer micro-nutrient deficiencies
- Diet-related disease: 2b overweight & obese; diet primary cause of ill-health & premature death (Cardio-vascular, diabetes, cancers);
  - EU countries spending €700b/yr to treat NCDs
- Globalisation & supply chain threats: chokepoints; tariffs; cyber-attacks; financialization; labour; food market volatility the new normal
- Yet c. 30% of all food is lost; EU = 132kg/person of which households = 72kg

Fundamental challenges for 21st century food systems

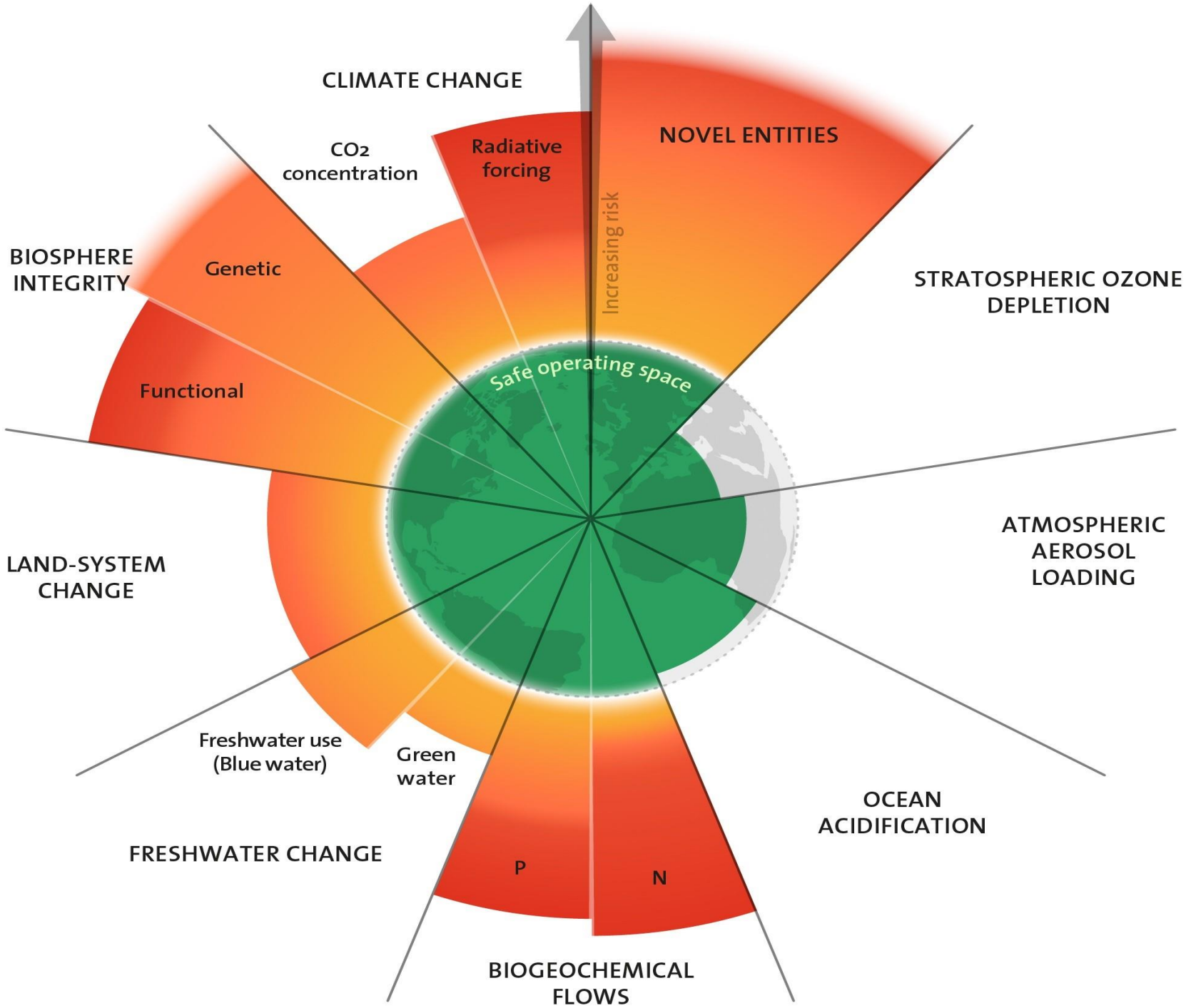
- Climate breakdown
- Energy transition
- Freshwater stocks, quality
- Land use & space for nature
- Biodiversity (habitats/species)
- Biosecurity (zoonotic spill-overs)
- Waste streams
- Globalised sourcing
- Population (9b+ 2050)
- Urbanisation
- Affluence (MICs +)
- Inequality
- Nutrition transition
- Dietary health
- Labour practices (work)
- Digitalisation / AI

Environmental impacts of the food system

- All stages of the food system contribute GHG but agriculture largest share
- Land use, land use change, forestry (LULUCF): releases CO_2; ↓ carbon sequestration capacity;
- Key driver of biodiversity loss; habitat destruction, species extinction
- Agriculture accounts for 70%+ of freshwater withdrawals; contamination of surface & groundwater resources (eutrophication);
- Use of synthetic fertilisers (N, P, K): in production & application releases CO_2, Nitrous oxide (N_2O);
- Rearing of ruminants & production of paddy rice: methane (CH_4);
- Food processing and supply chain (fossil fuels): CO_2
- Global food system emissions: 30% of total anthropogenic greenhouse gas emissions: Livestock 18% of total GHGe

The Planetary Boundaries Framework

(Richardson et al 2023)



Consequences of climate breakdown

- Enhanced greenhouse effect: atmospheric warming
- Intensification of water cycle: warmer air holds more moisture

➔ More extreme precipitation events: flooding, but also drought

  - Will affect regions dependent on rain-fed agriculture
  - Will create more environmental refugees fleeing hunger

- Wildfires: incidence & severity increasing (USA, Australia, Siberia…)

➔Melting of polar & glacier ice sheets: tipping points

➔Sea level rise (50cm by 2050; 2m+ by 2099?). Sea defences or retreat? Future of small island states?

➔Changes in oceanic circulation patterns eg AMOC

- Warming of oceans ➔ greater energy in hurricanes, storms
- Impact on biodiversity: native species out-competed

Main impacts of climate on agriculture

- Higher temperatures → greater heat stress on people, crops, animals
  - If too hot to work in fields what happens to local food security?
  - Some sectors more vulnerable than others eg viticulture
  - New pests & disease ↑burden of human & animal ill-health
- Changing precipitation patterns disrupt trad cycles of rain-fed farming
  - ↑ variability in timing; ↓rainfall per event; ↑intensity → ↑runoff & erosion
  - warming ↑evapotranspiration ⇨ ↓soil moisture
- ↑ atmospheric concentration of CO_2 encourages plant growth but reduces plant protein (↓ 20%) & micronutrient content
- Justification for moving to a more sustainable & *resilient* agri-food system with reduced emissions, capable of adaptation and mitigation.

“The coldest growing seasons of the future will be hotter than the hottest of the past. Is agriculture adapted to that?”

Cary Fowler

Co-Founder Svalbard Global Seed Vault
U.S. Special Envoy for Global Food Security.

Importance of food system transformation

“even if all non–food system GHG emissions were immediately stopped and were net zero from 2020 to 2100, emissions from the food system alone would likely exceed the 1.5°C emissions limit from 2051..” (Clark et al 2020).

◆ Necessity to rethink consumption (dietary practice)

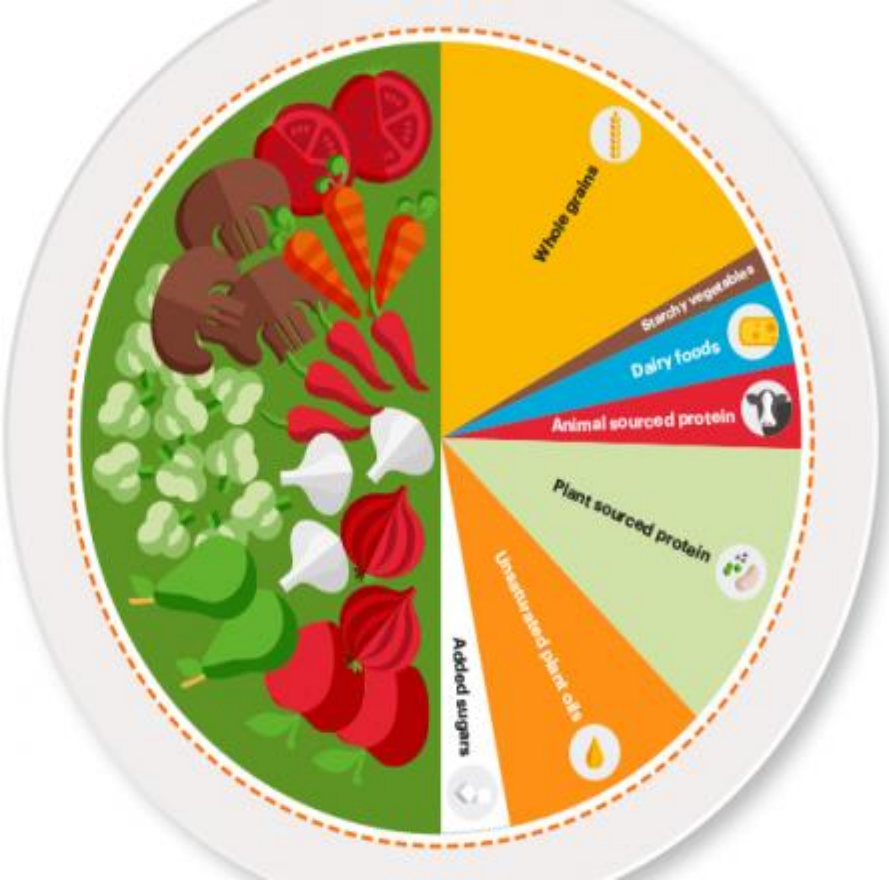
A sustainable food system is a food system that ensures food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition of future generations are not compromised.

HLPE, 2014. Food losses and waste in the context of sustainable food systems. A report by the High- Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome

Agriculture, Diet, Planetary & Human Health

- Livestock responsible for 37% of anthropogenic methane, 65% of nitrous oxide - powerful short-lived climate pollutants (85x & 300x CO_2) AND
- Livestock occupy 75% of all agricultural land, 30% of the Earth's total land surface. ⅓ of world's arable land is used to grow cattle feed.
- Concentrated feeding operations generate big pollution problems
- Extensive use of antibiotics (eg tetracycline) ⇨Anti-microbial resistance
- Diets high in meat associated with human ill-health (CVD, cancer)
- Food ⇔ Health nexus: complex, multi-dimensional & challenges 'business as usual' production AND consumption practices

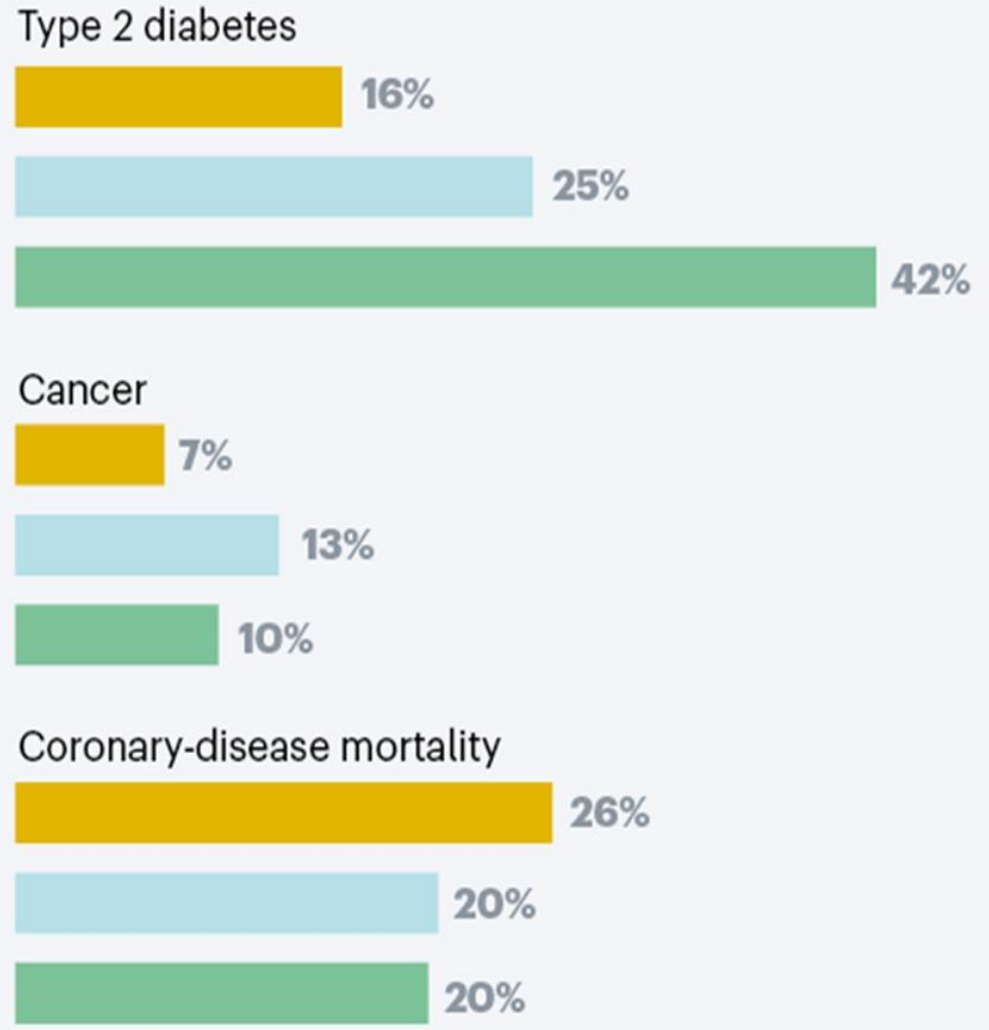
The Planetary Health Diet



Health risks

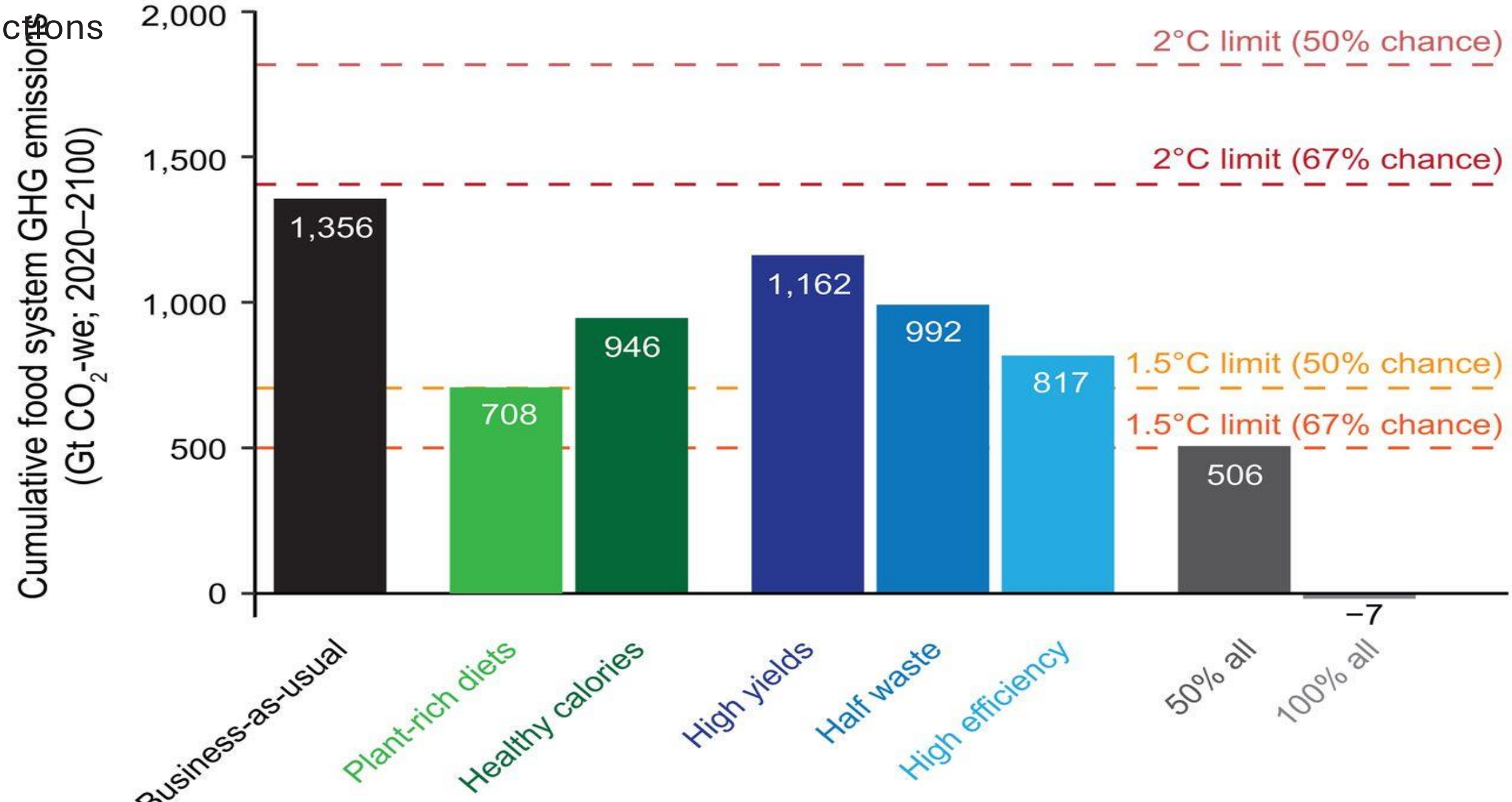
The planetary health diet could save around 11 million lives, according to its designers. Similarly, a 2014 analysis showed that diets that are lower in fat, meat and sugar reduce the relative risk of several health conditions when compared with an omnivorous diet such as the global average (above).

- Mediterranean
- Pescatarian
- Vegetarian



EAT-Lancet 2019

Projected cumulative 2020 to 2100 GHG emissions solely from the global food system for business-as-usual emissions and for various food system changes that lead to emission reductions



Sustainable diets

- Food & nutritional security for present & future generations is not about more production without fundamental changes to consumption
- Dietary practices have undergone homogenisation over past 70 years: *Meatification* & ultra-processed foodstuffs; loss of plant diversity
- Accompanied by elevated incidence of cancer, CVD, type-2 diabetes, AMR, BMI. 70% of European health budget spent on treating dietary ill-health.
- Overwhelming evidence that plant-based diets are healthier & more ecologically sound (climate, water, land use, biodiversity etc)
- The expected 51% increase in food-associated GHG emissions by 2050 under BAU would be reduced to a 7% increase if WHO guideline diets were adopted globally

Food system transformation

- Rising proportion of global population living in cities (70% by 2050)
- Dietary transitions most rapidly underway in cities (LMICs)
- Synergies of circular economy: reduce waste streams, nutrient recycling; greening urban environment (air quality, cooling, storm water drainage). Food + local ecology = win-win.
- Developing a municipal agenda connecting health, transport, urban regeneration etc. Climate proofing cities involves food.
- Growing international network of sustainable food cities (MUFPP, EU)
- Spread of food policy councils & civic partnerships bringing together local interests advocating for sustainable food (& climate mitigation)
- Cork Food Policy Council

Cork Food Policy Council

- ‘Feed the city’ event 2014: 5,000 bowls from 1t of surplus vegetables
- Making food growing an inclusive & visible aspect of Cork city:
- From guerilla planting on the streets to 25 community gardens; college rooftop bee hives; a garden for asylum seekers;
- Annual Sustainable Food Awards: c.40 [schools, businesses, CSOs]/year
- The Food Hub project: repurposing a dairy farm with small organic producers
- Collaborating with Cork City Council to develop a comprehensive food policy

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PRESENTS

GROWING URBAN AGRICULTURE: OPPORTUNITIES FOR CORK

COULD CORK BE A GREENER, HEALTHIER AND MORE ABUNDANT FOOD PRODUCING CITY?

A NETWORK MEETING FOR THOSE INTERESTED IN DEVELOPING FOOD GROWING ACROSS THE CITY AND THE SURROUNDING AREAS. THE PURPOSE IS TO SHARE IDEAS, IDENTIFY OBSTACLES, AND TO DESIGN CREATIVE SOLUTIONS.

Friday, November 13th at Camden Palace Hotel, Camden Quay, Cork

2.00pm - 6.00pm

This is a free event and refreshments will be provided.

Facilitator: Veronica Barry, Birmingham City University. Veronica has over twenty years experience in developing urban agriculture and food growing initiatives, and is currently studying for a PhD.

(with thanks to COST Action Urban Agriculture Europe)

RSVP by November 7th to Tara at tara.kenny@umail.ucc.ie

www.corkfoodpolicycouncil.com


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LORD MAYOR
CLLR. SEAN MARTIN

Food as basis for climate action in schools

- No single blueprint: a strategy must evolve out of local physical & human resources
- Senior management must be aligned with a sustainability / climate action strategy as a ‘whole-of-school’ approach
- Agreeing upon a common ethos must consider the following:
- How are children fed in school? (lunch, breakfast, vending machines)
  - Provision of cheap calories or vital dietary support? Options for improvement?
- What possibilities for bringing food into the curriculum?
  - And not silo-ed into geography but interconnected across subjects
- Opportunities for developing life skills outside the classroom
  - Cooking, gardening, practical problem-solving in teams

Food and Schools: Consumption

- School Lunch: A contested meal. Price vs nutrition. Entitlements vs stigma. A world of inequality requires sensitivity but huge opportunity
- Procurement (SFSC, organic); on-site preparation vs dark kitchens?
- Labour (parental volunteers? ‘dinner ladies’). Encouragement, support
- Vending machines: Ultra processed foods. Water for soda. Financials?
- Food and plastic waste streams need to be minimised/eliminated.
- Vegetarian options. Meatless Mondays.
- Networking schools for procurement options & support

Food and Schools: the Curriculum

- ‘Food studies’ in a crowded STEM-heavy curriculum requires a ‘whole-of-school’ approach: critical role of leadership & team building.
- Climate & sustainability to be woven across the curriculum
- Food and environment: Geography
  - Opportunities for learning outside of the classroom: growing spaces on school grounds (fruit trees, grow boxes, polytunnels)
  - Materiality of food; collecting & crafting artefacts, foraging and tasting
  - Connecting with the seasons, pollinators, soil. Consequences of climate Δ
- Cultural dimensions of growing & eating – non-western societies
  - Developing alternative narratives: food as cultural practice
  - Seeds: learning about heritage varieties & their role in changing environement

Food and Schools: Skills

- With many families eating for convenience / time-saving / cheaply, it is necessary to enable students acquire life skills eg food prep from scratch
- Gardening for connecting with nature: empathy for natural world; insights into biodiversity
- Learning by doing: builds confidence, sense of agency, team work
  - Rainwater harvesting; composting of food waste; building nesting boxes, bee hotels (pollinators); practical botany; digital apps using sensors.
- Communication skills: making videos, design & presentation of plans, results; speaking in front of others;
- Student Council: a forum for consultation with responsibilities

Conclusions

- Climate disruption will affect food production & those regions that depend most upon agriculture, contributed least to the problem & have fewest alternative sources of income will suffer most
- Need to ensure a world of 9.5b will have food security with zero net carbon emissions. Rich countries have responsibility to act now.
- Solutions that are equitable, socially just & deliver for future generations require holistic thinking to build adaptive capacity & enhance resilience.
  - Young people must be included in devising & executing solutions.
- Schools are a vital crucible for engaging climate action & food is the most promising portal into lifestyle change
- “Start where you are. Use what you have. Do what you can.” (Arthur Ashe)

Reading

- Sage, C. (2022) A Research Agenda for Food Systems. Ch1 and Ch2 available here: https://www.elgaronline.com/edcollbook/book/9781800880269/9781800880269.xml
- Chapter 3 'The food system, planetary boundaries and eating for 1.5°C' here: https://cora.ucc.ie/items/22b1a160-a2df-4b2d-96f1-16cc00f857fb
- Richardson, K. et al., 2023 Earth beyond six of nine planetary boundaries. Science Advances 9, eadh2458.
- Sage et al 2020 Grassroots initiatives in food system transformation https://www.taylorfrancis.com/books/edit/10.4324/9781003131304/food-system-transformations-cordula-kropp-irene-antoni-komar-colin-sage