The Future of Organics?
and
Back to the Soil

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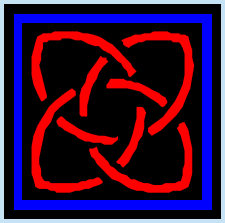

Merfield Agronomy Ltd.
Permanent Agriculture and Horticulture
Science, Consulting and Extension
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Outline

This is not a prediction

The three stages of organic history

The multiplication of ag sustainability standards

The ossification of organic standards

The march of agroecology

How organics can change the world

The new soil health paradigm

The future of organics?

This presentation is **not** a prediction

"Prediction is very difficult, especially if it's about the future"

Niels Bohr

This presentation is a look at the changing context of organic agriculture

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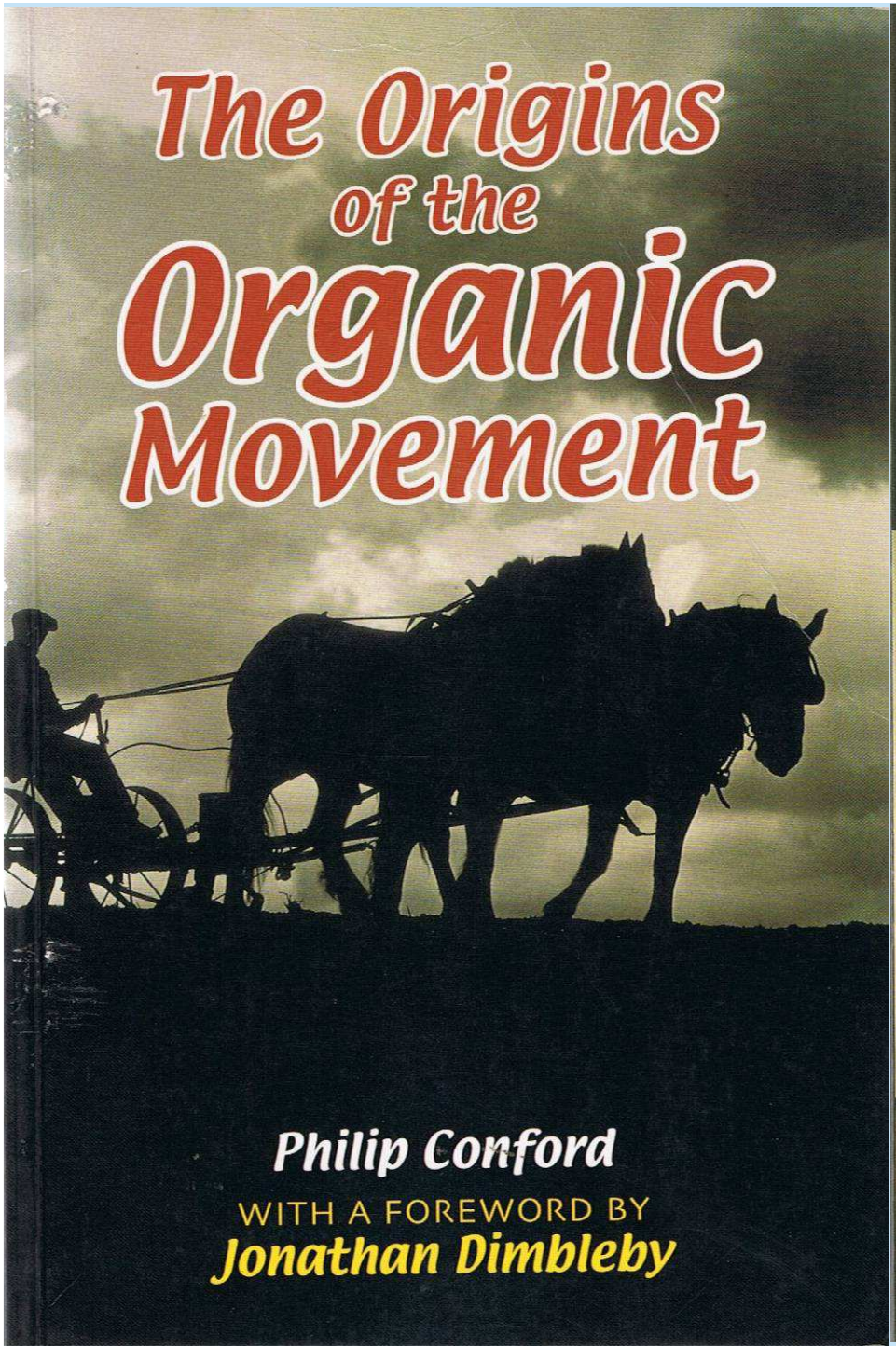
Organic history in one page

Organic history is divided into three periods

V1 – 1920-1950 – Soil & Health

V2 – 1960-2020s – Anti: chem pesticides and GE

V3 – 2015- Sustainable farming & consumption

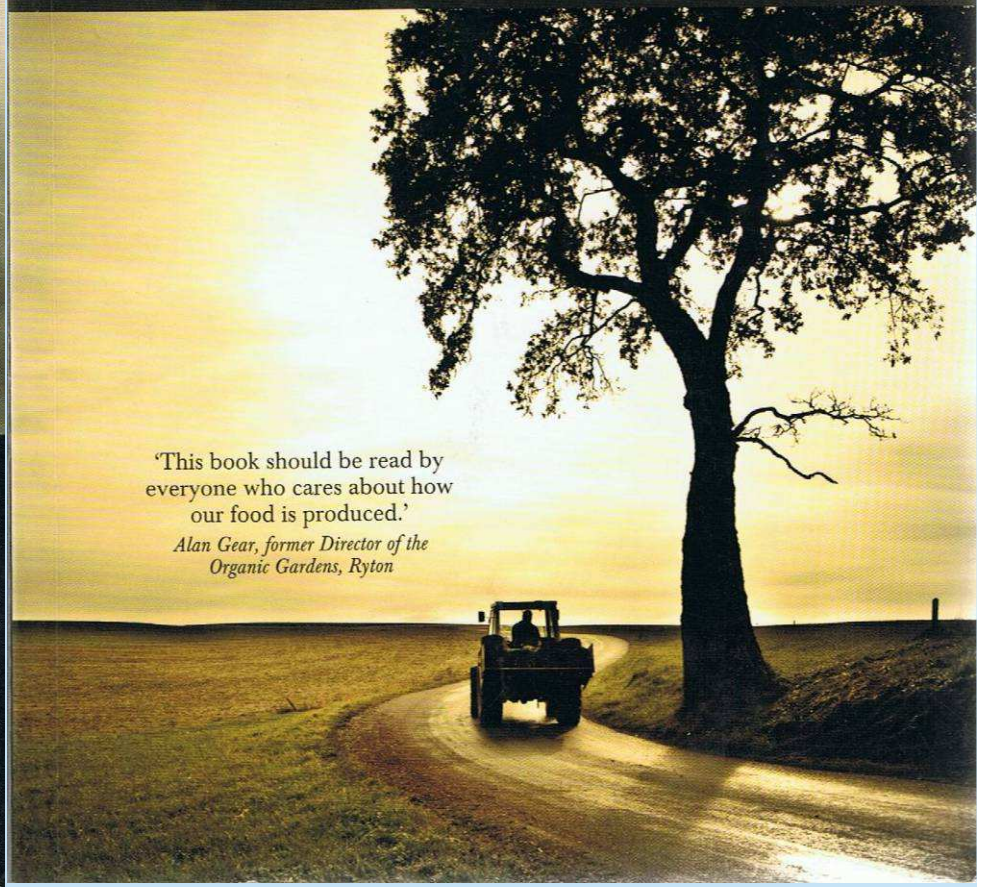


The Development *of the* Organic Network

Linking People and Themes, 1945–95

PHILIP CONFORD

Foreword by Jonathon Porritt



Organic 3.0 Strategy

The strategy for Organic 3.0 includes six main features, consistently promoting the diversity that lies at the heart of organic and recognizing there is no 'one-size-fits -all' approach:

- A culture of innovation
- Continuous improvement toward best practice
- Diversity of ways to ensure transparent integrity
- Inclusion of wider sustainability interests
- Empowerment from the farm to the final consumer
- True value and cost accounting
- https://www.ifoam.bio/why-organic/organic-landmarks/organic-30-truly-sustainable

3.0 missing in action?

Where is Organics 3.0?

Trapped behind standards 2.0?

- First standards 1970s
- Rapid expansion though 70s and 80s
- Reached maturity in the 90s – banning of GE at IFOAM GA at Lincoln
- Only minor tweaks and fixes since then
  - Last revision of BioGro's standards in 2009

Over in conventional farming

1990s

- Kiwigreen
- SWNZ -Sustainable Winegrowing New Zealand
- IPM in pipfruit
- NZ GAP

These standards have been revised multiple times since the 1990s, often substantially

Organic standards only limited improvements

Manaaki Whenua
Landcare Research

New Zealand's monitoring frameworks for agricultural sustainability and assurance

Prepared for:
Our Land and Water National Science Challenge & the NEXT Foundation

August 2021

Other sustainability frameworks

Calm The Farm

DairyNZ: Dairy Tomorrow

Savory Institute: Ecological Outcome Verification

New Zealand Farm Assurance Programme (NZFAP) and NZFAP Plus

New Zealand Merino Company: ZQ and ZQRX

NZ Pipfruit Integrated Fruit Production (NZP-IFP)

New Zealand Good Agricultural Practice (NZGAP)

Regenerative Agriculture Network

Sustainable Wine New Zealand (SWNZ)

Synlait Milk ‘Lead with Pride’

Etc.

Regenerative Organic Certified (ROC)

Initiated by Rodale

Nothing to do with Regenerative Agriculture

Extension to organics – filling the gaps in standards

Three sections (2020 version)

- **Soil health** & land management
- Animal welfare
- Farmer & worker fairness

FAO's SAFA vs organic standards

Sustainability Assessment of Food and Agriculture Systems

- The mother of all ag sustainability assessment frameworks

As part of the NZ Sustainability Dashboard project compare SAFA and organic standards were compared

The results were not kind on organics…

Theme and Dimension level average score		
C1 Investment	21%	
C2 Vulnerability	8%	
C3 Product Quality and Information	93%	
C4 Local Economy	0%	**31%**
E1 Atmosphere	33%	
E2 Water	21%	
E3 Land	72%	
E4 Biodiversity	38%	
E5 Materials and Energy	8%	
E6 Animal Welfare	100%	**45%**
G1 Corporate Ethics	33%	
G2 Accountability	67%	
G3 Participation	17%	
G4 Rule of Law	35%	
G5 Holistic Management	25%	**35%**
S1 Decent Livelihood	0%	
S2 Fair Trading Practices	0%	
S3 Labour Rights	88%	
S4 Equity	25%	
S5 Human Safety and Health	44%	
S6 Cultural Diversity	25%	**30%**
Grand average		**35%**

SAFA compared to COROS

COROS Level 1 description	
1. Organic Management is long-term, ecological and systems-based.	84%
2. Soil fertility is long-term and biologically-based.	63%
3. Synthetic inputs are avoided/minimized.	66%
4. Pollution and degradation are minimized.	93%
5. Unproven, unnatural and harmful technologies are excluded from the system.	22%
6. Animals are treated responsibly.	88%
7.The natural health of animals is promoted and maintained.	84%
8. Organic integrity is maintained throughout the supply chain.	n/a
9. Organic identity is provided in the supply chain.	n/a
10. Fairness, respect and justice	100%
Grand Average	**75%**

The ossification of standards

Organic standards, having once been world leading, are increasingly falling behind mainstream sustainability assessment systems

The problem is standards 2.0 is trapped by govt to govt agreements and IFOAM's OGS

- Makes it very difficult to make major changes to standards

Standards 3.0

Why not just write Organic Standards 3.0 from scratch?

What would they look like?

Agroecology

A thing in itself and the umbrella term for the alternative / sustainable ag's

- Organic
- Regen
- Permaculture
- Agroforestry
- Etc.

Agroecology

V1 Originated in the 1920s as a science studying farming through an ecological lens

V2 Took off in the 1960s, morphing into ‘how to do agriculture’ with an ecological mindset

V3 Final expansion in the 1980s into the whole food system - production and consumption - and became a social and political movement.

The FAO and EU and agroecology

The world's two largest supranational bureaucracies

- Require a huge amount of evidence and debate to make decisions
- Slow and ponderous but very deliberate

The FAO and EU and agroecology

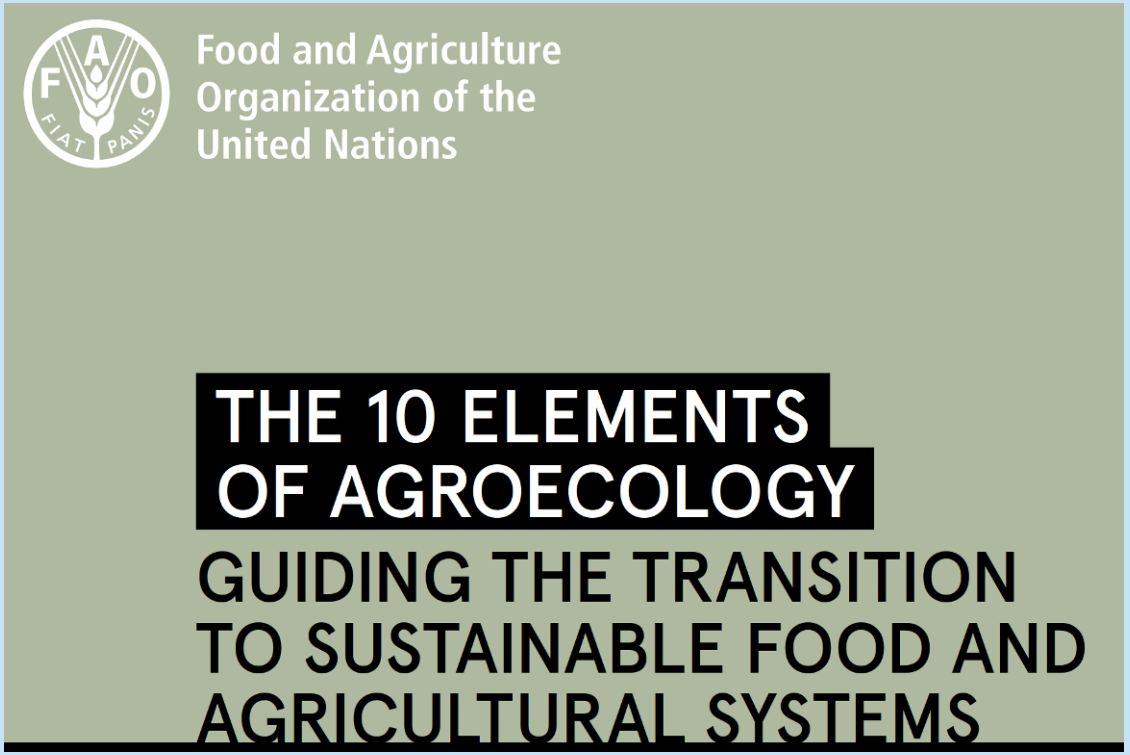
The FAO was set up in the 1960s as the global champion of intensive agriculture and the green revolution

The EU established the CAP (Common Agricultural Policy) in the 1960s to maximise food production

- By the 1980-90s ‘wine lakes’ and ‘butter mountains’

The FAO and EU and agroecology

Over the last three decades both the FAO and EU have moved from championing intensive agriculture to championing agroecology



European Commission

CORDIS

Results Pack on agroecology

Transitioning toward sustainable, climate and ecosystem-friendly farming and food systems

Research and Innovation

Agroecology

Increasingly becoming mainstream

Clearly still lots of holdouts – intensive ag won't disappear anytime soon

A Lighter Touch

NZ Hort (most) and FAR $27 million 7 year project focused on reducing chemical pesticides

Sub-project on agroecological transformation of perennial crops for arthropod pest management (conservation biocontrol)

Agroecological transformation

Apples & Pears

Presented the AE transformation at Apples & Pears Conference

- Astonished
- Desperate to do it

How can organics change the world

1. Certified organic agriculture grows and grows until all farming is certified organic
2. Conventional farming becomes more and more like organics (and agroecology) until all farming is like or exceeds organics, and becomes agroecology

Looks like 2 is what is happening

Soil health

Is the foundation of organic agriculture

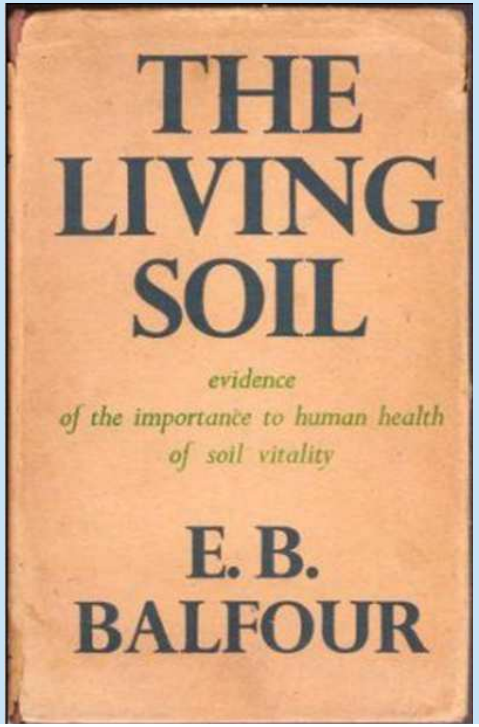
"Organic agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible."

Soil & Health Assn

An Agricultural Testament

Etc., etc., etc.

But, standards?



Soil health in standards

Cropping module

c. Soil health

After the commencement of organic management, measures of biological fertility and soil structure must show either good or generally improving levels of these soil parameters. This must be achieved by, where appropriate:

i. cultivation of legumes, green manures or deep-rooting plants in an appropriate multi-annual rotation programme; and/or

ii. addition to the soil of composts (refer d below) or other allowed organic material. BioGro may place limits on the quantities being applied.

Livestock module

c. Soil health

Measures of biological fertility and soil structure must show either good or generally improving levels of these soil parameters.

Orchard module

c. Soil health

After the commencement of organic management, measures of biological fertility and soil structure must show either good or generally improving levels of these soil parameters.

Regenerative Organic Certified (ROC)

Eight pages on soil health and land management

V. Soil Health & Land Management

The Soil Health & Land Management module of ROC seeks to facilitate the adoption of agricultural practices that build, rather than degrade, soils by increasing soil organic matter, biodiversity, and fertility.

Standards for Soil Health & Land Management

1. Base Requirements	Practice Description	Bronze	Silver	Gold
1.1 Existing Certifications	Operation has proof of existing USDA Organic certification or recognized equivalent.	**R**	**R**	**R**
1.2 Regenerative Organic System Plan (ROSP)	Operation has a documented Regenerative Organic System Plan (ROSP), which includes implementation and requirements related to all relevant pillars. Detailed requirements are outlined in the ROSP template provided at RegenOrganic.org/Resources. Required items include: – Tillage action plan	**R**	**R**	**R**

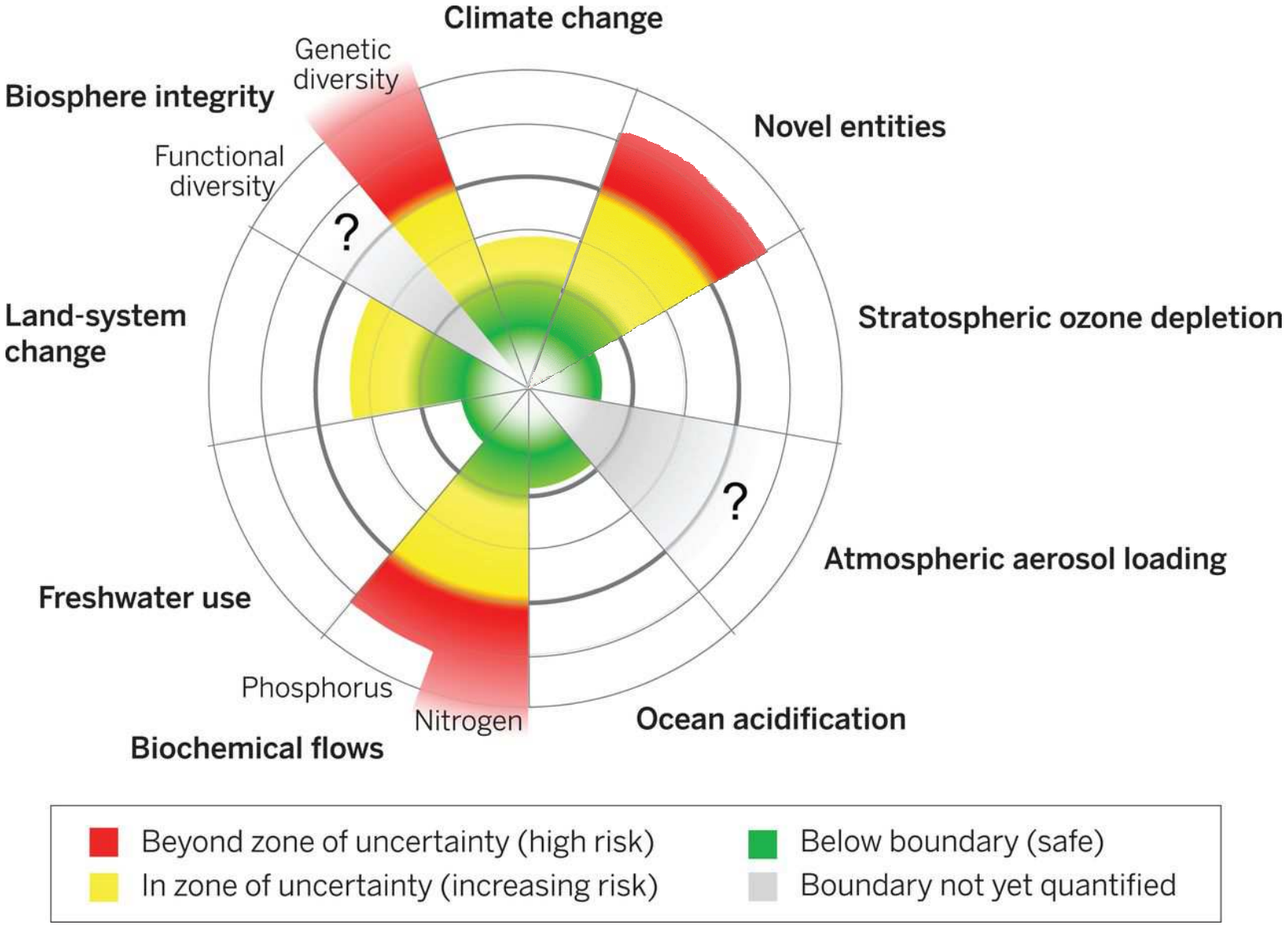
Soil health revolution

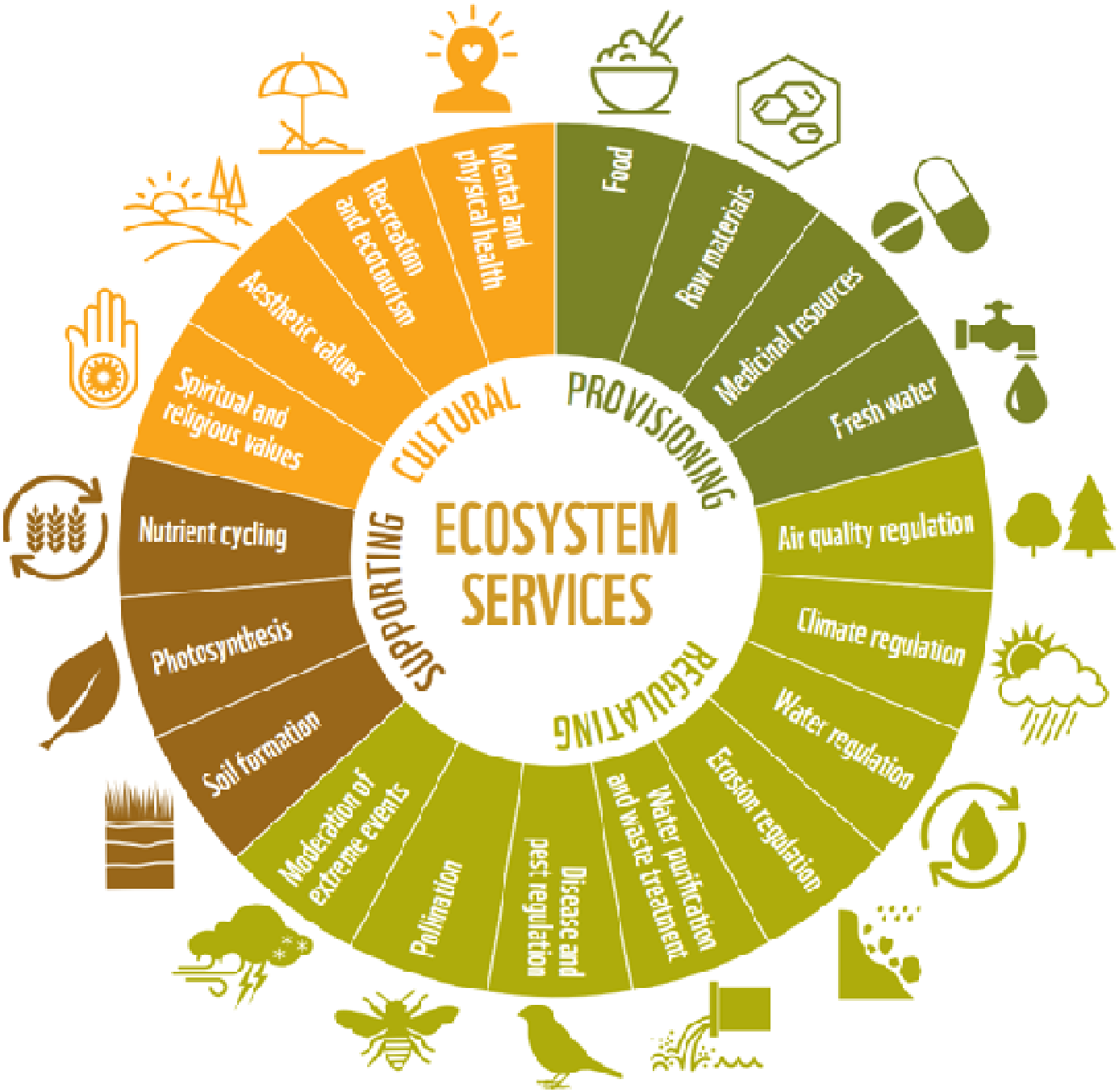
There has been a paradigm change / revolution in soil science in how soil organic matter (SOM) forms and what drives soil biology and health!

First the context

The Nine Planetary Boundaries

A safe operating space for humanity




ECOSYSTEM SERVICES
CULTURAL
PROVISIONING
REGULATING
SUPPORTING
Mental and physical health
Recreation and ecotourism
Aesthetic values
Spiritual and religious values
Food
Raw materials
Medicinal resources
Fresh water
Air quality regulation
Climate regulation
Water regulation
Erosion regulation
Water purification and waste treatment
Disease and pest regulation
Pollination
Moderation of extreme events
Soil formation
Photosynthesis
Nutrient cycling

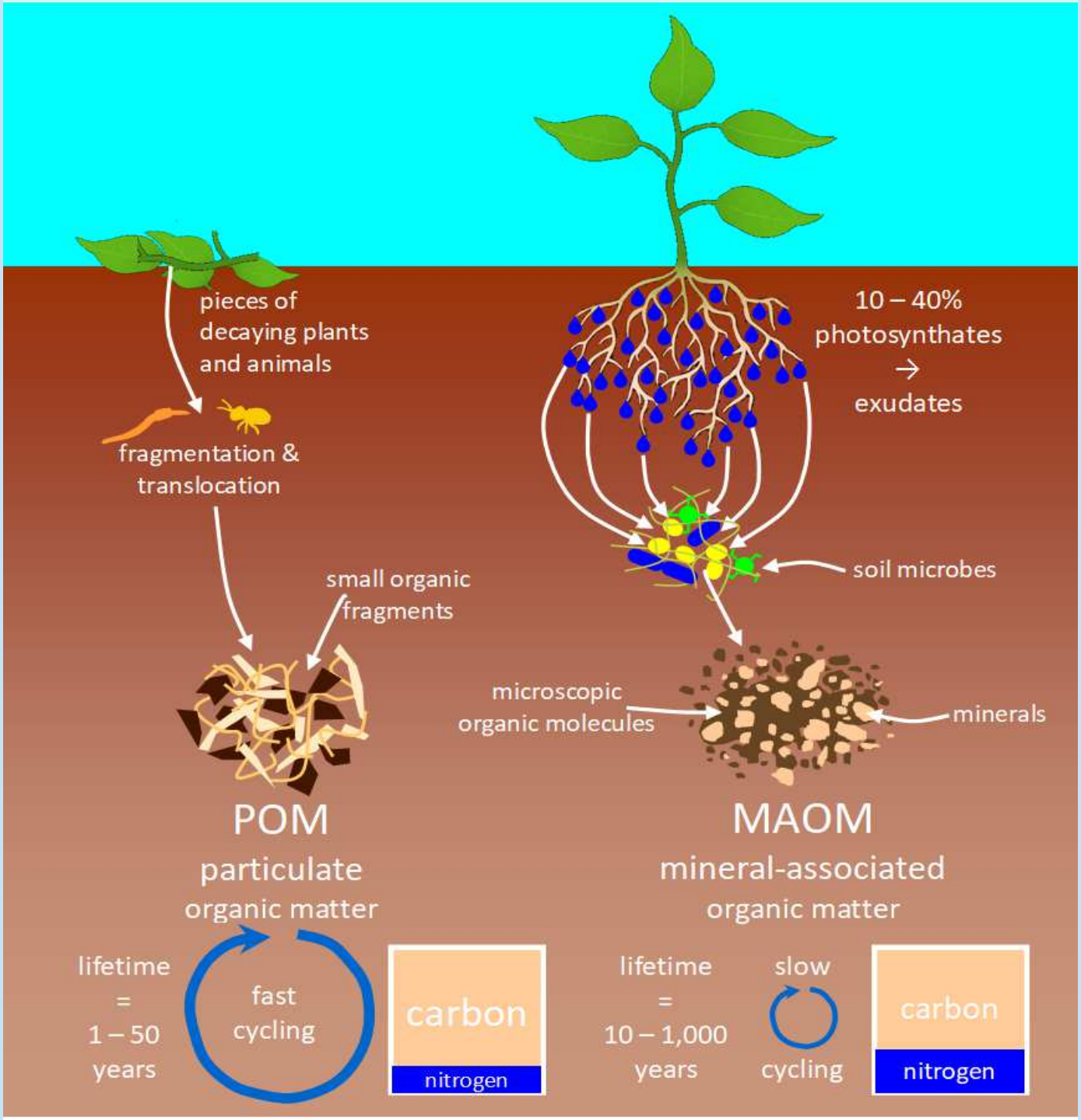
The old paradigm

Plants die, manure, compost deposited on soil

SOM decomposes / mineralises back to inorganic compounds

- Simple compounds e.g., sugars, proteins, lipids decompose in hours to weeks
- Medium complexity compounds e.g., cellulose, decomposes in weeks to years:
- High complexity compounds, e.g., lignin decompose over years to centuries even millennia i.e., become humus
- Text book info, but wrong!

The new soil paradigm



Plants and soil organic matter

Long term trial at Plant & Food Research Lincoln

Land had been in pasture >15 years

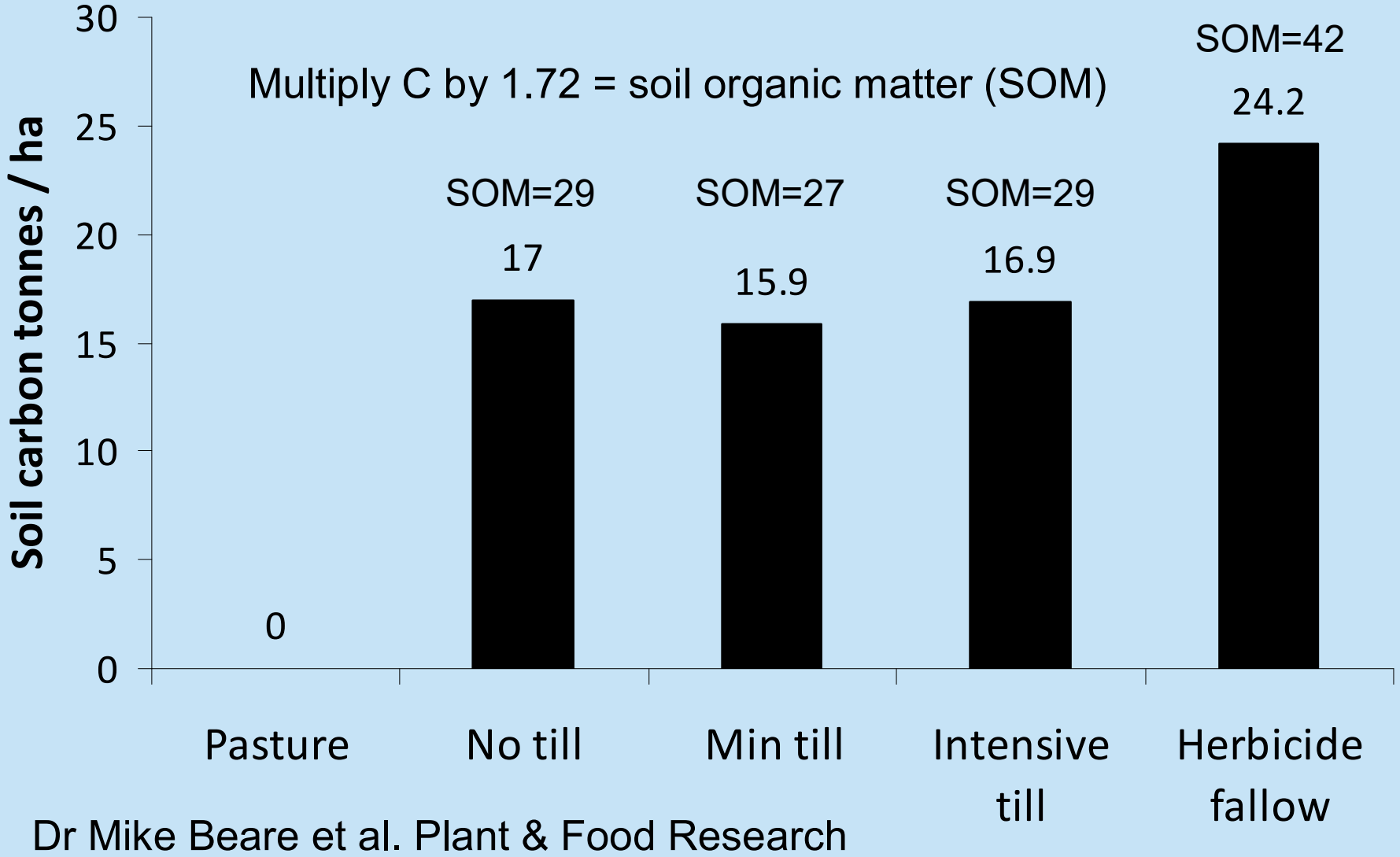
Five treatments

- Intensive tillage: Plough, maxi-till, harrow, roll x 2
- Minimum tillage: Disc, harrow, roll x 2
- No till: No cultivation, direct drilled
- Continuous grass pasture
- Continuous herbicide fallow

11 years

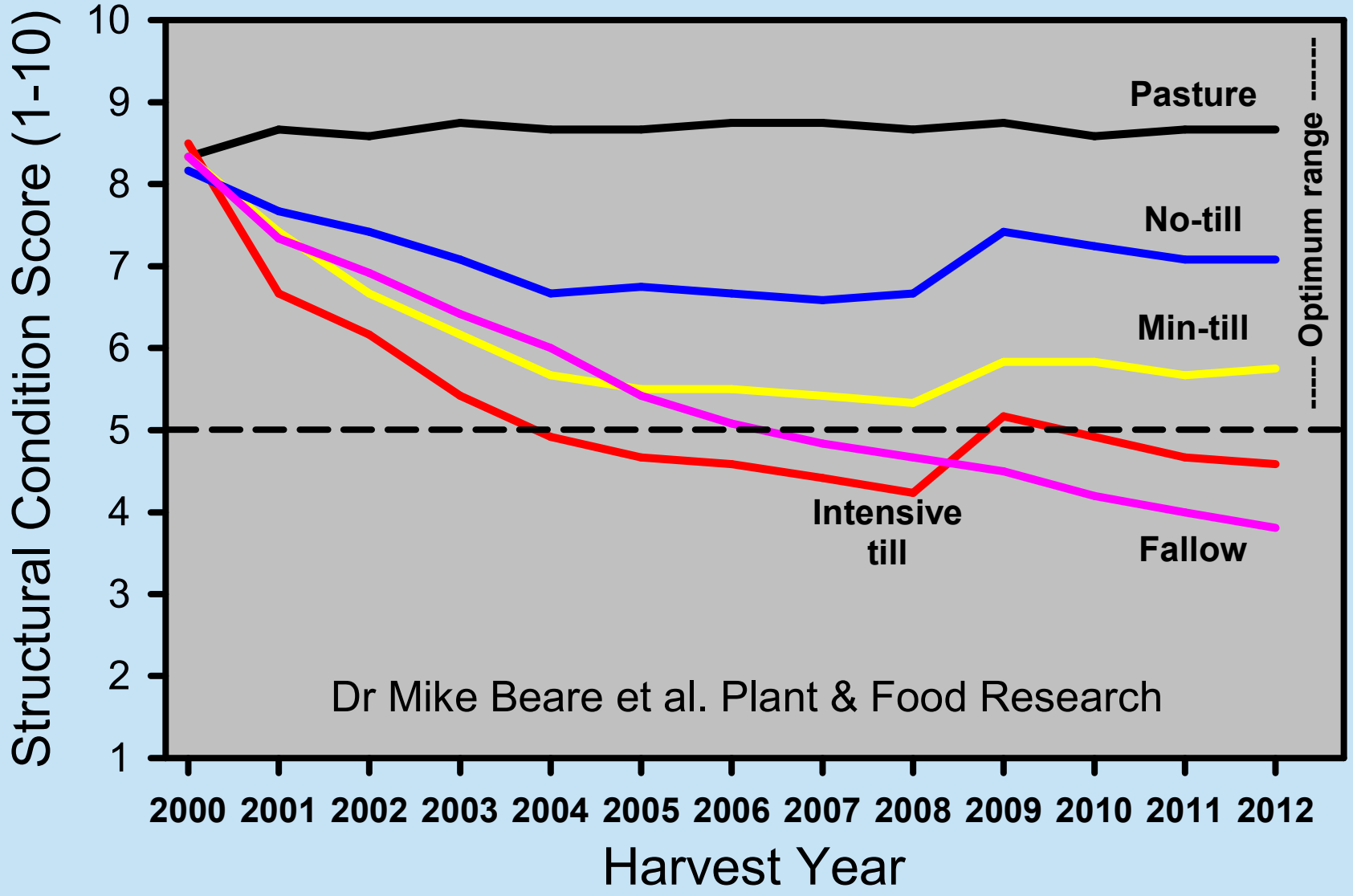
http://dx.doi.org/10.1071/SR14173

Amount of soil carbon loss relative to pasture after 11 years



Dr Mike Beare et al. Plant & Food Research

Effect on soil structure



Biological / ecological soil health

The **main driver** of soil biology / health is a

- **diversity of living plants,**
- **year round,**
- maximising biomass production,
- **particularly from roots**
- on a foundation of physical and chemical health

It is **not** compost and other externally applied amendments

- though they can help, esp. in unhealthy soils

Plant (bio)diversity

Plant root exudates are the main source of SOM

But plant species are not all the same

- Monoculture crops – the soil equivalent of living on ice cream and nothing else

To maximise soil health requires plant diversity

Plant diversity begets overall biodiversity

Biodiversity is the most transgressed planetary boundary

Thanks

Discussion