Agroecology

The role in food systems, food security and environment

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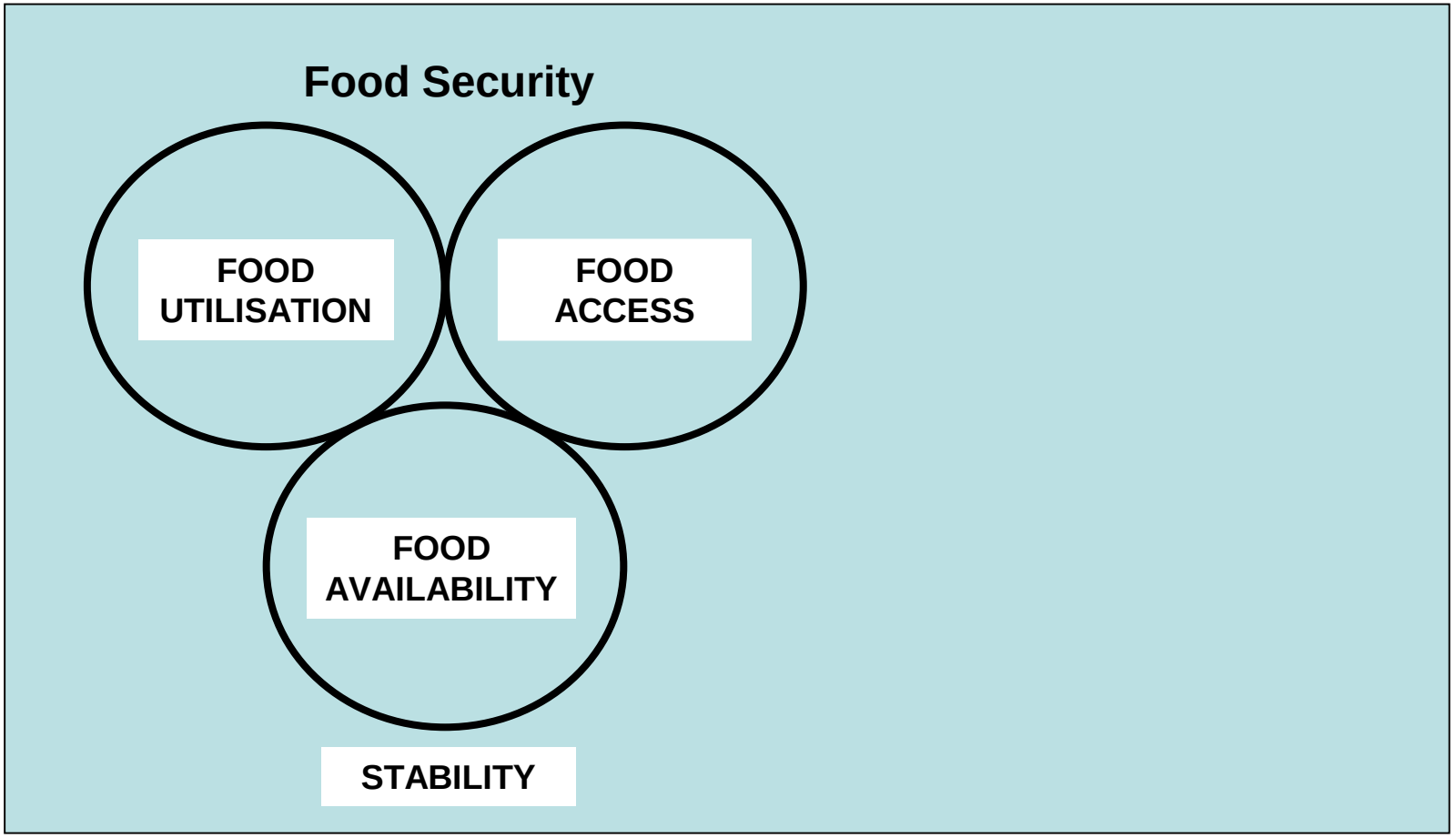
Environmental *Change* Institute

eci

UNIVERSITY OF OXFORD

What do we want from Food Systems?



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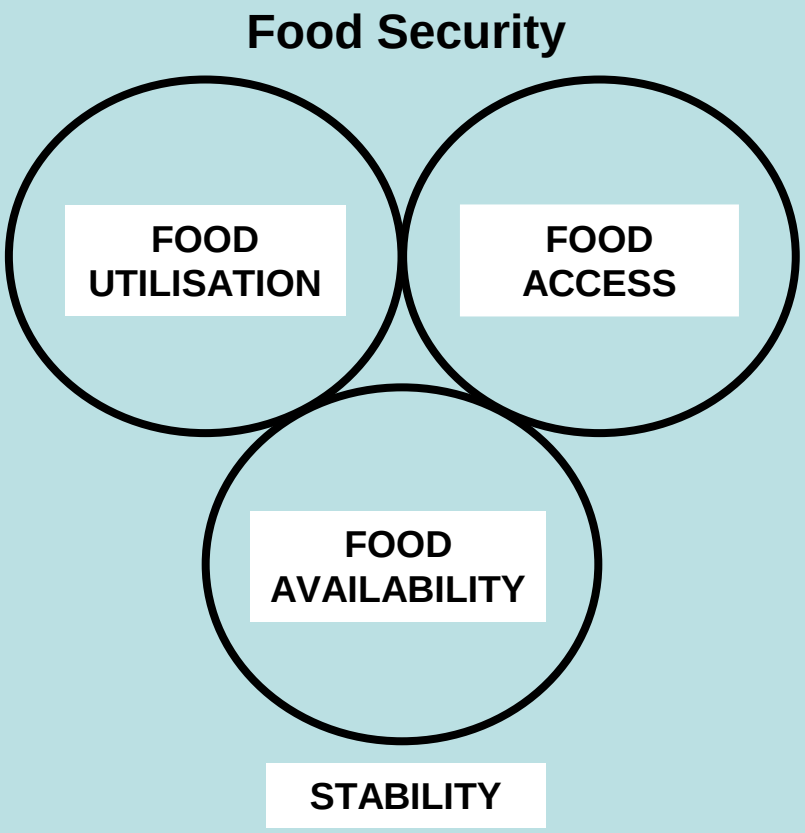
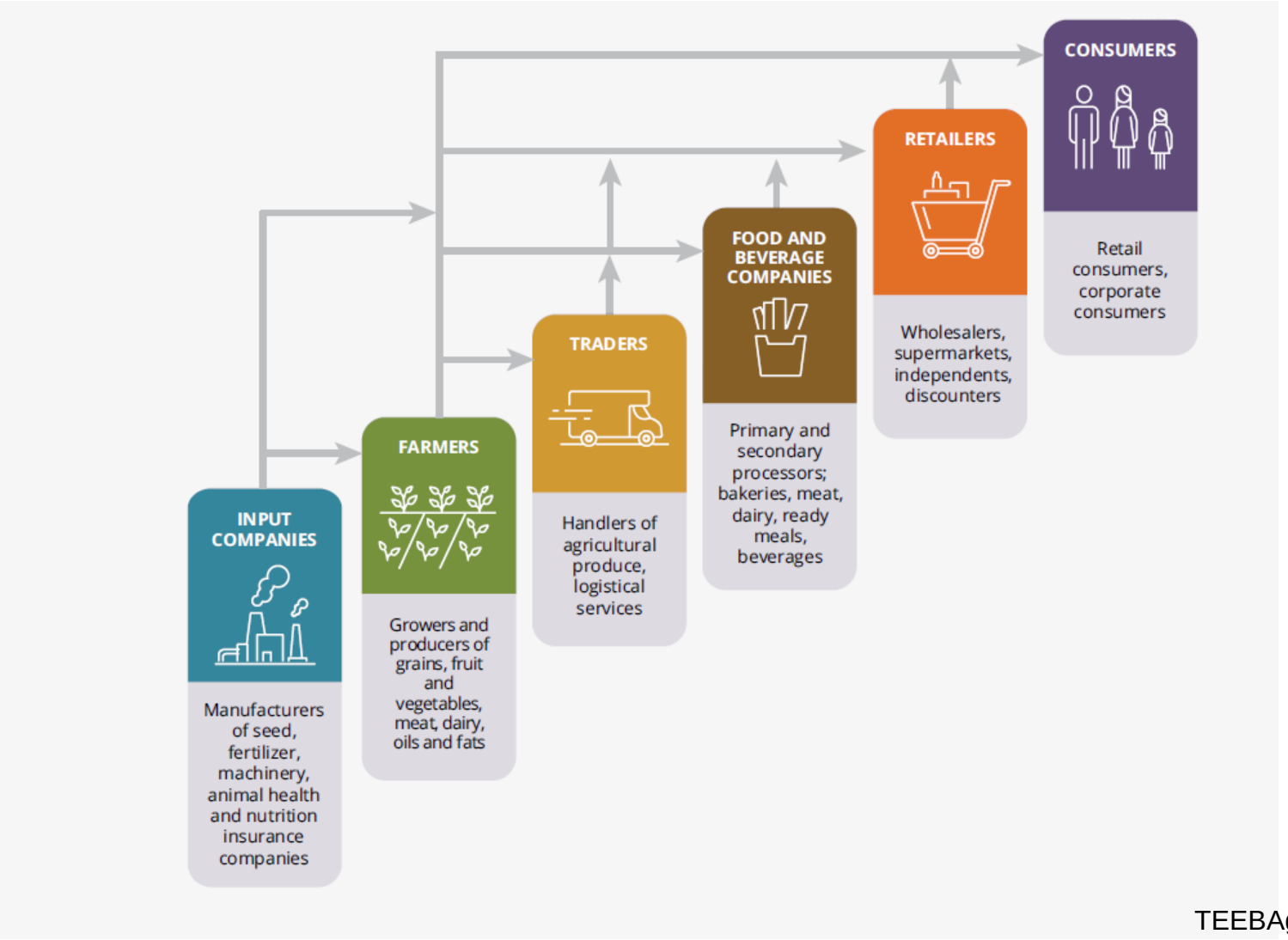


Other Societal Interests

- Health
- Income
- Profit
- Rural development
- Employment
- Environment
- Landscape
- Ecosystem services
- Animal welfare
- …

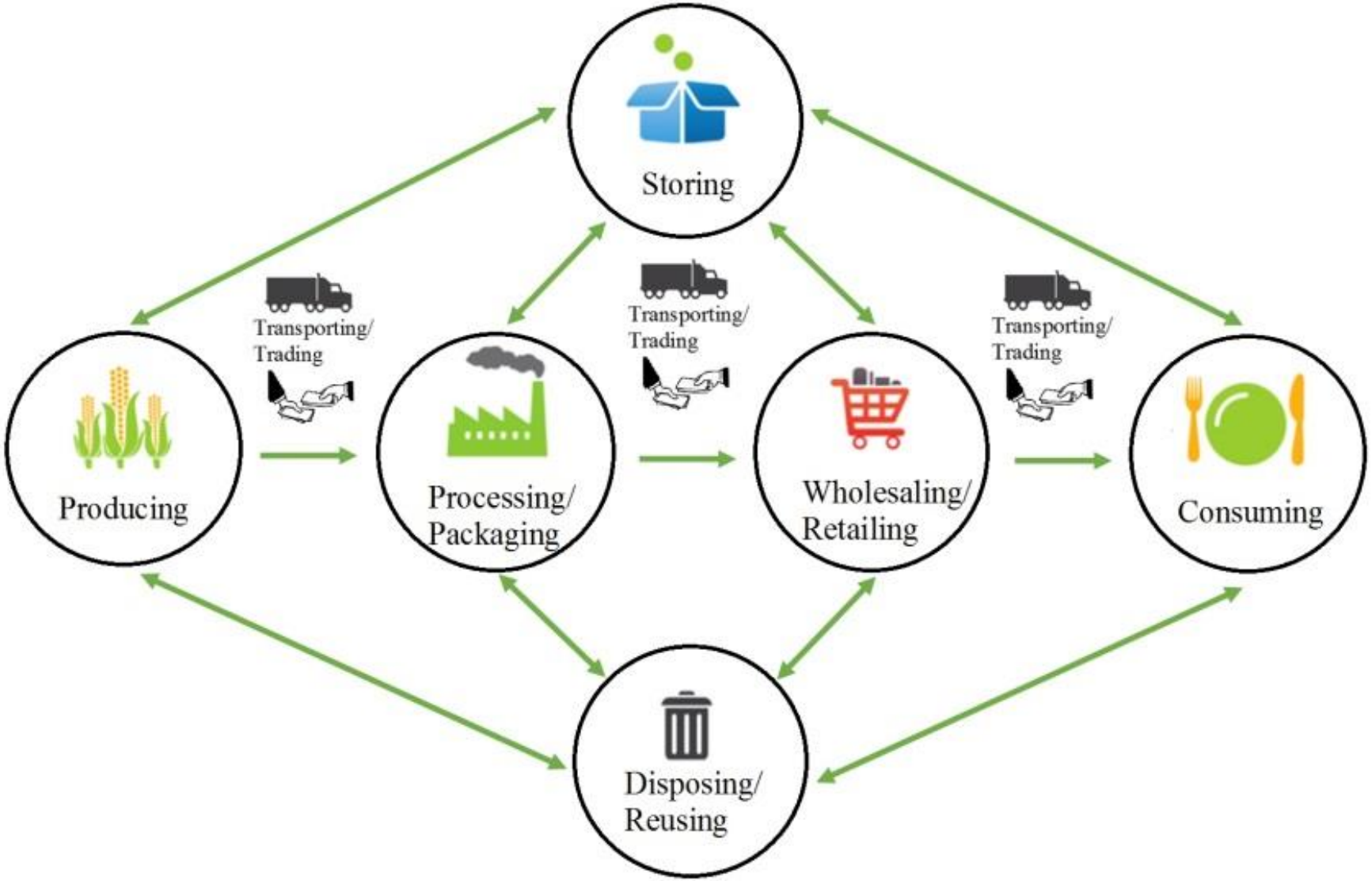
The food ‘value chain’



TEEBAgriFood, 2018

“Unpacking the Food System”

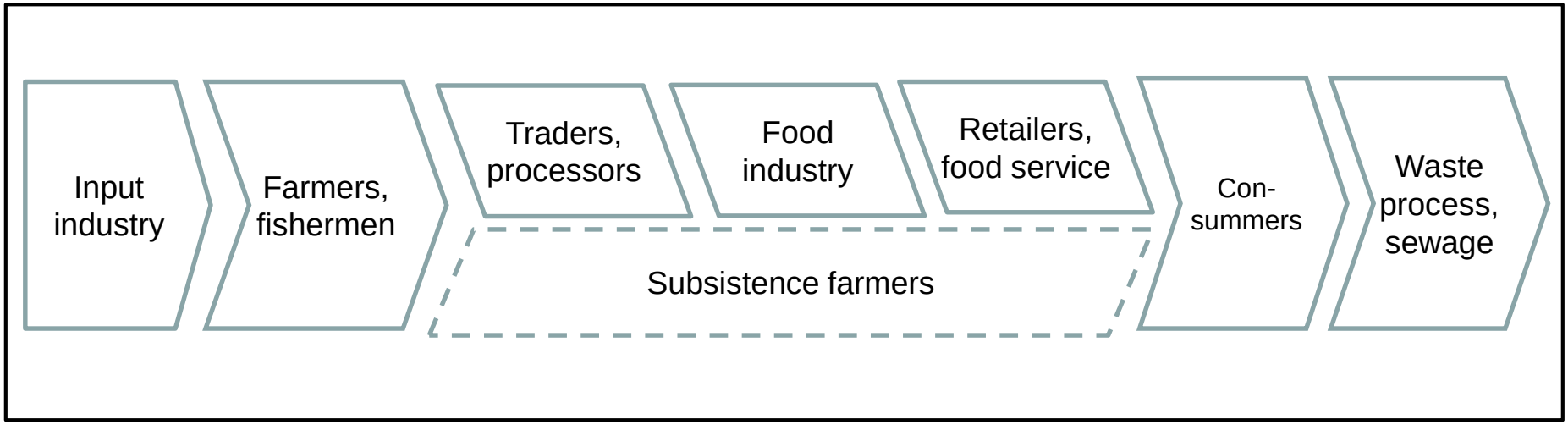
1: Recognising different Food System ‘Activities’



"Unpacking the Food System"

1: Recognising different Food System 'Activities'

2: Identifying the range of Food System 'Actors'



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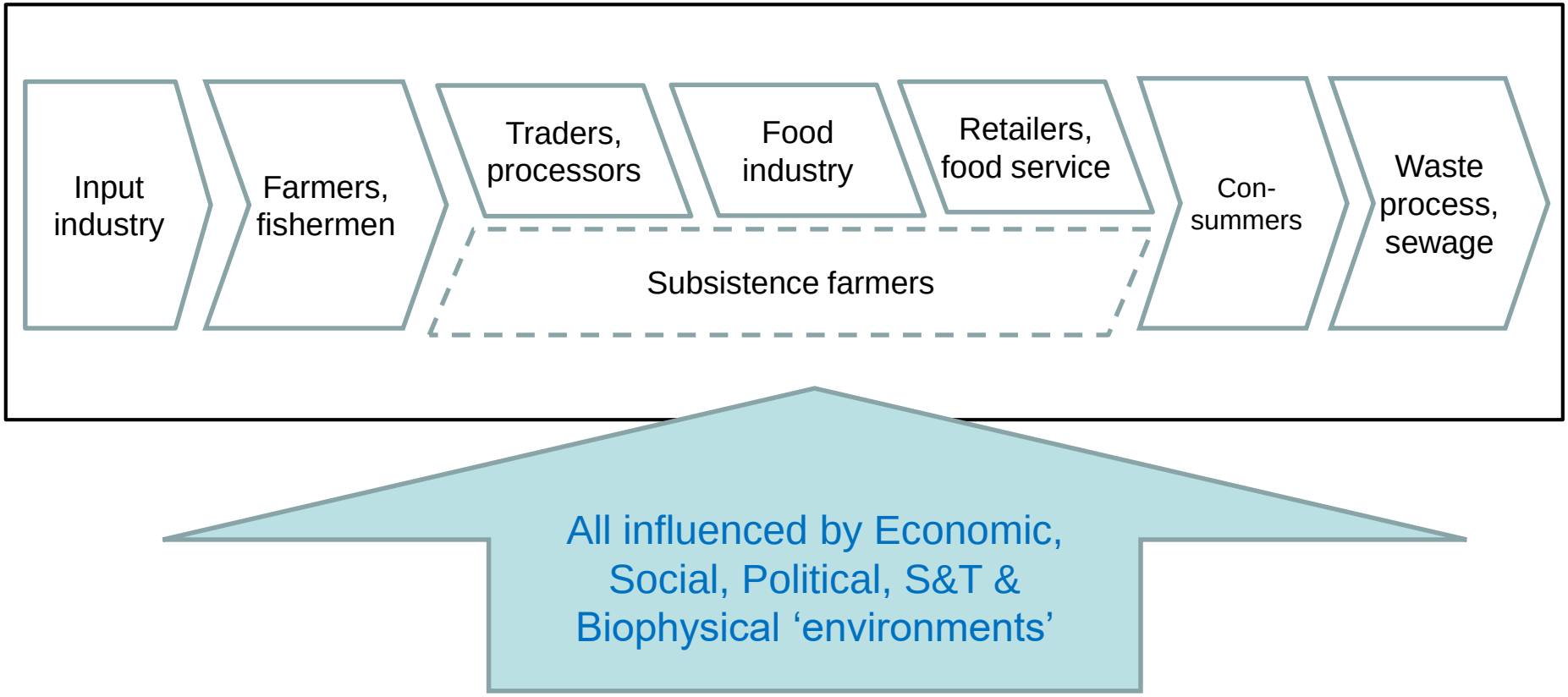

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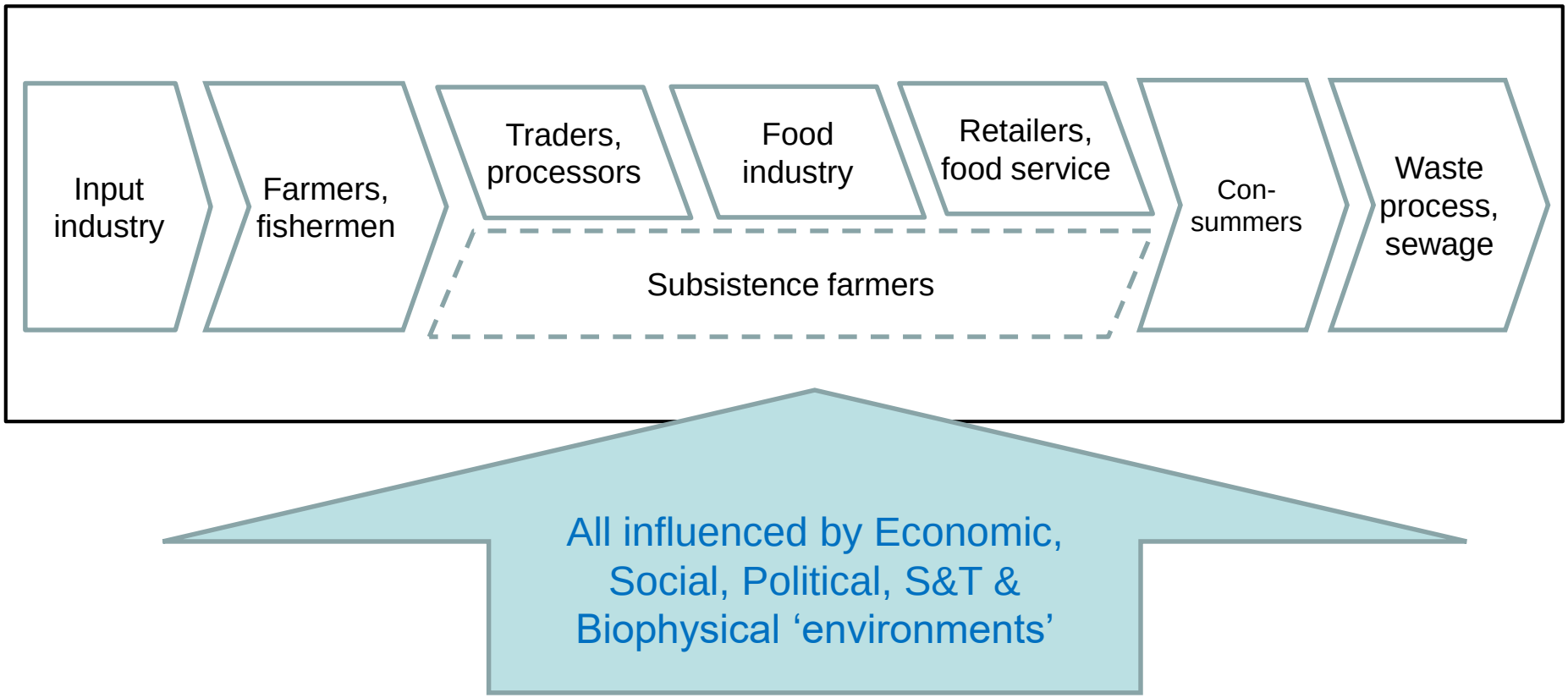
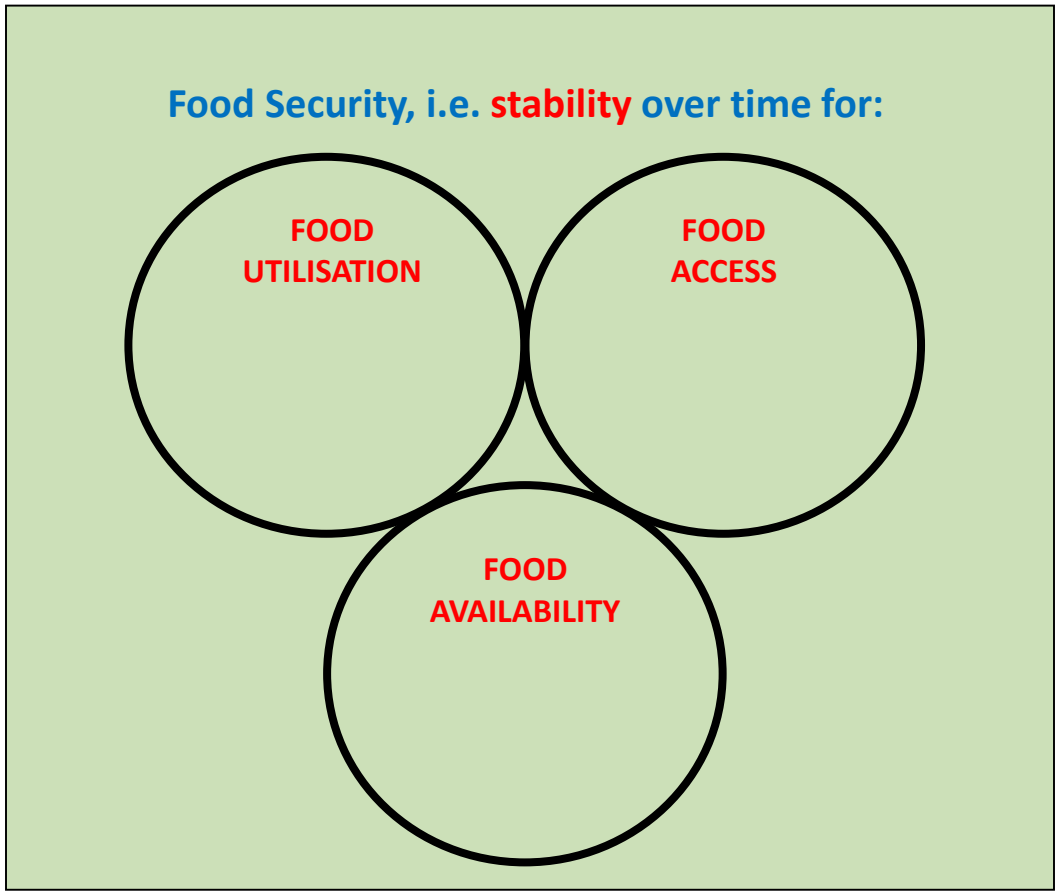


… and the immediately previous link in the chain

3: Highlighting multiple roles of agroecological diversity for food security

"… when all people, at all times, have physical, economic and social access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life."



GECAFS;
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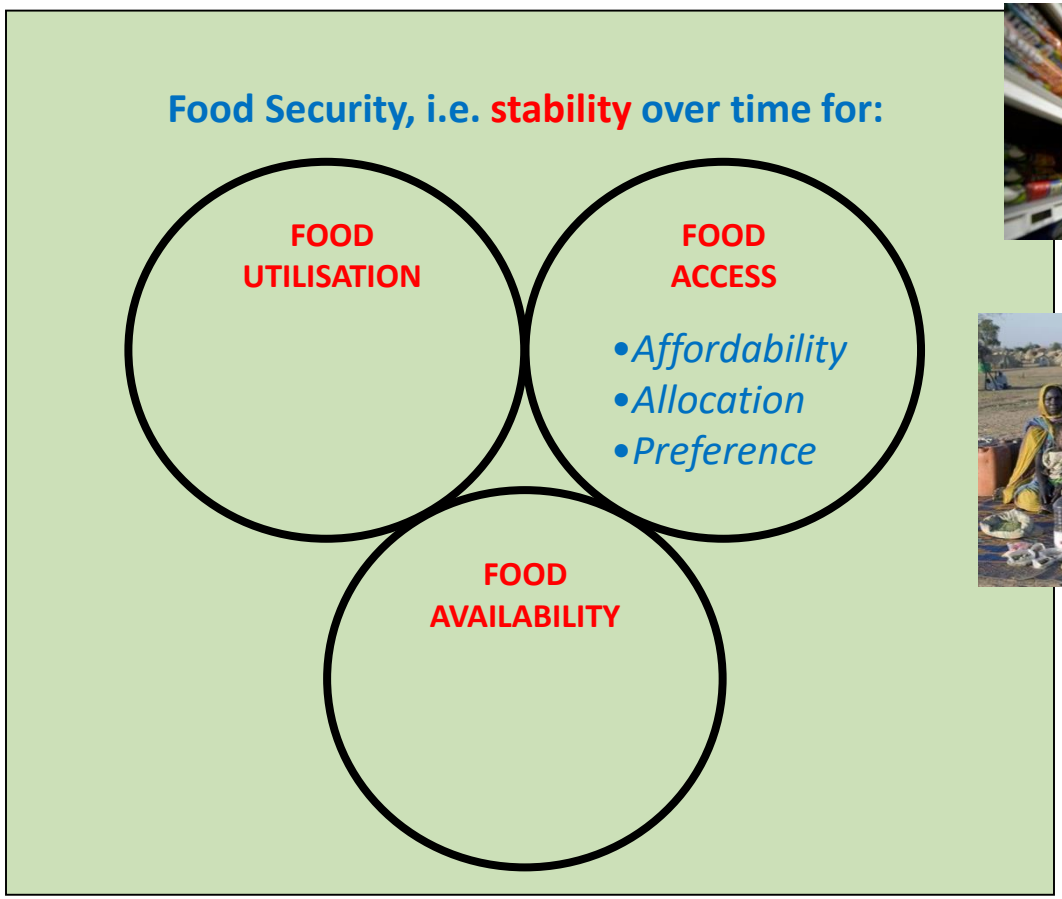

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Food Security, i.e. stability over time for:

FOOD UTILISATION

- *Nutritional Value*
- *Social Value*
- *Food Safety*

FOOD ACCESS

- *Affordability*
- *Allocation*
- *Preference*

FOOD AVAILABILITY

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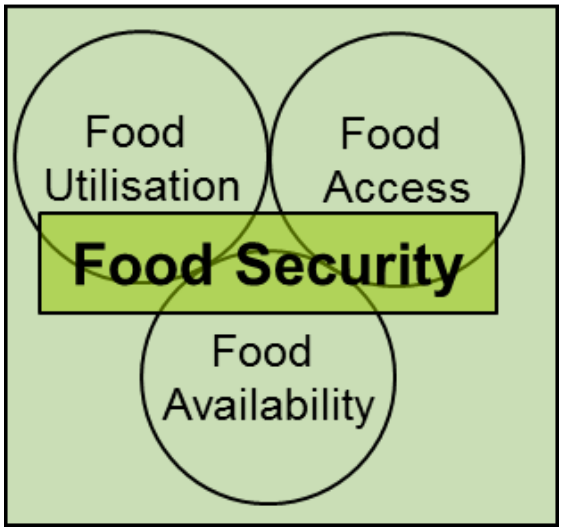

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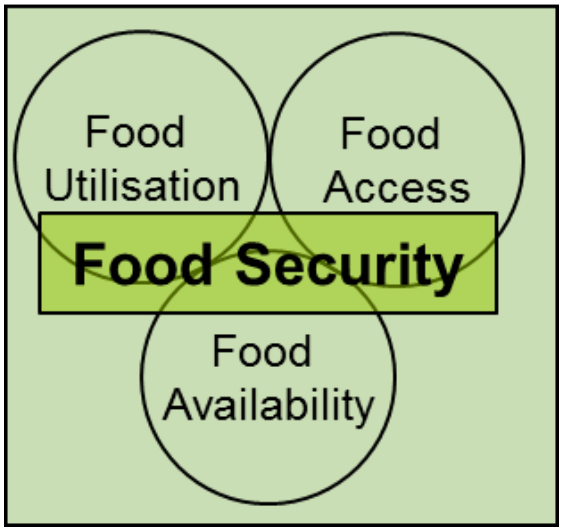
Socioeconomic Outcomes

- Income
- Employment
- Health
- Social capital
- Political capital
- Ethics
- …



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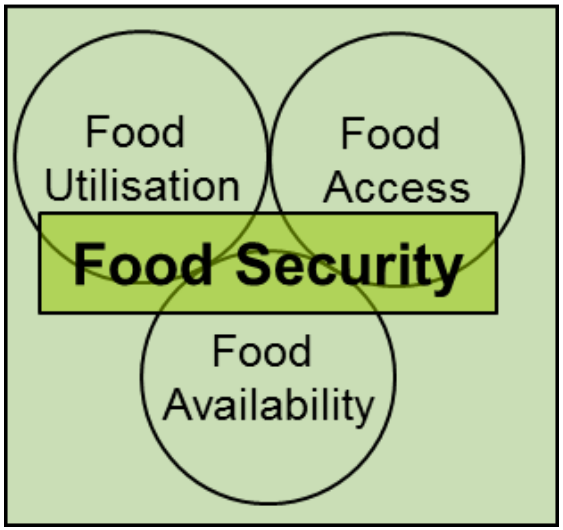

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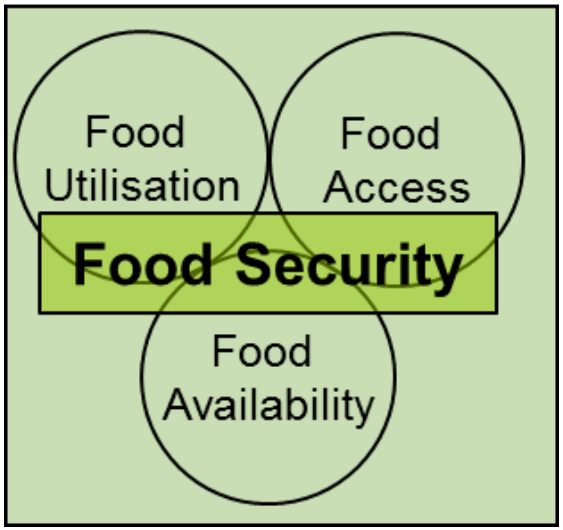

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- Climate change
- Water availability
- Water quality
- Biodiversity
- Biogeochemistry
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Food Utilisation

Food Access

Food Security

Food Availability

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Trade-offs to be aware of!

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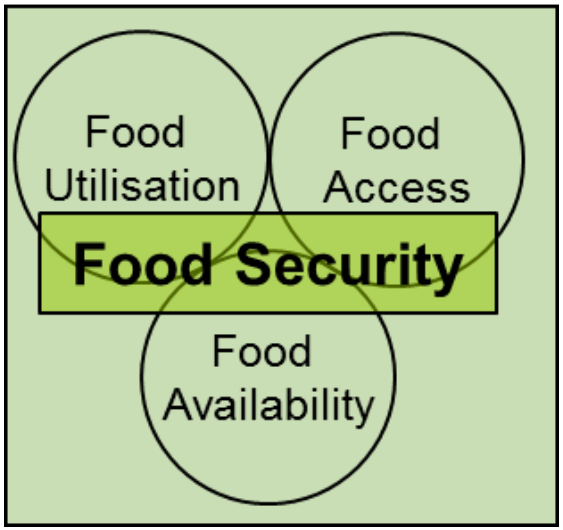

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Synergies to exploit!

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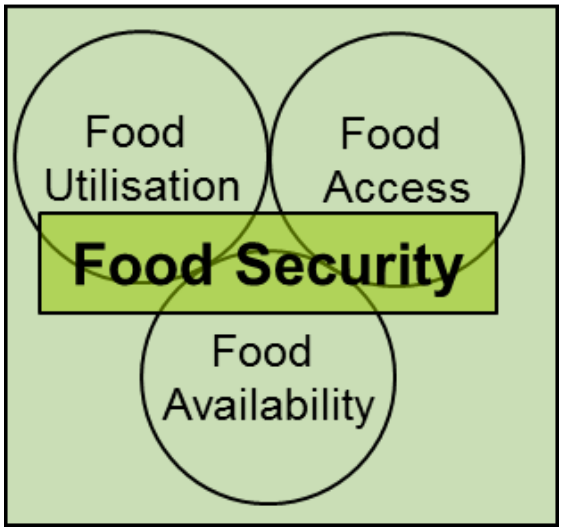

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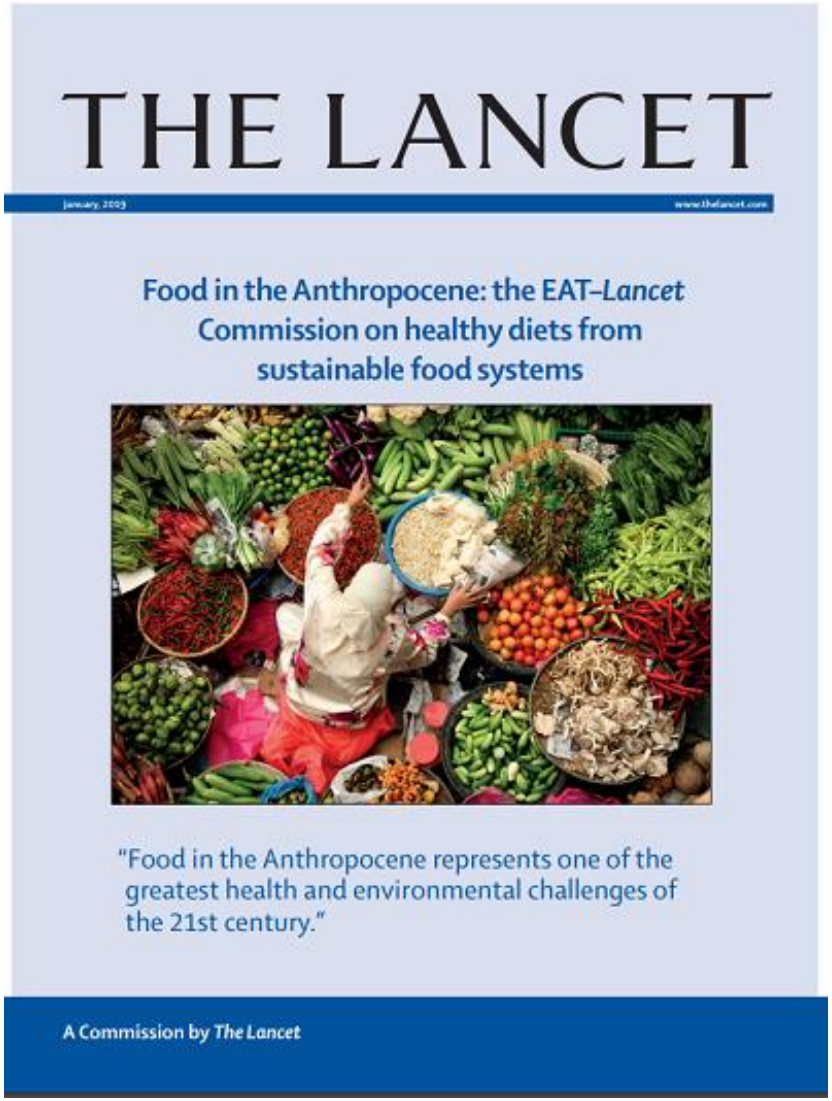
~~Sustainable Diets~~

Aim for healthy diets from sustainable food systems



Needs a Great Food Transformation

An unprecedented range of actions taken by all food system sectors across all levels that aim to normalise healthy diets from sustainable food systems.

January 2019

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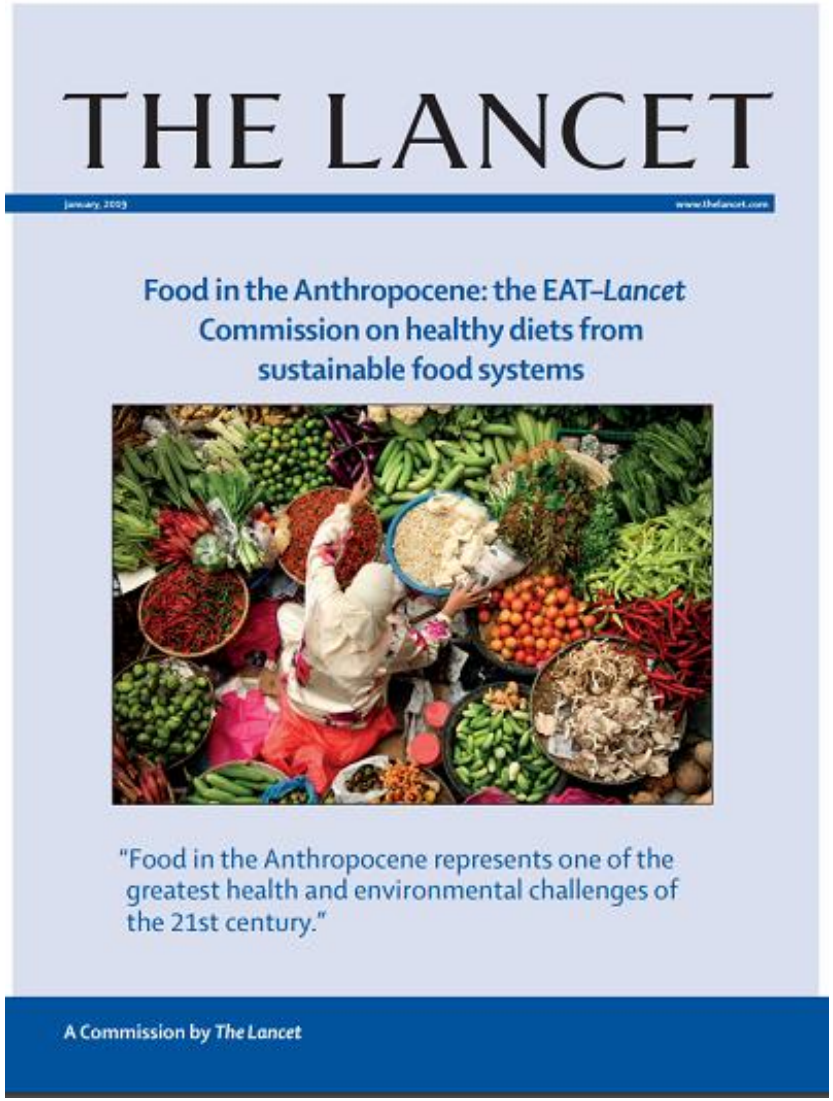

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Healthy Diet *Outcomes*

- ✓ Calorie and nutrient density
- ✓ Quality
- ✓ Diversity
- ✓ Safe
- ✓ Affordable
- ✓ Acceptable
- ✓ Sufficient

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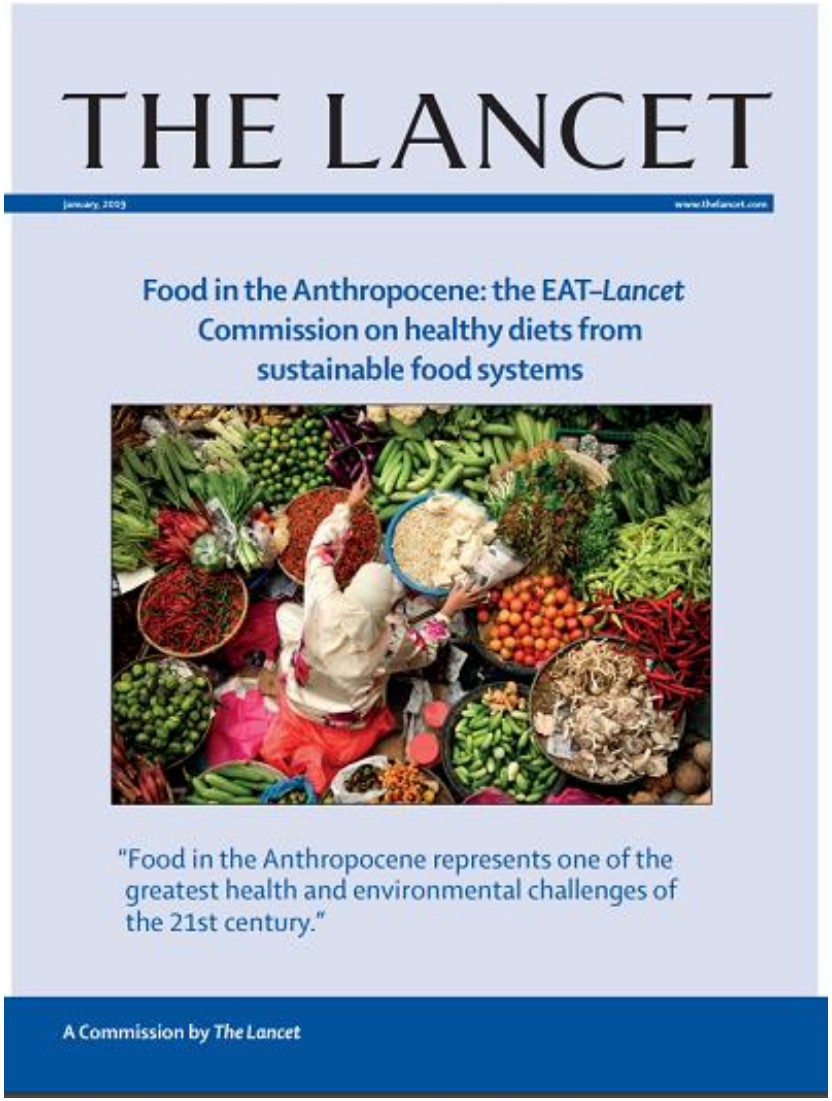

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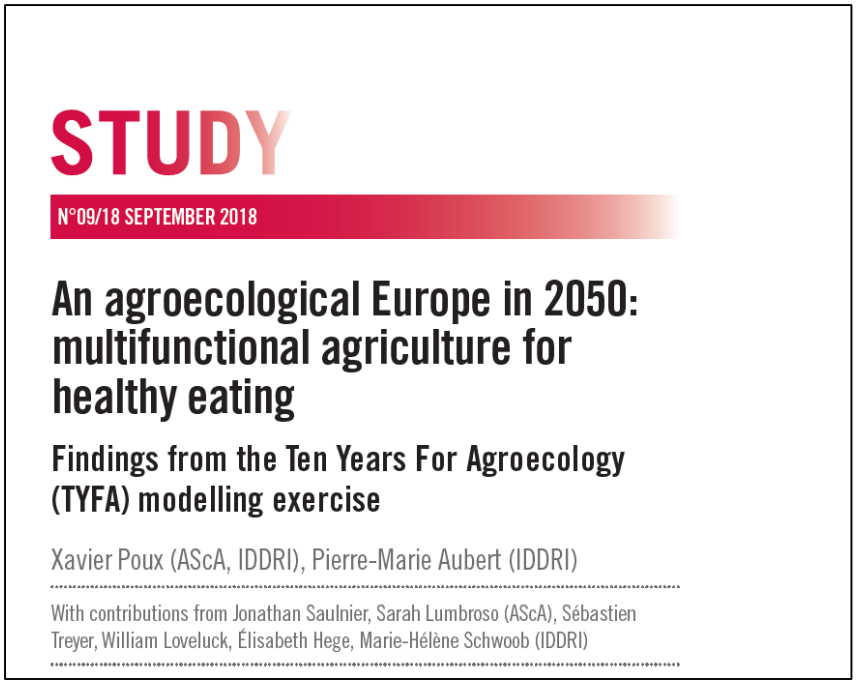
Sustainable Food System *Activities*

- ✓ Environmentally sound
- ✓ Socially acceptable
- ✓ Economically/Enterprise viable

January 2019

A plausible way forward?


STUDY

N°09/18 SEPTEMBER 2018

An agroecological Europe in 2050: multifunctional agriculture for healthy eating

Findings from the Ten Years For Agroecology (TYFA) modelling exercise

Xavier Poux (AScA, IDDRI), Pierre-Marie Aubert (IDDRI)

With contributions from Jonathan Saulnier, Sarah Lumbroso (AScA), Sébastien Treyer, William Loveluck, Élisabeth Hege, Marie-Hélène Schwoob (IDDRI)

- Phasing-out of pesticides and synthetic fertilizers, and the redeployment of extensive grasslands and landscape infrastructure
- A change in diet less rich in animal products
- Widespread adoption of agroecology, the phasing-out of vegetable protein imports and the adoption of healthier diets by 2050

✓ provides healthy food for Europeans while maintaining export capacity;

✓ reduces Europe's global food footprint;

✓ leads to a 40% reduction in GHG emissions from the agricultural sector;

✓ regains biodiversity and conserves natural resources.

Reorganise our ‘views’ on Food System Outcomes

InterAcademy Partnership: 28 Nov 2018

Reorganise our 'views' on Food System Outcomes

"Providing a healthy, affordable, and environmentally-friendly diet for all people will ***require a radical transformation of the system***.

This will depend on:

better farming methods,

wealthy nations **consuming less meat** and

countries **valuing food which is nutritious rather than cheap**."

InterAcademy Partnership: 28 Nov 2018

‘Agroecological Intensification’ can help *but definitions vary…*

Review by Wezel, et al, *Agron. Sustain. Dev*. (2015):

Integrates ecological principles into agricultural management to reduce dependency on external inputs and increase the productive capacity of biotic and abiotic system components.

Milder et al. (2012)

Improving the performance of agriculture through **integration of ecological principles into farm and system management**.

(CCRP 2013)

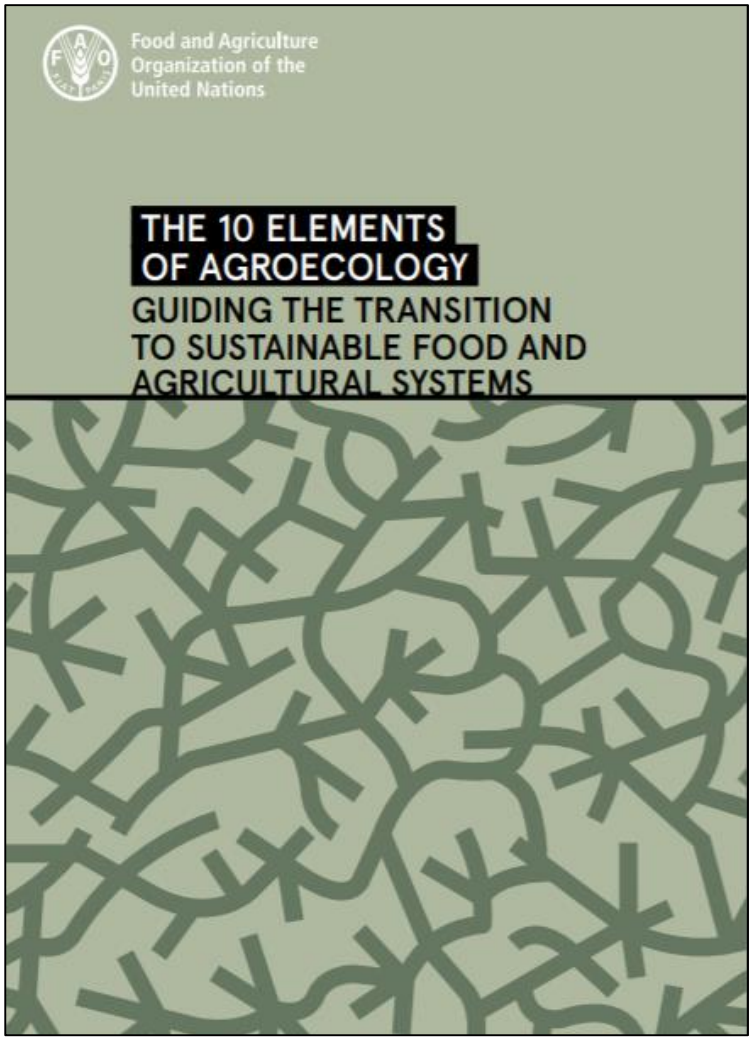
A set of improved inputs, implements, and practices that **produce more output per unit of input relative to traditional practices** and whereby the use efficiency of those inputs is maximised.

Vanlauwe et al. (2013)

Sustains ecosystem services, while minimizing environmental costs and maintaining functional biodiversity” through wildlifefriendly farming systems.

Tscharntke et al. (2012)

10 Elements of Agroecology



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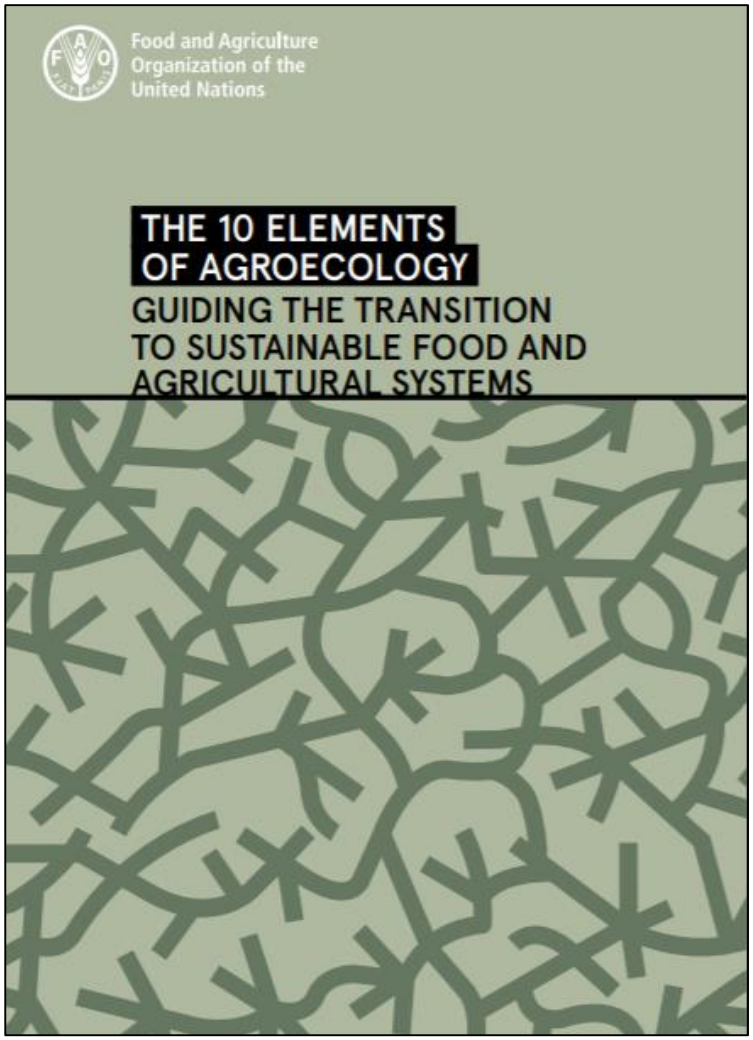

Common characteristics

1. Diversity (species and systems)
2. Co-creation & Sharing Knowledge
3. Synergies
4. Efficiency
5. Recycling
6. Resilience

Context

7. Human & Social Values
8. Culture & Food Traditions

Enabling environment

9. Responsible Governance
10. Circular & Solidarity Economy

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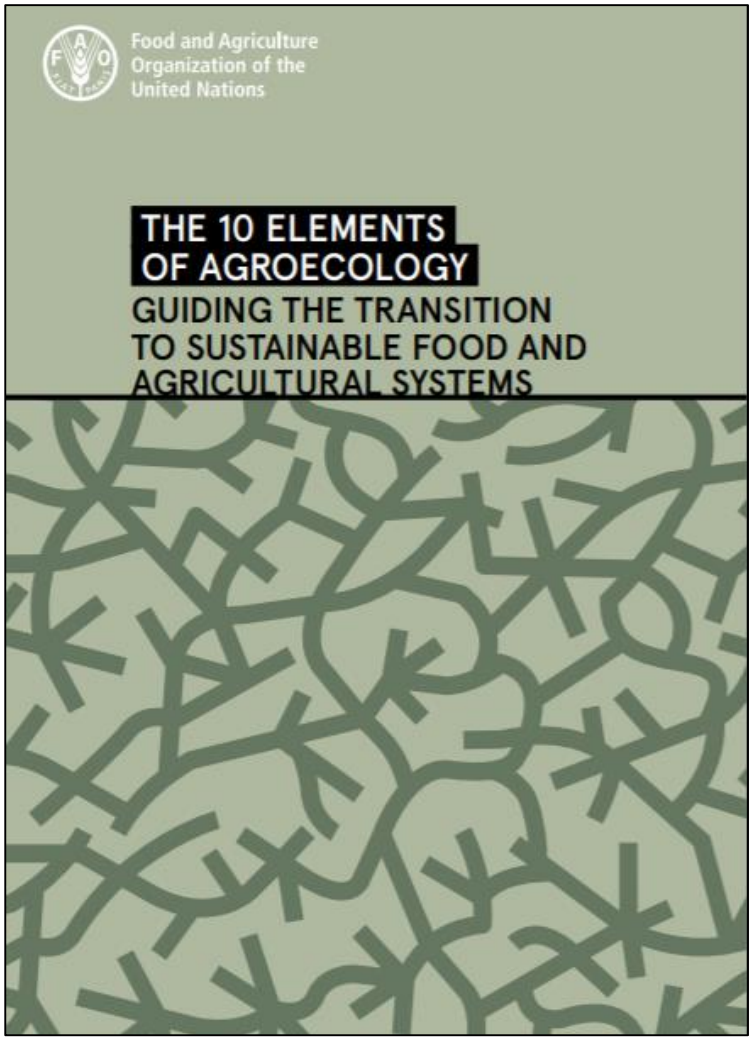

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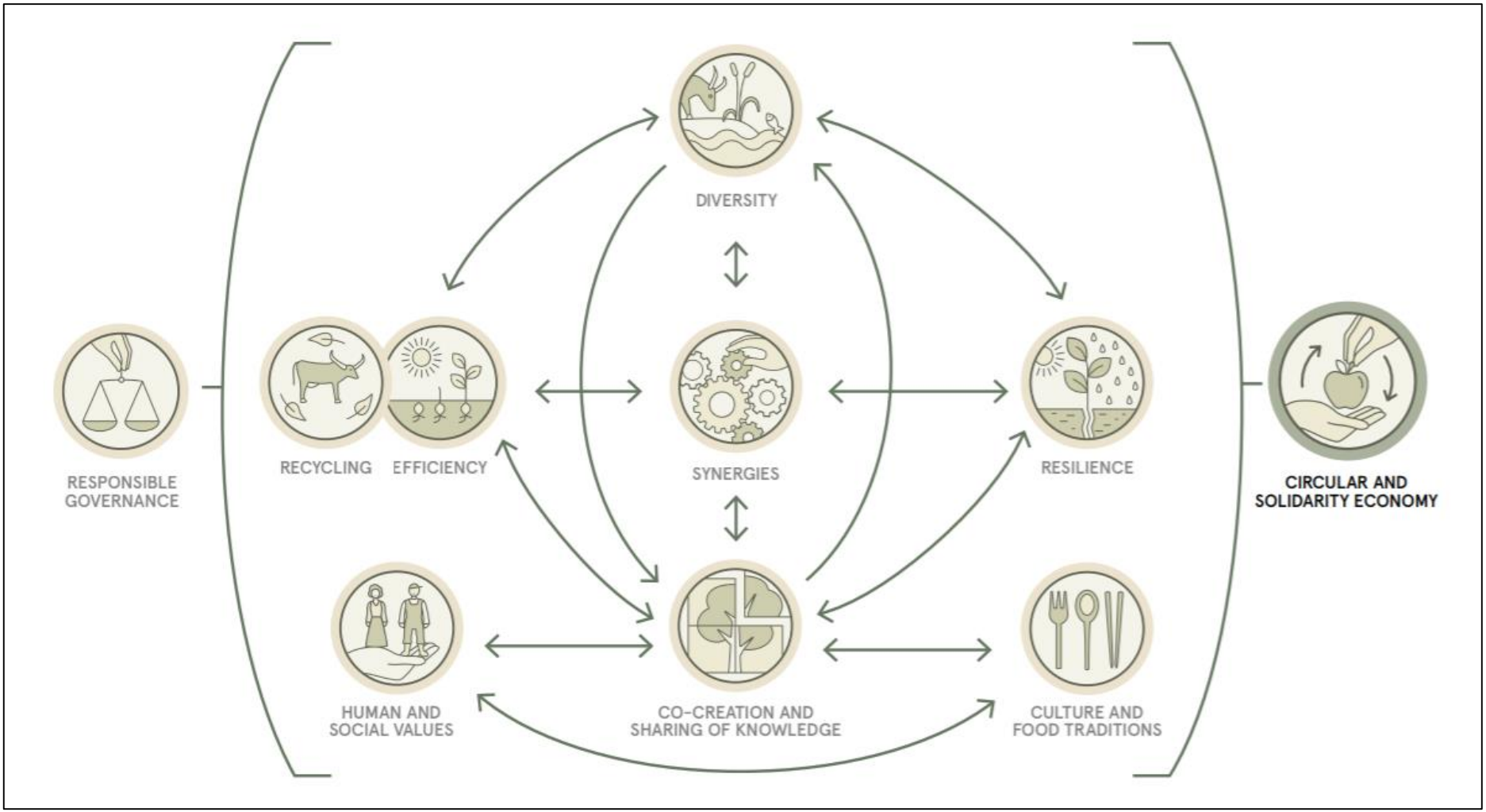

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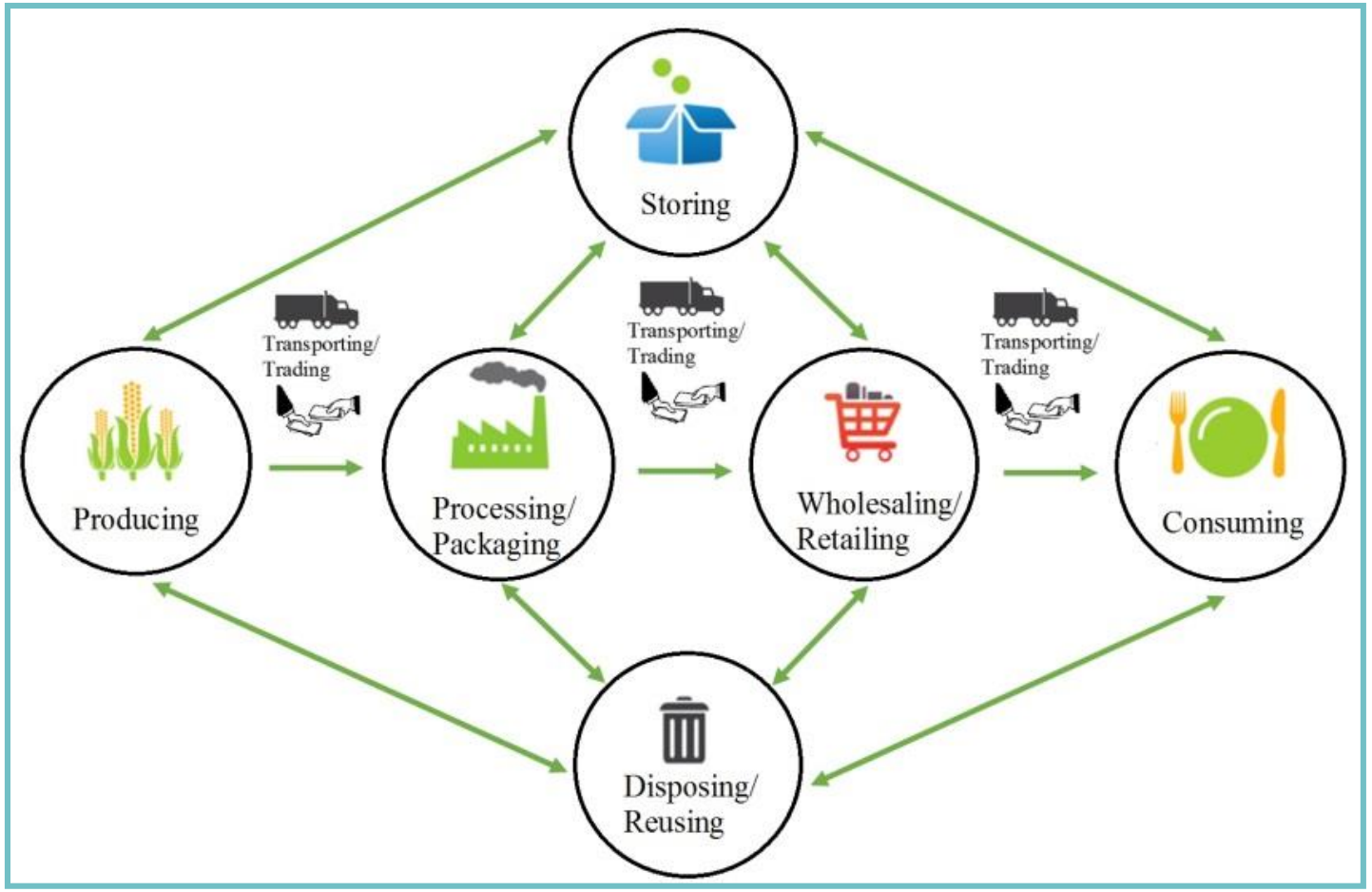
5: Recognising transformation and value addition



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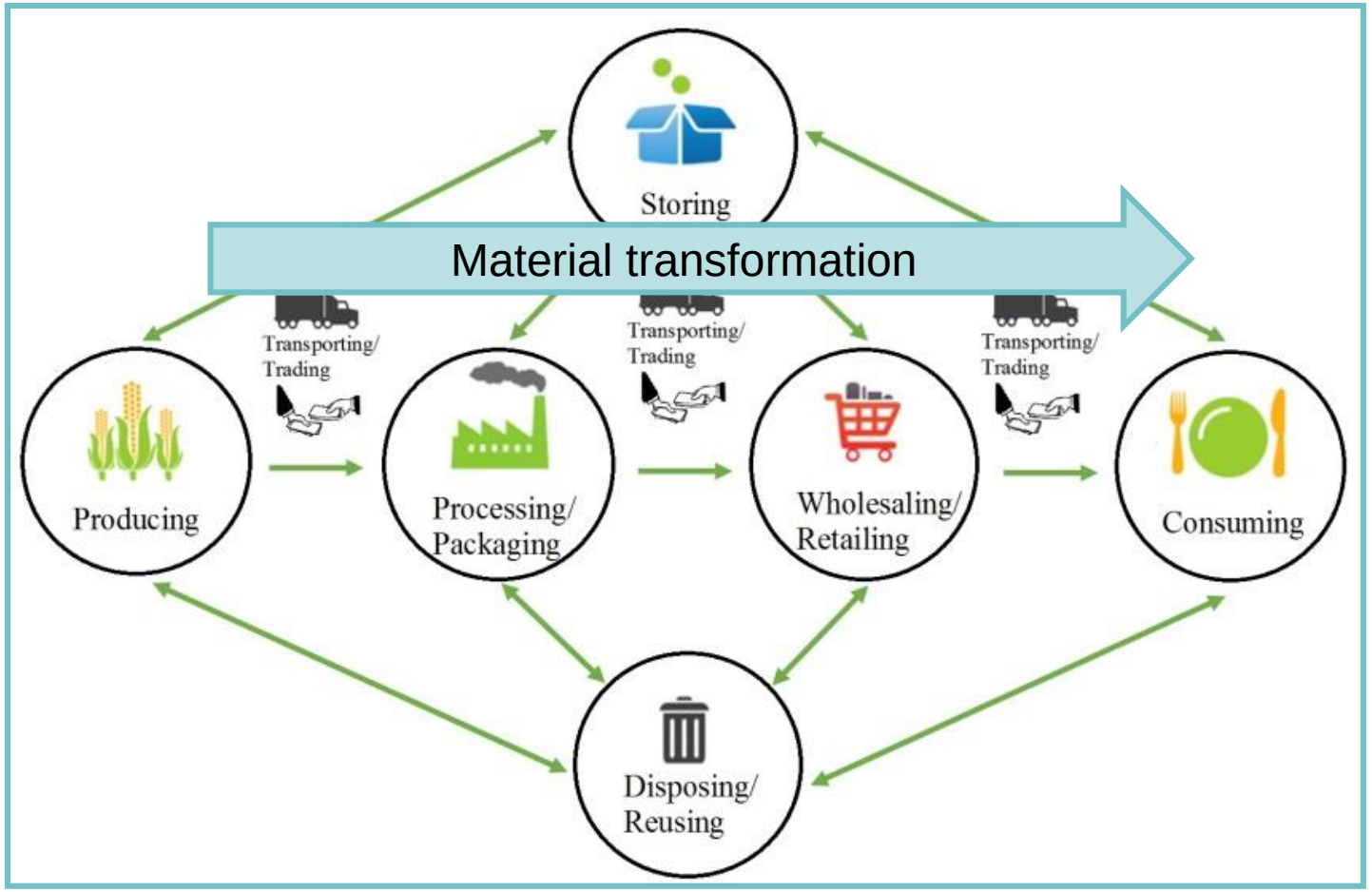

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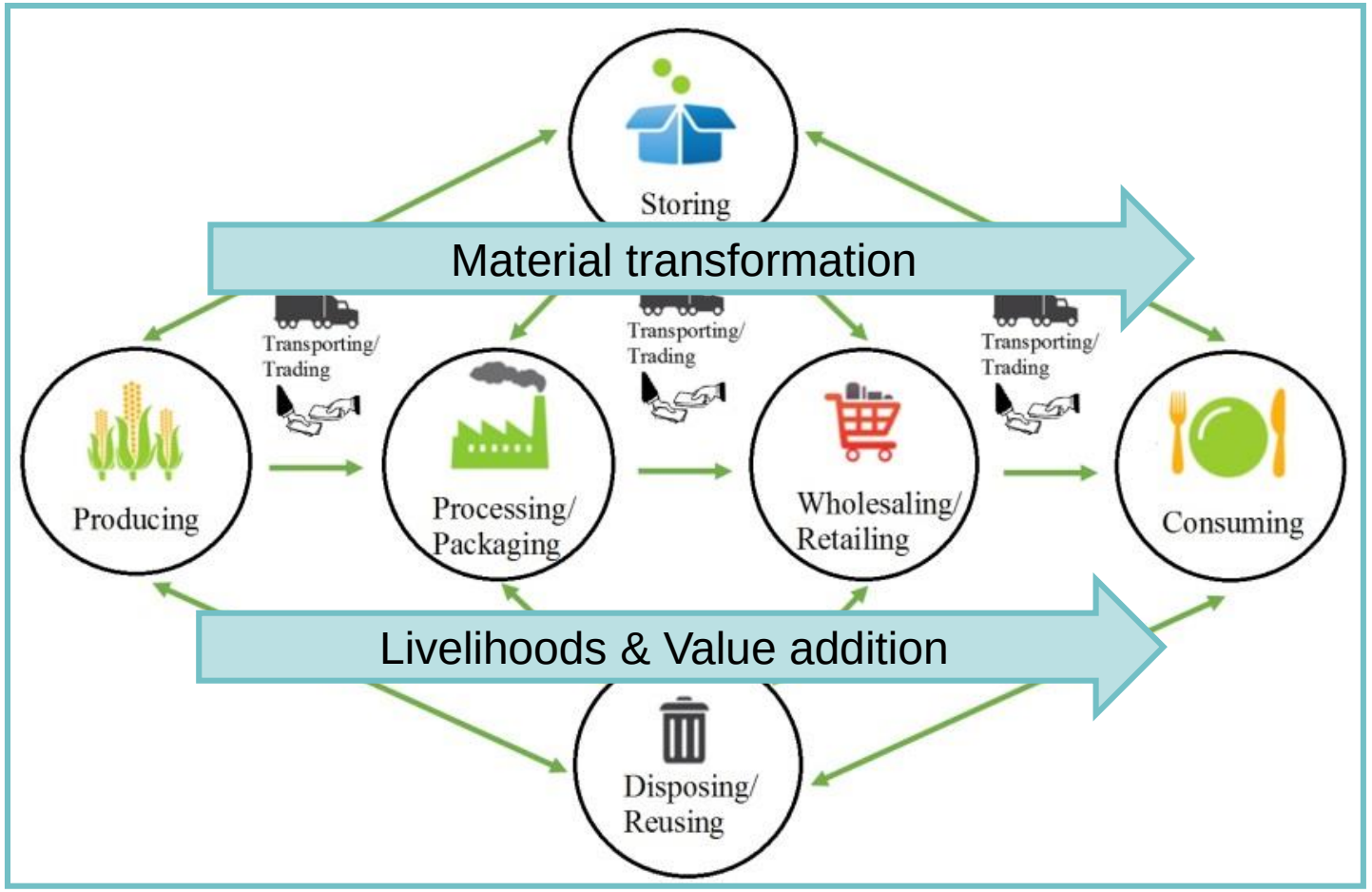

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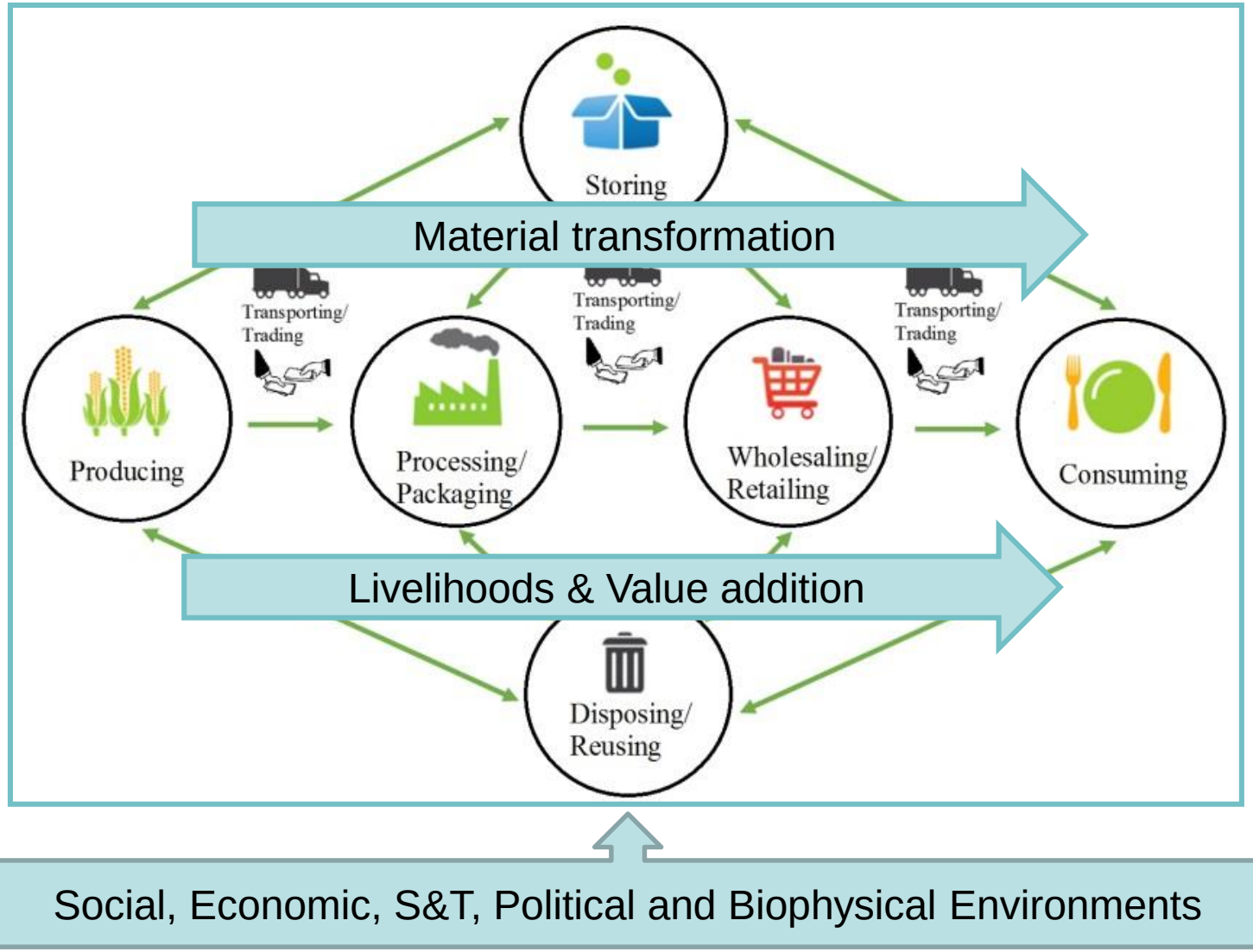

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Constraints on dietary choice and diversity

affordability, preference, allocation, cooking skill, convenience, cultural norms, …

=> Consumption by Sub-populations

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FOOD CHAIN ACTORS

'Post-farm gate' Food System Activities

processing, packaging, trading, shipping, storing, advertising, retailing, …

=> Final Cals/Nutrient Quantity and Price at shop

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PRODUCERS

Local, Regional & Global Production Activities

farming, horticulture, livestock raising, aquaculture, fishing, …

=> Basic Cals/Nutrient Quantity and Price at farm

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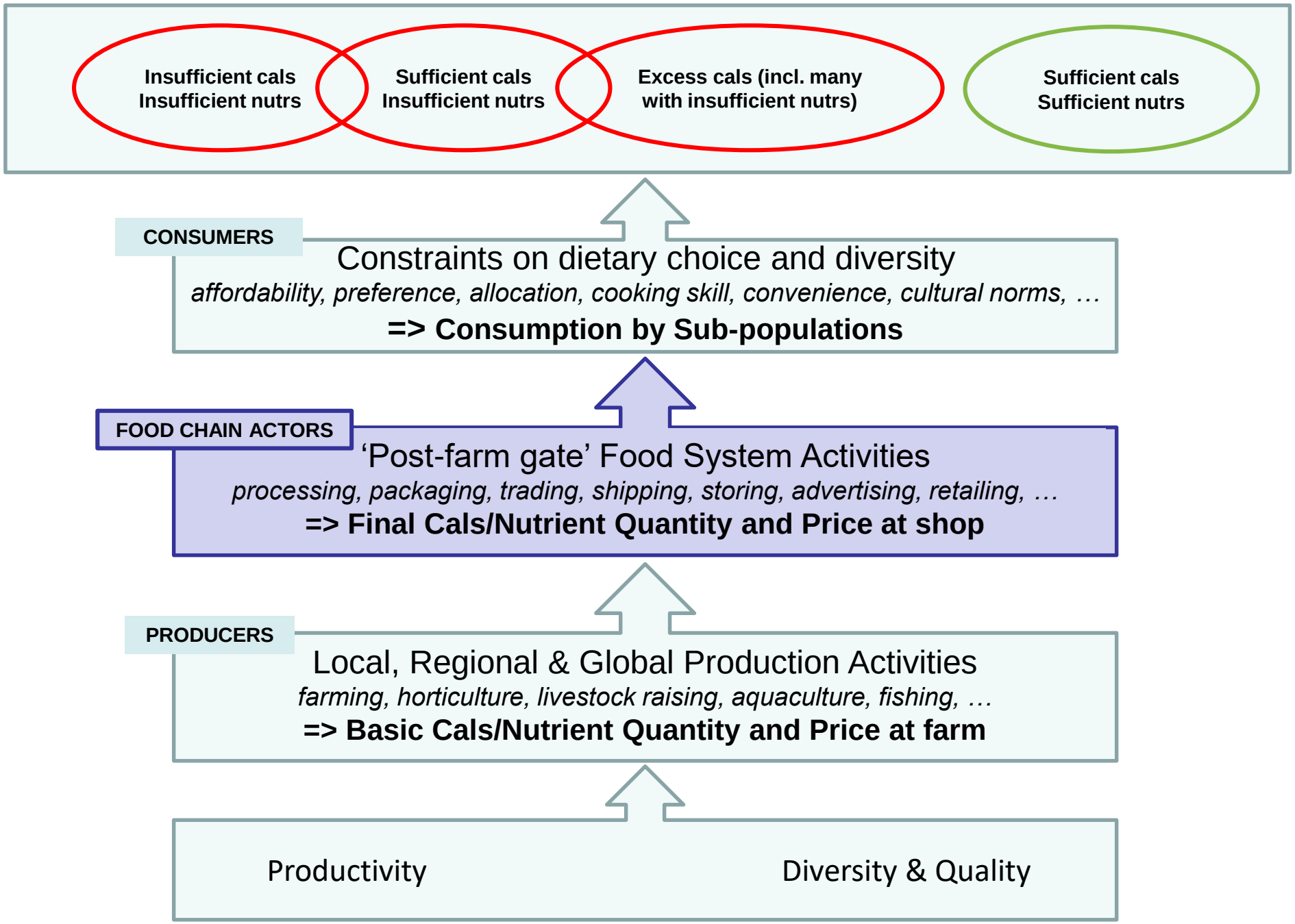

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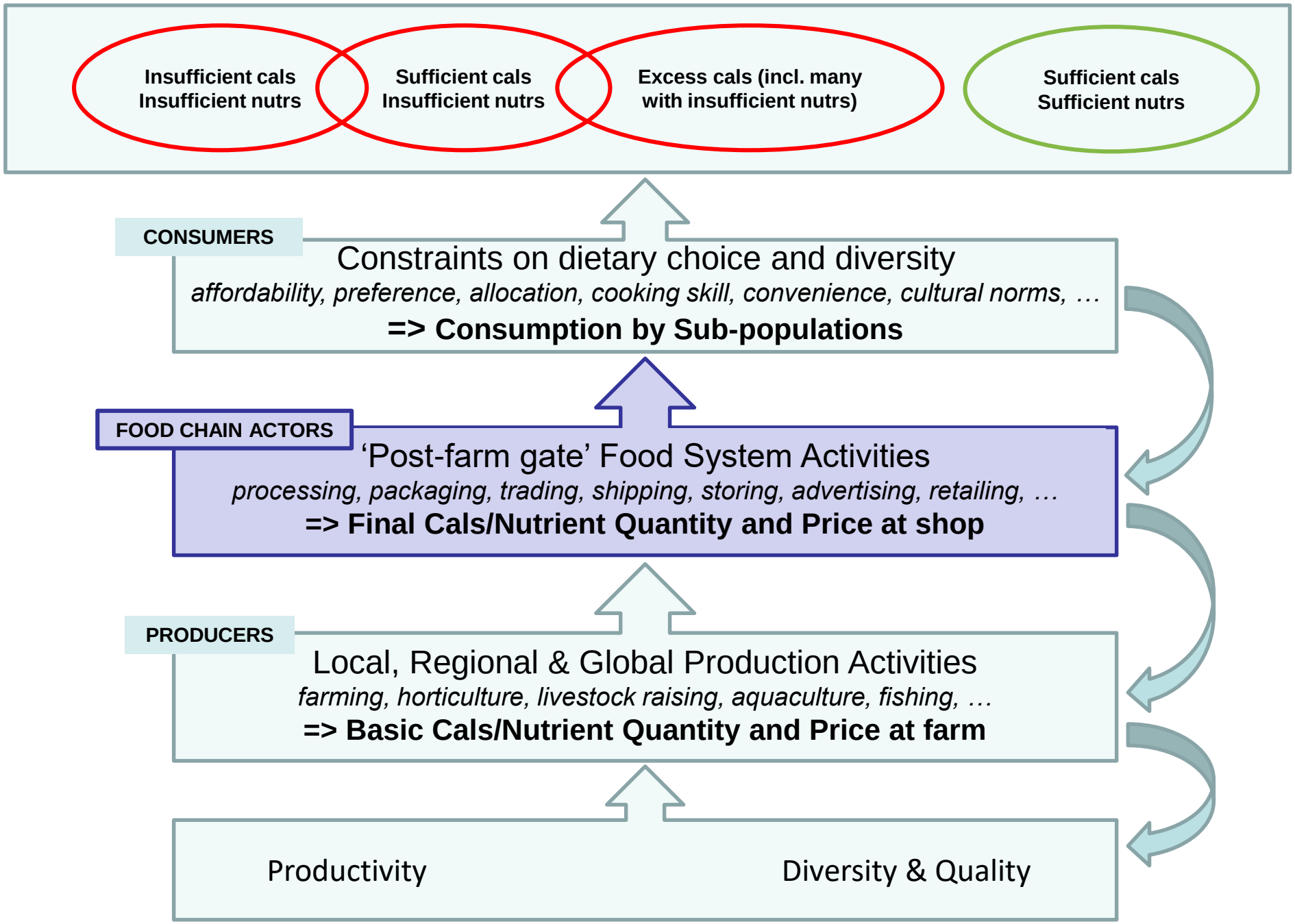

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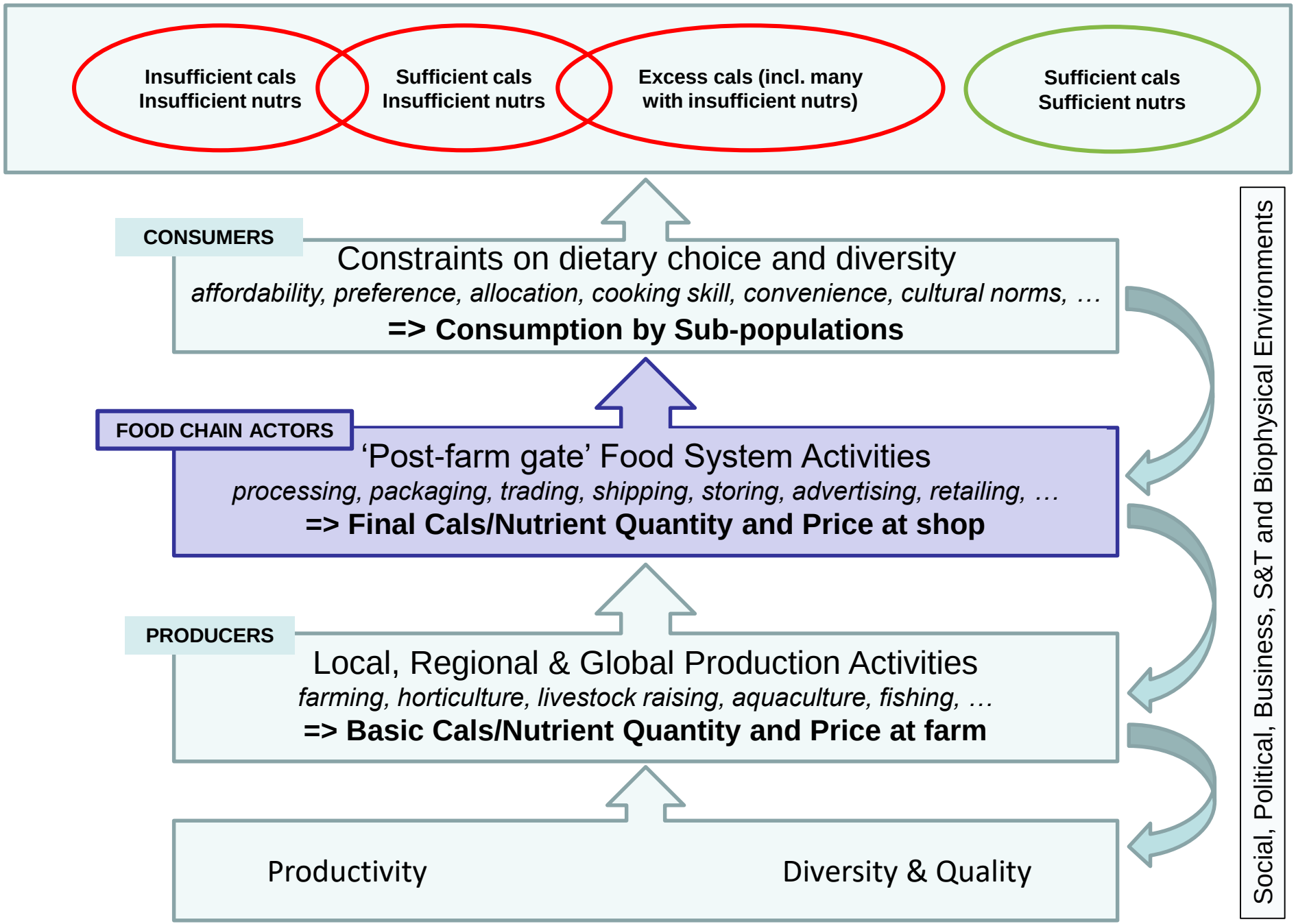

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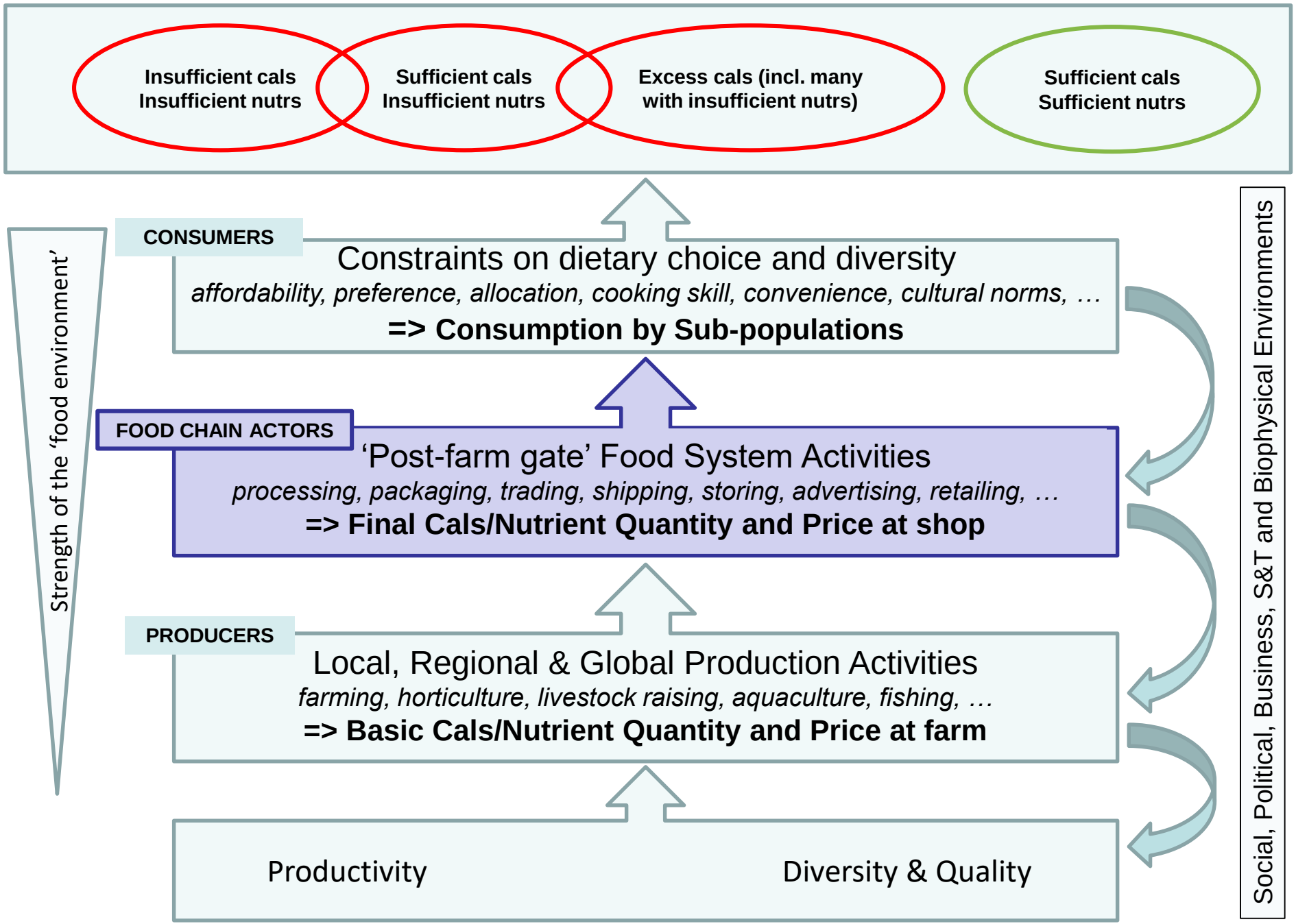

Example role of agroecology to help increase protein consumption

High-protein biscuits

Based on *The Protein Challenge 2040*

forum for the future

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A ‘Food System’ Perspective

based on multiple dialogues across multiple interfaces

Nutritionists, Anthropologists, Behavioural Psychologists

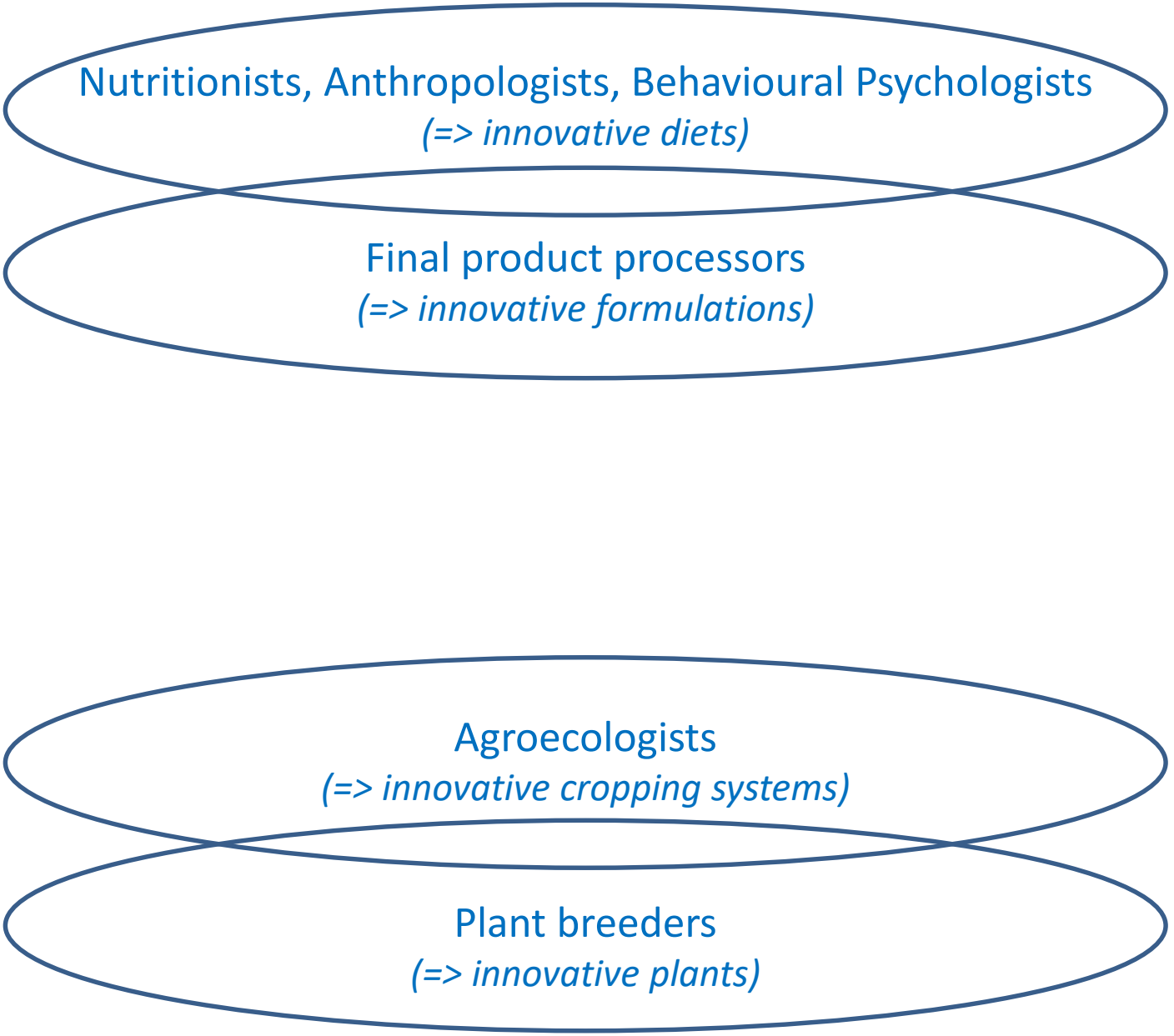
(=> innovative diets)

Plant breeders

(=> innovative plants)

A ‘Food System’ Perspective

based on multiple dialogues across multiple interfaces



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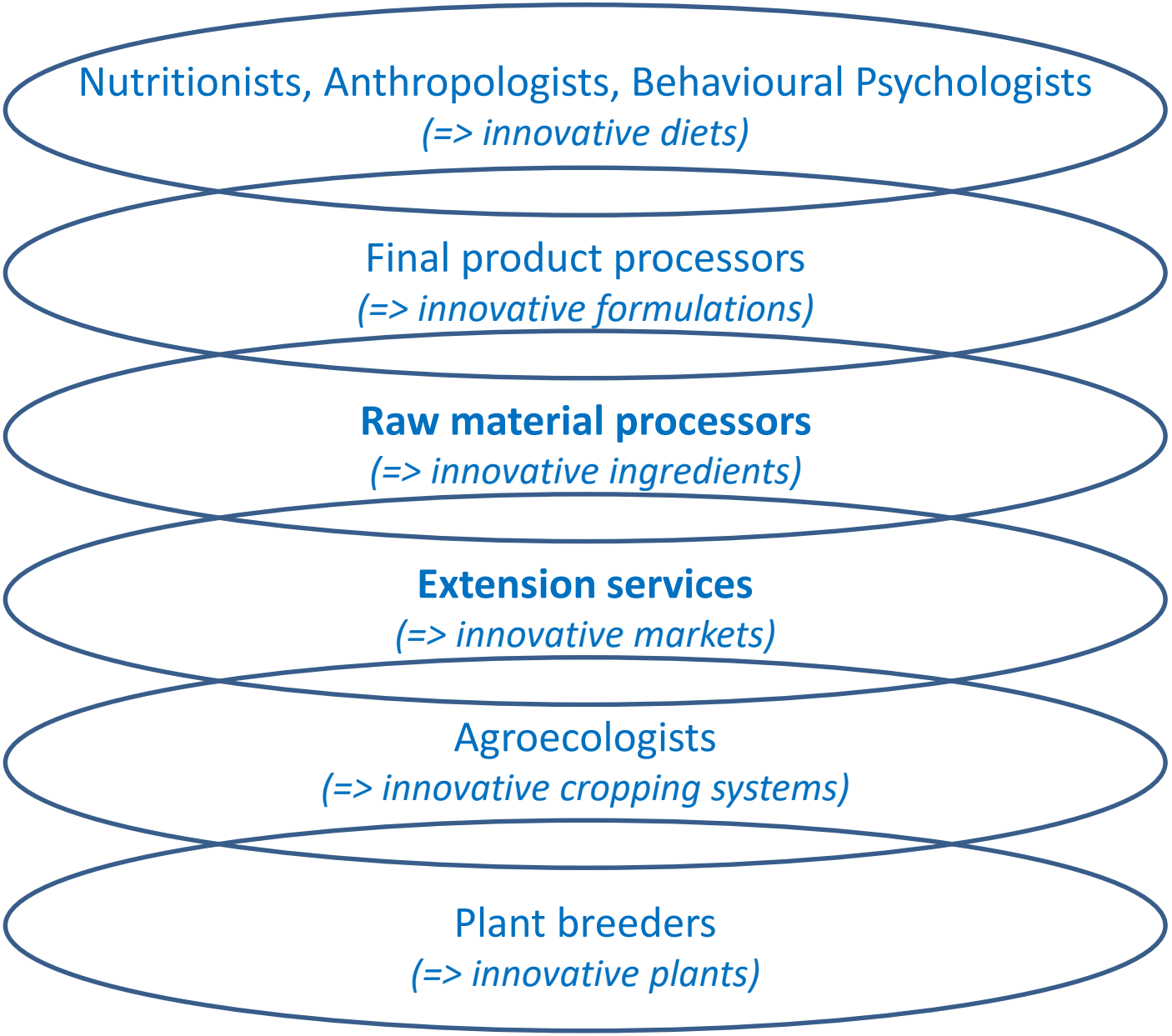

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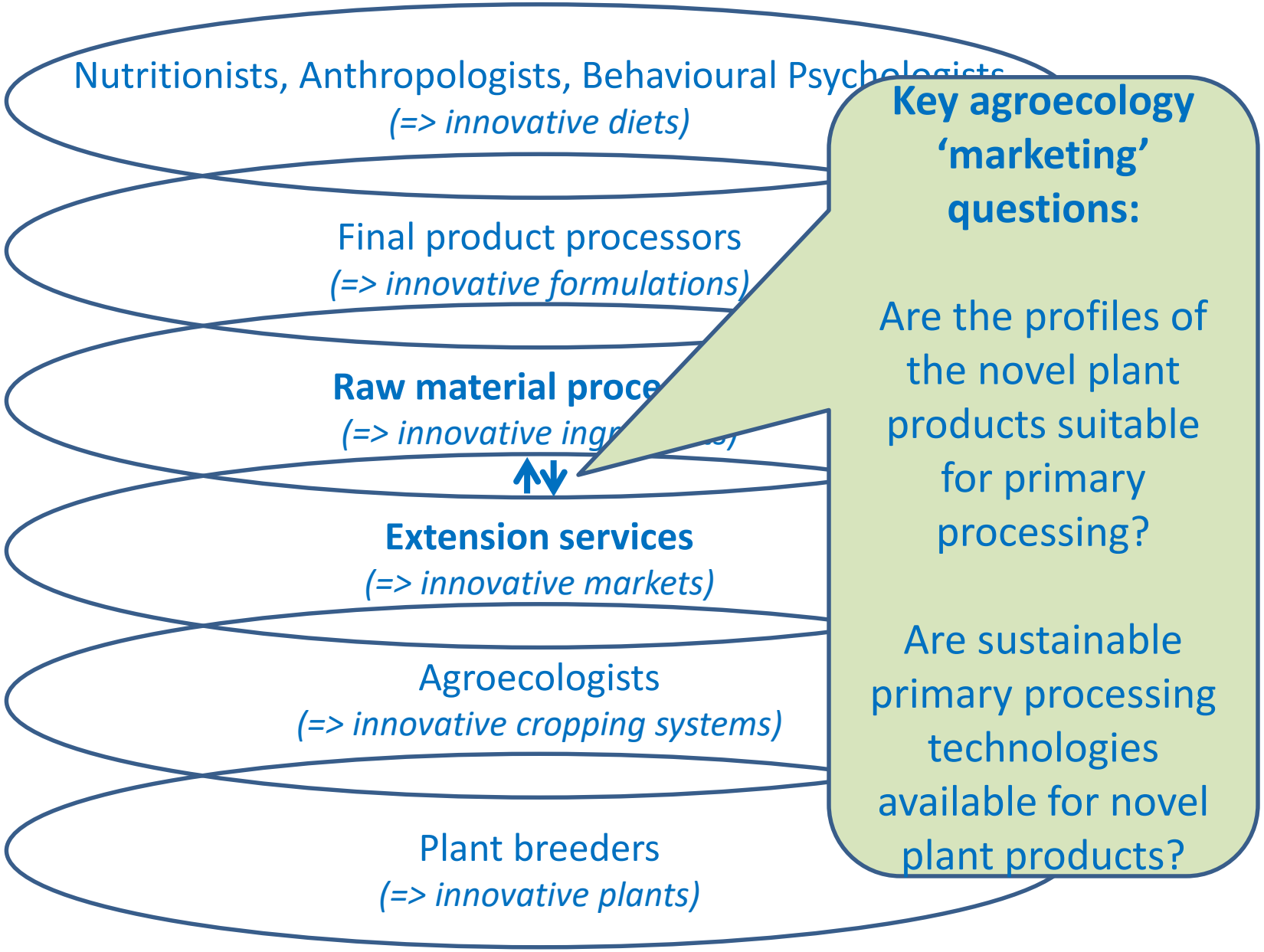

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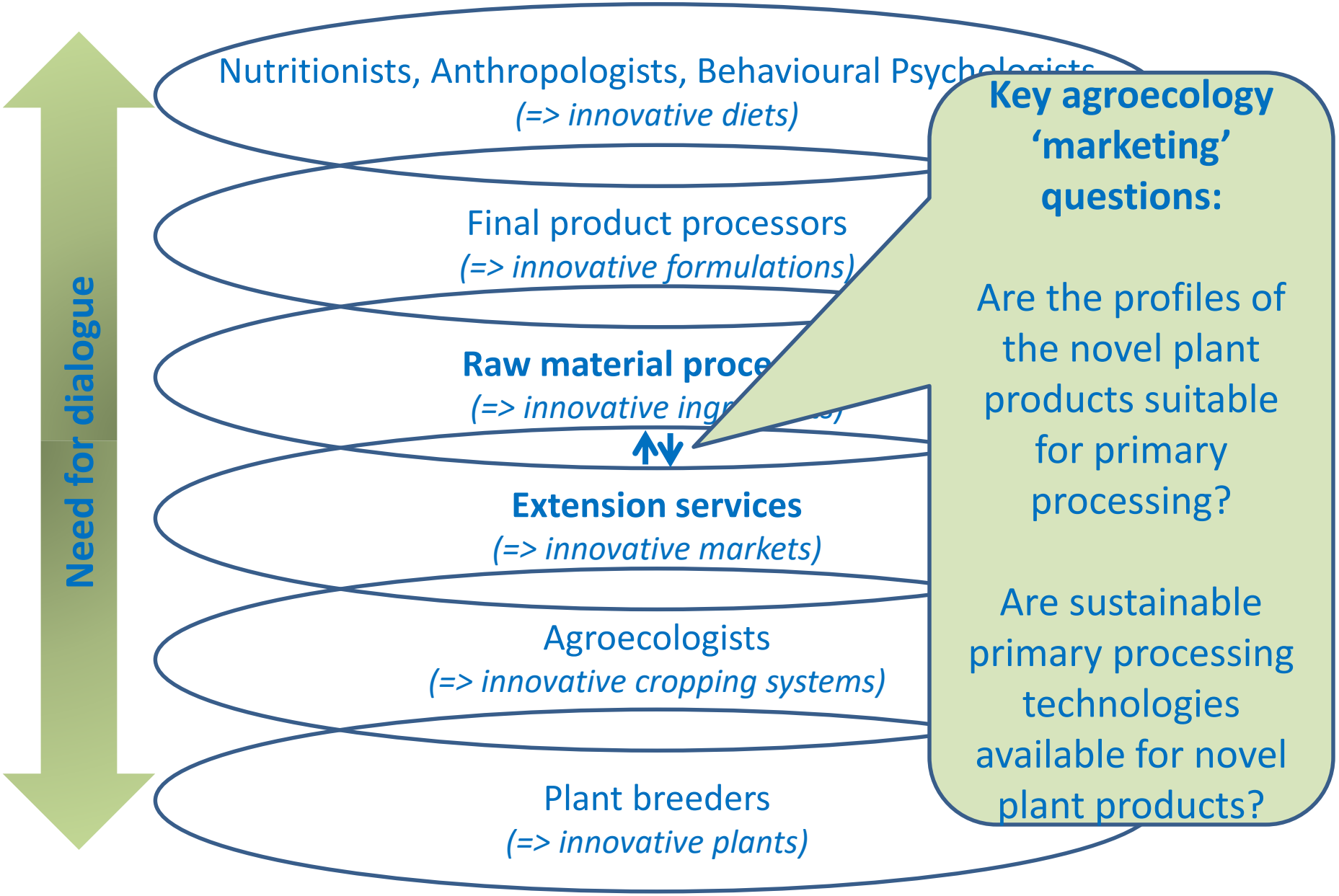
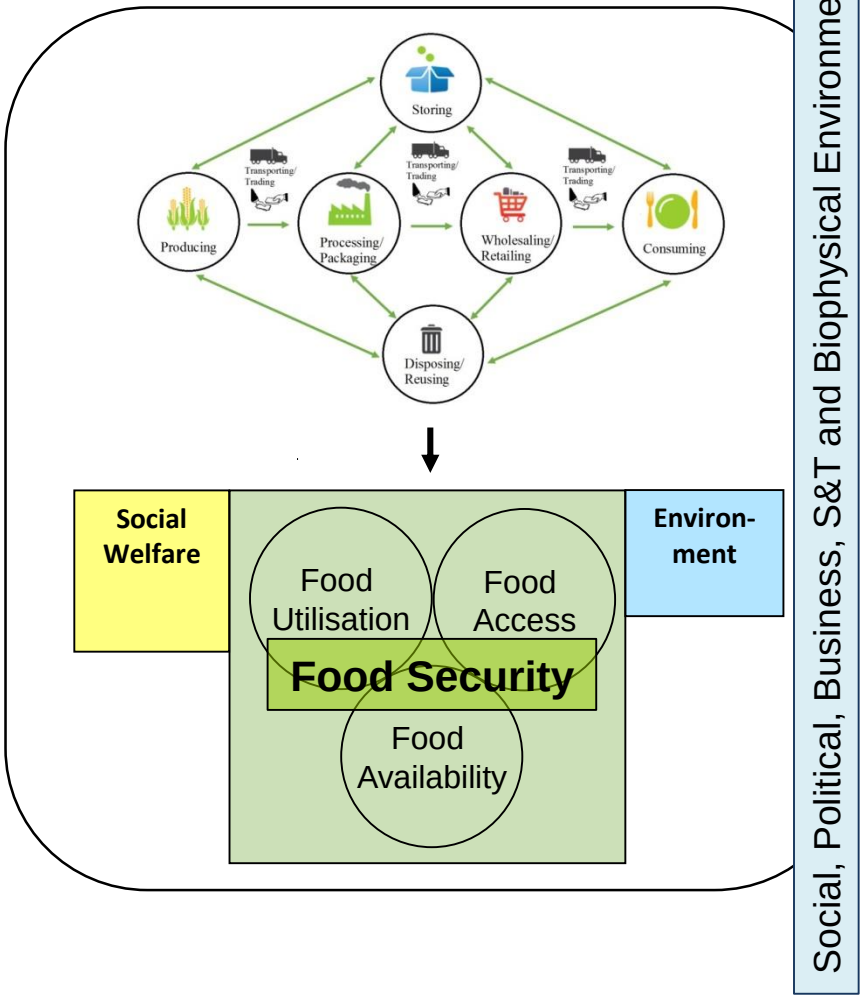


A ‘Complex Adaptive System’

Where to intervene; who does what (power); winners & losers?



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Socioeconomic DRIVERS

Changes in:

Demographics, Economics,
Socio-political context,
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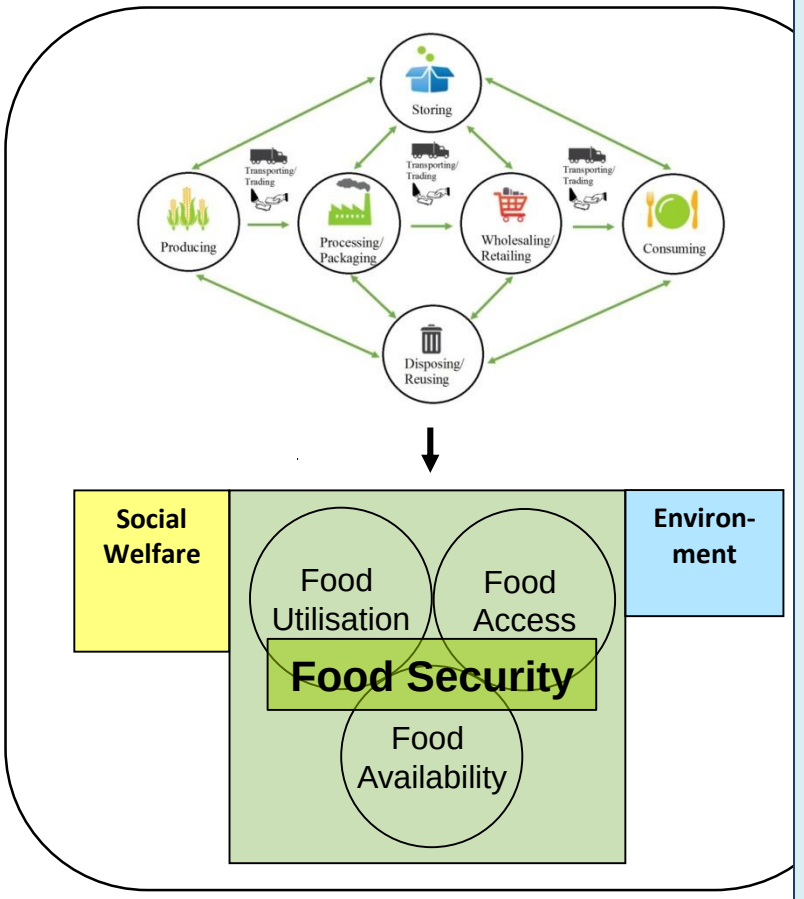
Science & Technology



A ‘Complex Adaptive System’

Where to intervene; who does what (power); winners & losers?

Environmental DRIVERS

Changes in:

Land cover & soils, Atmospheric Comp., Climate variability & means, Water availability & quality, Nutrient availability & cycling, Biodiversity, Sea level

‘Natural’ DRIVERS

e.g. Volcanoes
Solar cycles

Socioeconomic DRIVERS

Changes in:

Demographics, Economics, Socio-political context, Cultural context
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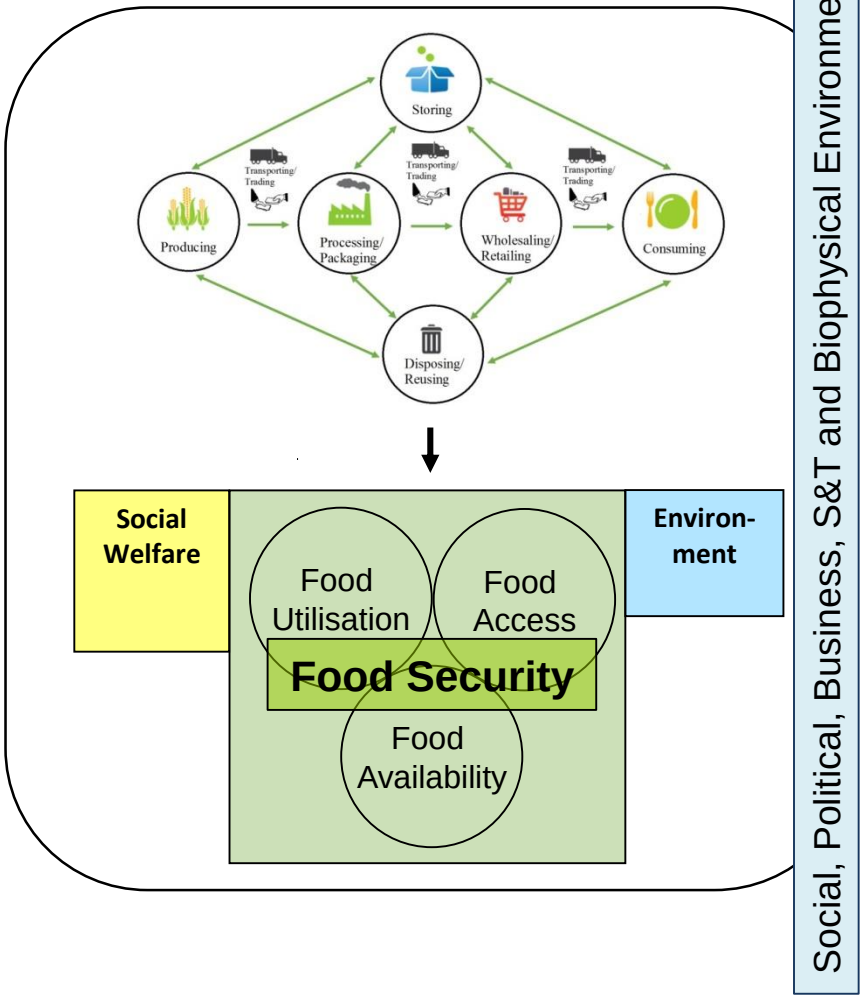

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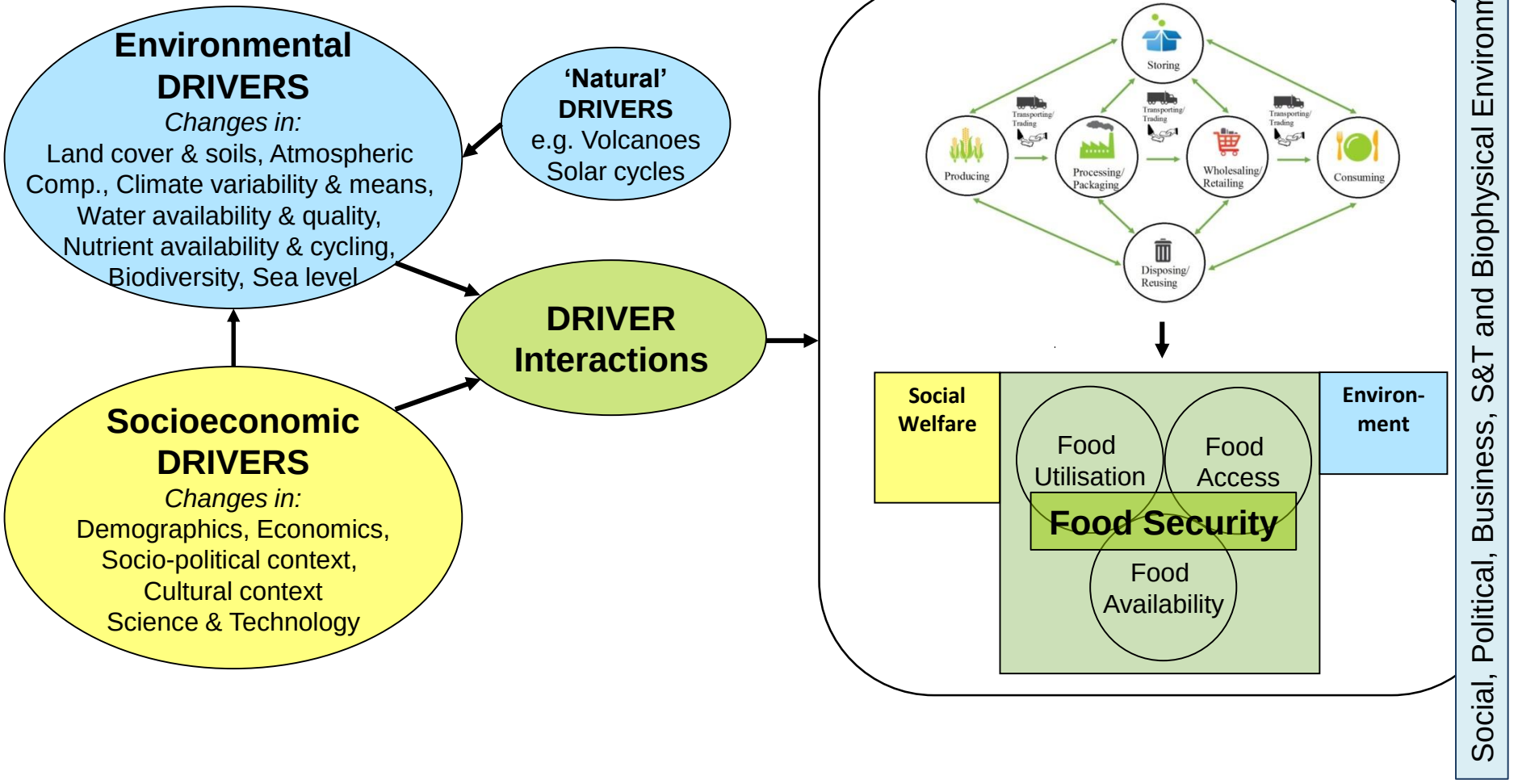

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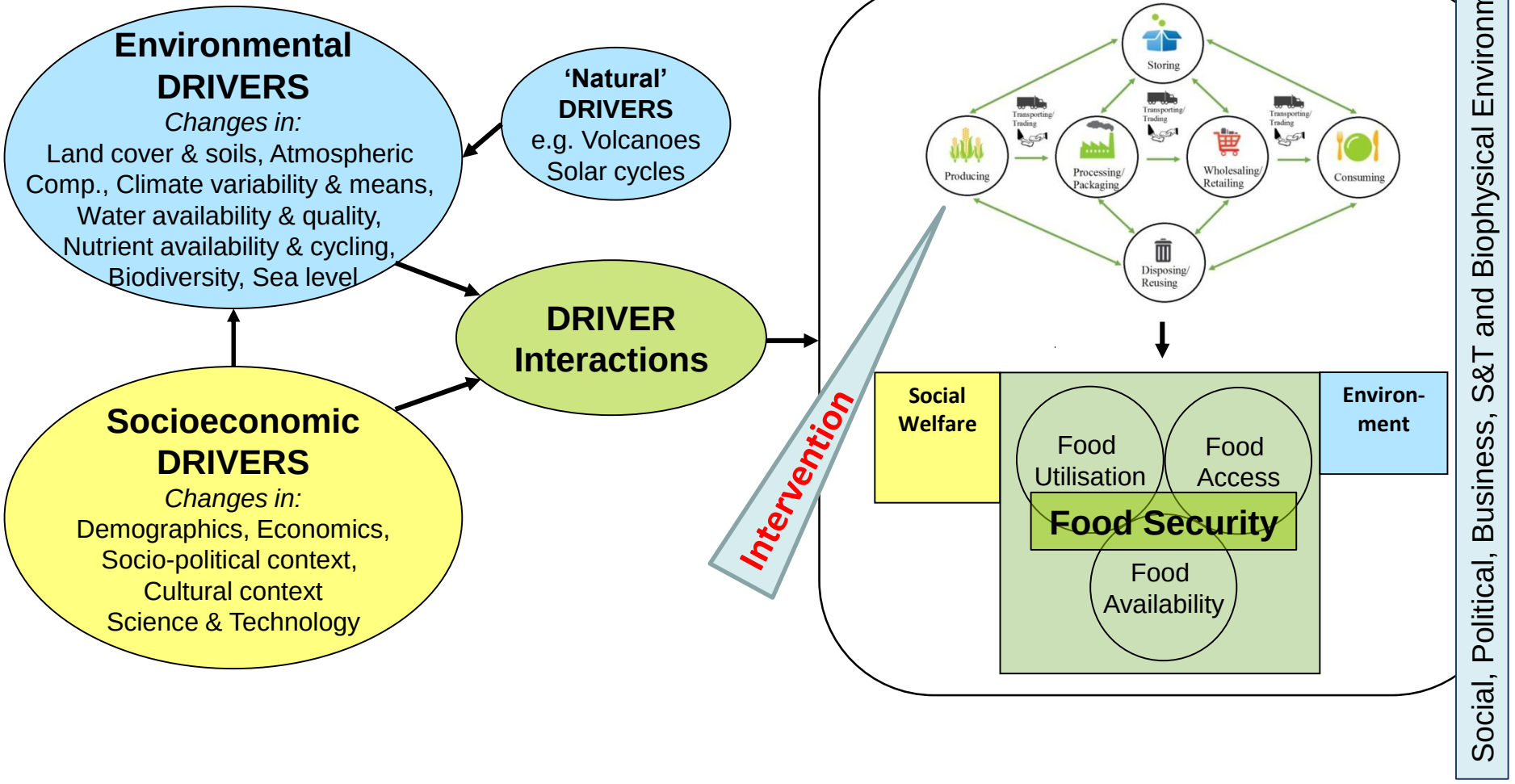

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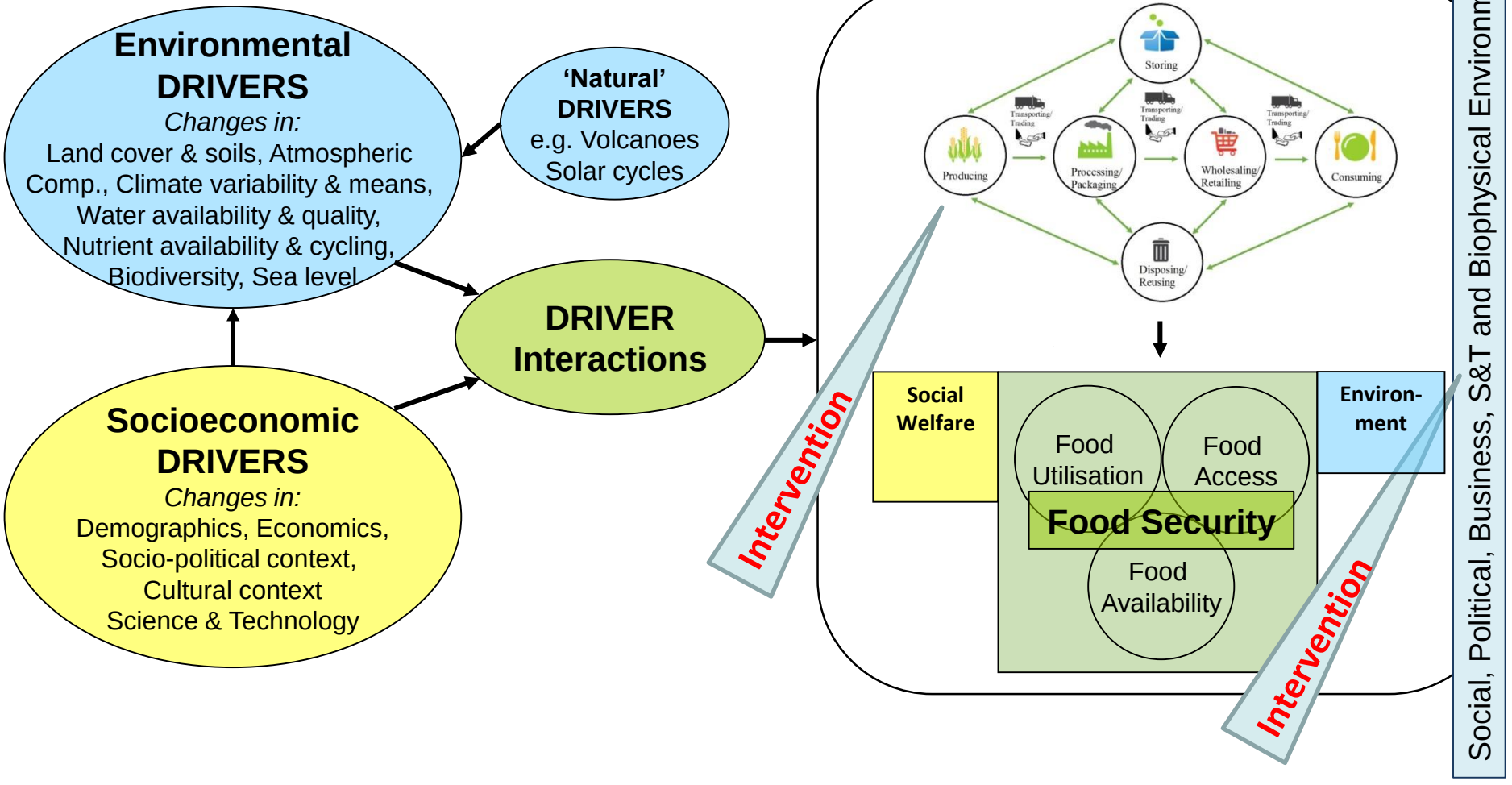

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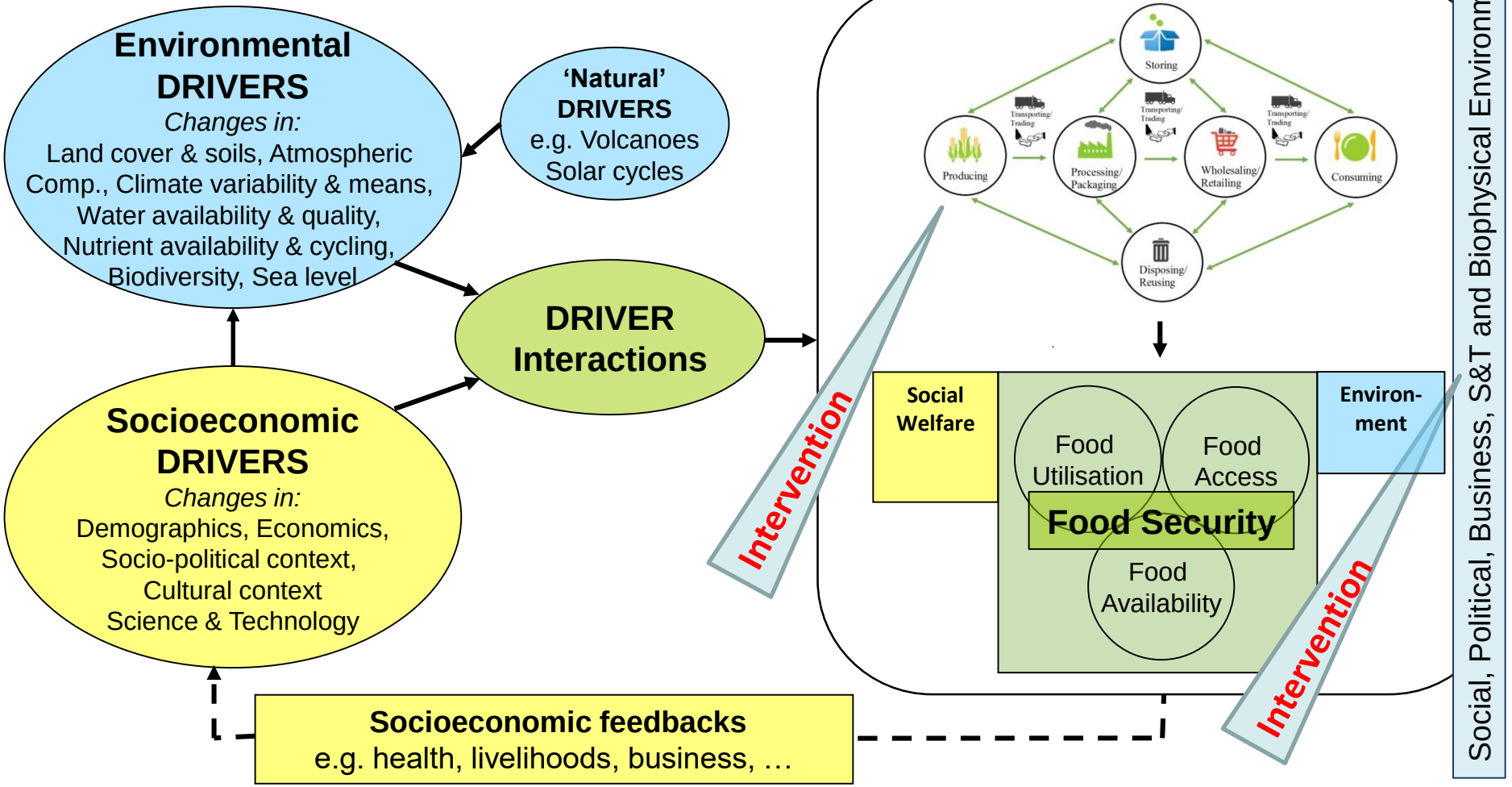

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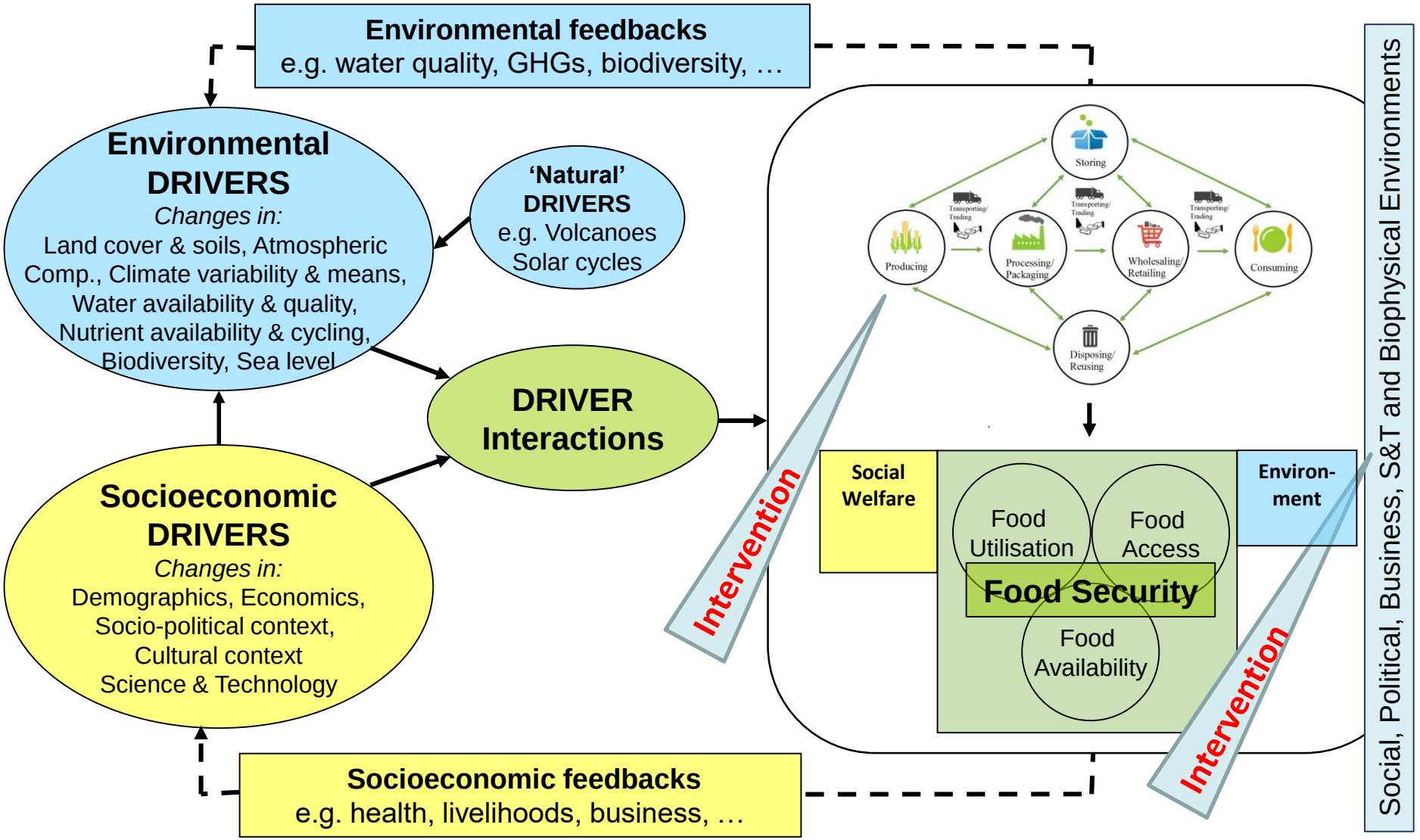

$1m/minute subsidies
an opportunity for agroecology?

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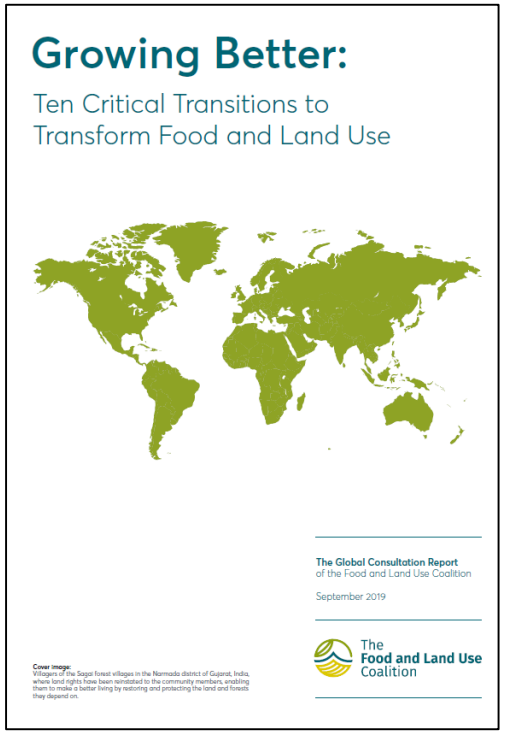
$1m a minute: the farming subsidies destroying the world - report

'Perverse' payments must be redirected to measures such as capturing carbon, report says

Damian Carrington *Environment editor*

@dpcarrington

Mon 16 Sep 2019 00.00 EDT



Growing Better:

Ten Critical Transitions to Transform Food and Land Use

The Global Consultation Report of the Food and Land Use Coalition

September 2019

The Food and Land Use Coalition

Cover image: Villagers of the Sagai forest villages in the Narmada district of Gujarat, India, where land rights have been reinstated to the community members, enabling them to make a better living by restoring and protecting the land and forests they depend on.

FINANCIALS KEY

Economic prize by 2030

Annual additional investment requirements to 2030

Business opportunity by 2030

Ten Critical Transitions		Essential Actions	Financials (by 2030)
#2 Productive & Regenerative Agriculture	Agricultural systems that are both productive and regenerative will combine traditional techniques, such as crop rotation, controlled livestock grazing systems and agroforestry, with advanced precision farming technologies which support more judicious use of inputs including land, water and synthetic and bio-based fertilisers and pesticides.	**Government & Business:** Scale up payments for ecosystem services (soil carbon/health and agrobiodiversity) plus improve extension services (training and access to technology, seeds, etc.) **Business & Investors:** Shift procurement from buying commodities to investing in sustainable supply chains; deploy innovative finance to reach currently underfinanced parts of supply chains	$1.17 trillion $35-40 billion $530 billion

Why is it so hard to make progress?

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- Complex adaptive system, many interactive 'drivers' and feedbacks
- Set of dynamic actors and activities
- Interactive socioeconomic and environmental drivers
- Policy, social, economic and technical lock-in
- Wide range of power and vested interests; fragmented governance
- Traditional silo approaches; poor ability to deal with complexity

However…

- Many policy, fiscal, social and technical options for change
- Many options for cooperation among actors
- Many plausible futures
- Many opportunities for agroecological approaches!

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