Ecological principles of circularity

Economic Perspectives for a Circular Food System

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A healthy planet

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Fisher et al. (2007)

What if …

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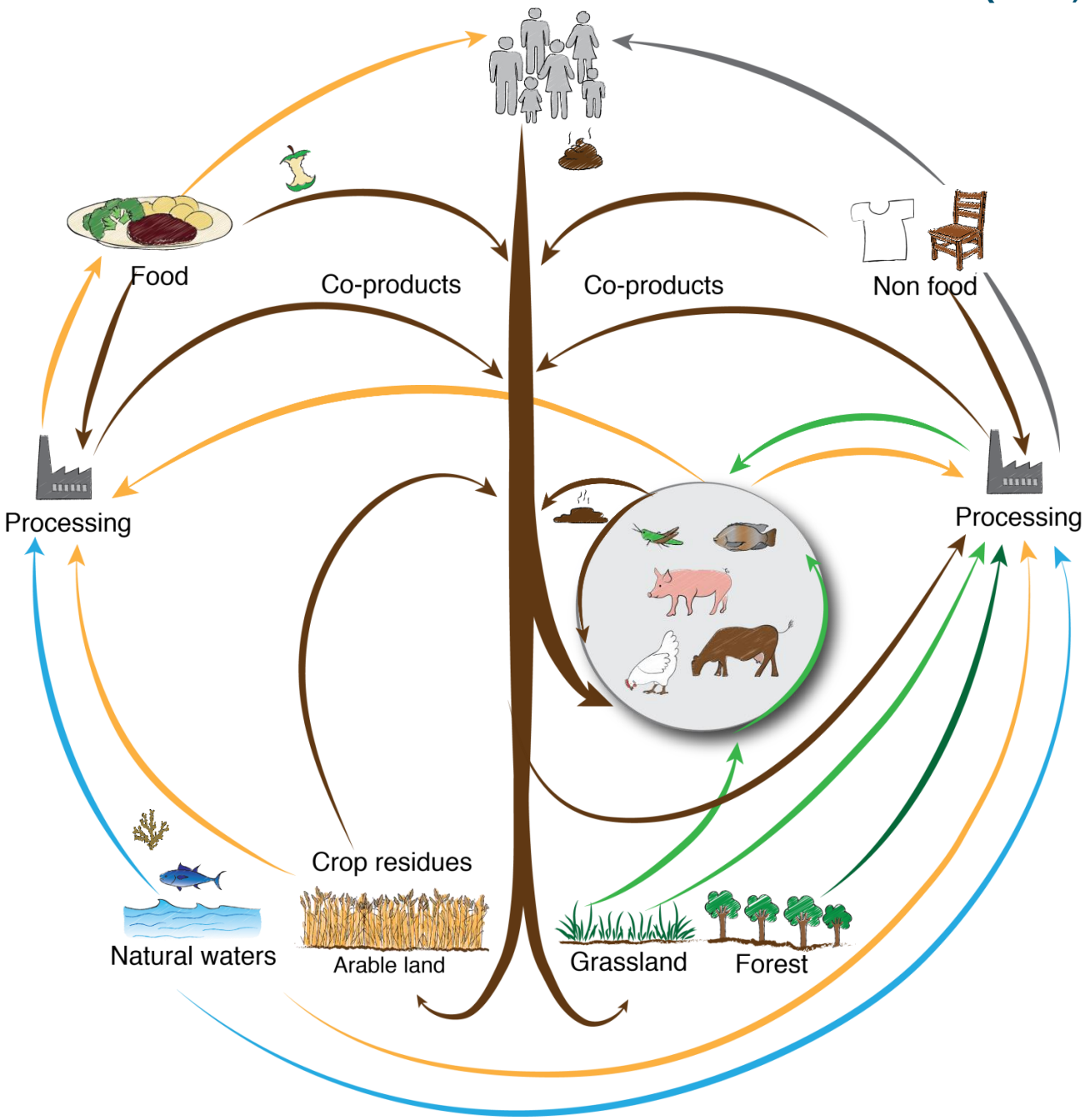
Muscat et al. (2020, under review)



Plant biomass is the basis

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Source: Pixabay; Achive Texelse Courant

Key ecological principles

1. **Safeguard** the health of our agroecosystems
2. **Avoid** non-essential products, losses & wastes of essential ones
3. **Use** biomass effectively
4. **Recycle** inevitable & unavoidable biomass streams
5. **Minimize renewable energy use**

1. Safeguard

Conservation and regeneration of healthy ecosystems

Conservation
e.g. zero deforestation

Regeneration
e.g. polyculture

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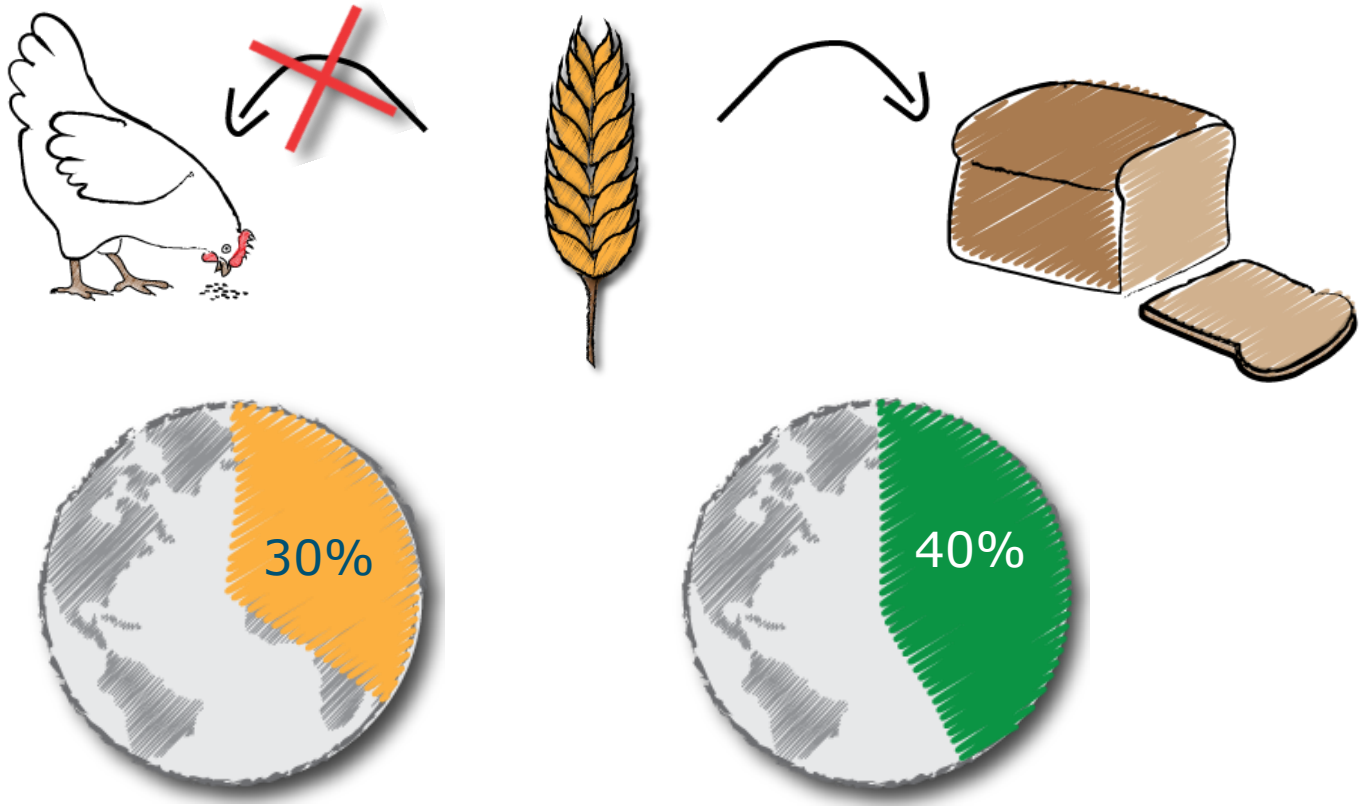
2. Avoid

Avoid comes before use/recycle to prevent upstream production processes and associated impacts

3. Use principle

Biomass and production resources should be used most effectively – human needs framework



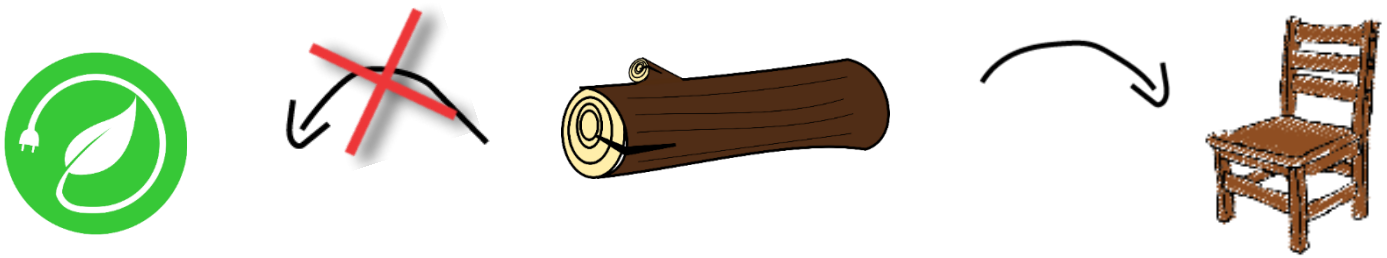
Global cereal production

Global arable land

Mottet et al. (2017)

3. Use principle

- 60% of fish stocks need rebuilding
- 25% of global landings not used as human food
- 90% of fish meal is food-grade fish



Worm et al. (2009); Cashion et al. (2017)

4. Recycle principle

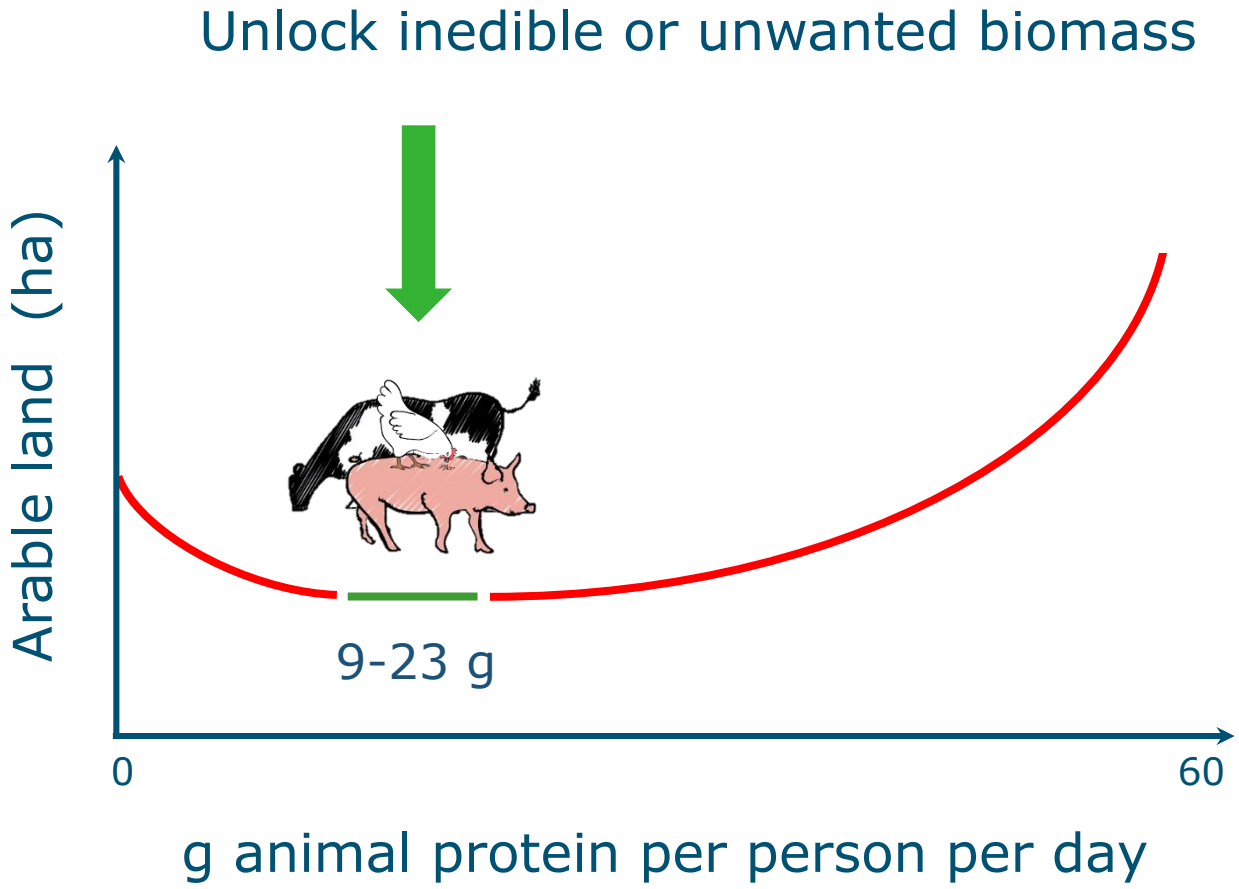
By-products should be recycled back into the system if they are inevitable or unavoidable

?

Farm animals

- Food
- Manure
- Other ecosystem services

Animals?



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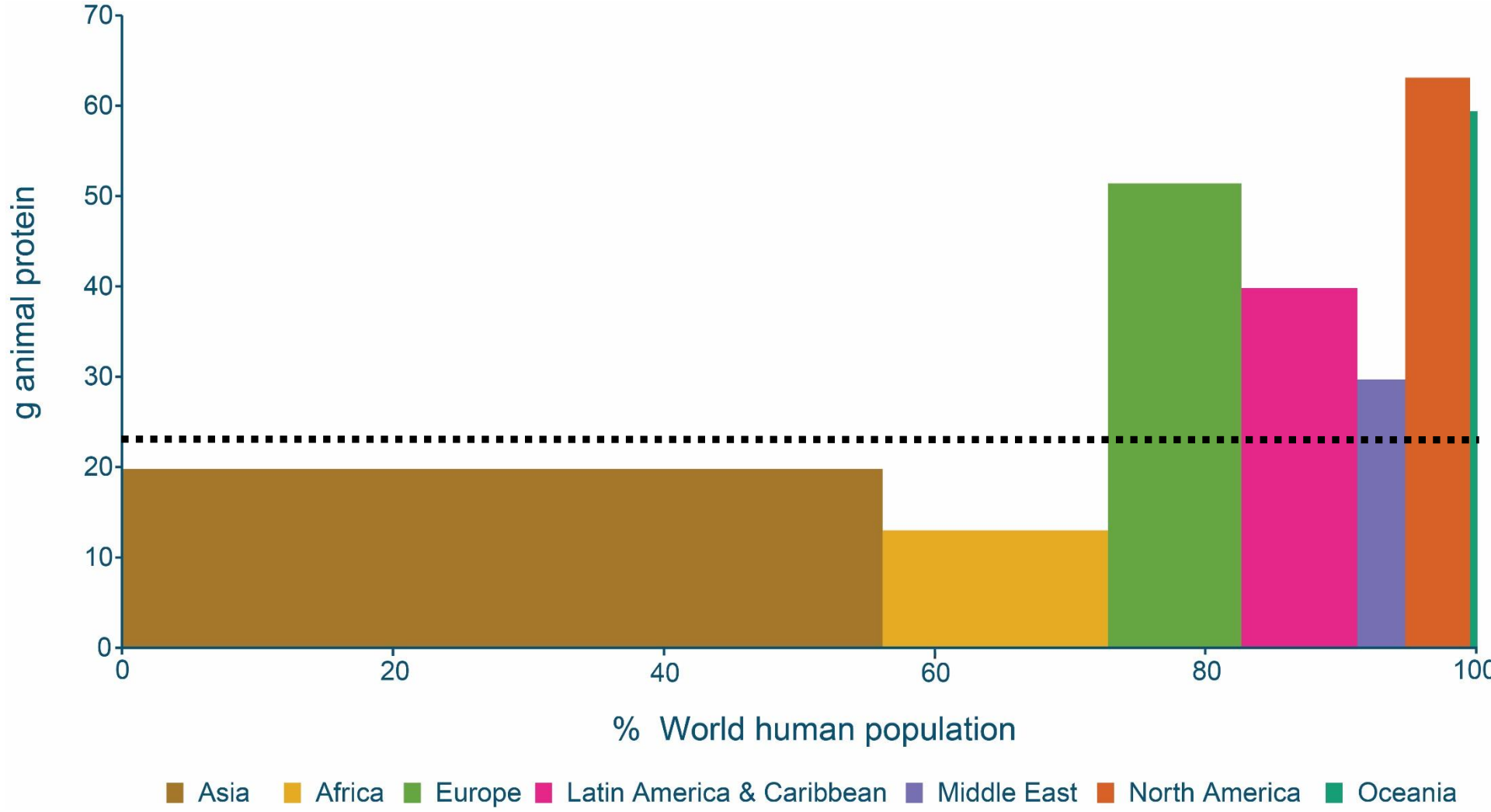
Van Zanten et al. (2018) Global Change Biology

Animal protein available for consumption



Van Zanten et al. (2018) Global Change Biology

5. Energy Principle

Non-renewable energy sources, minimise energy use

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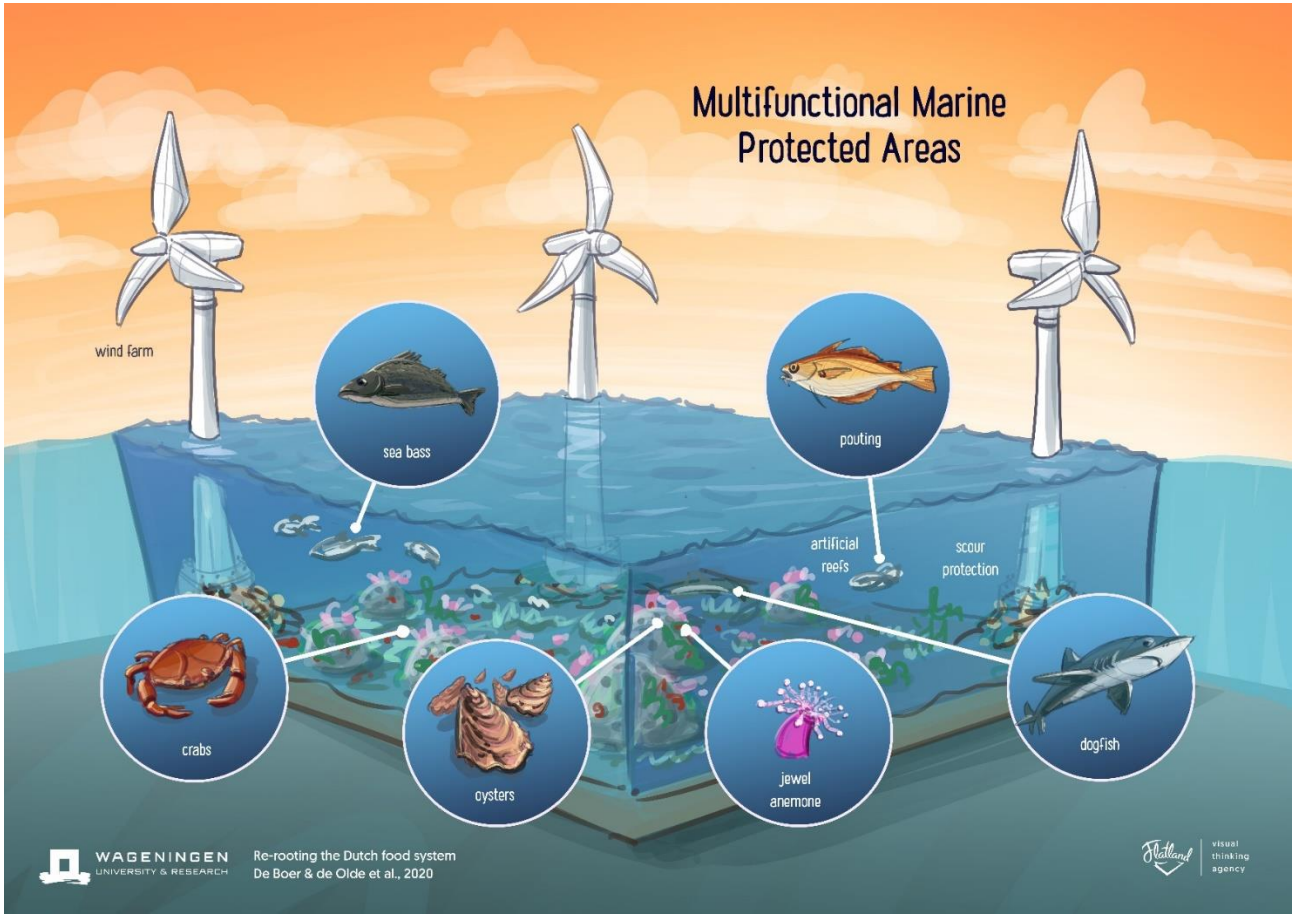
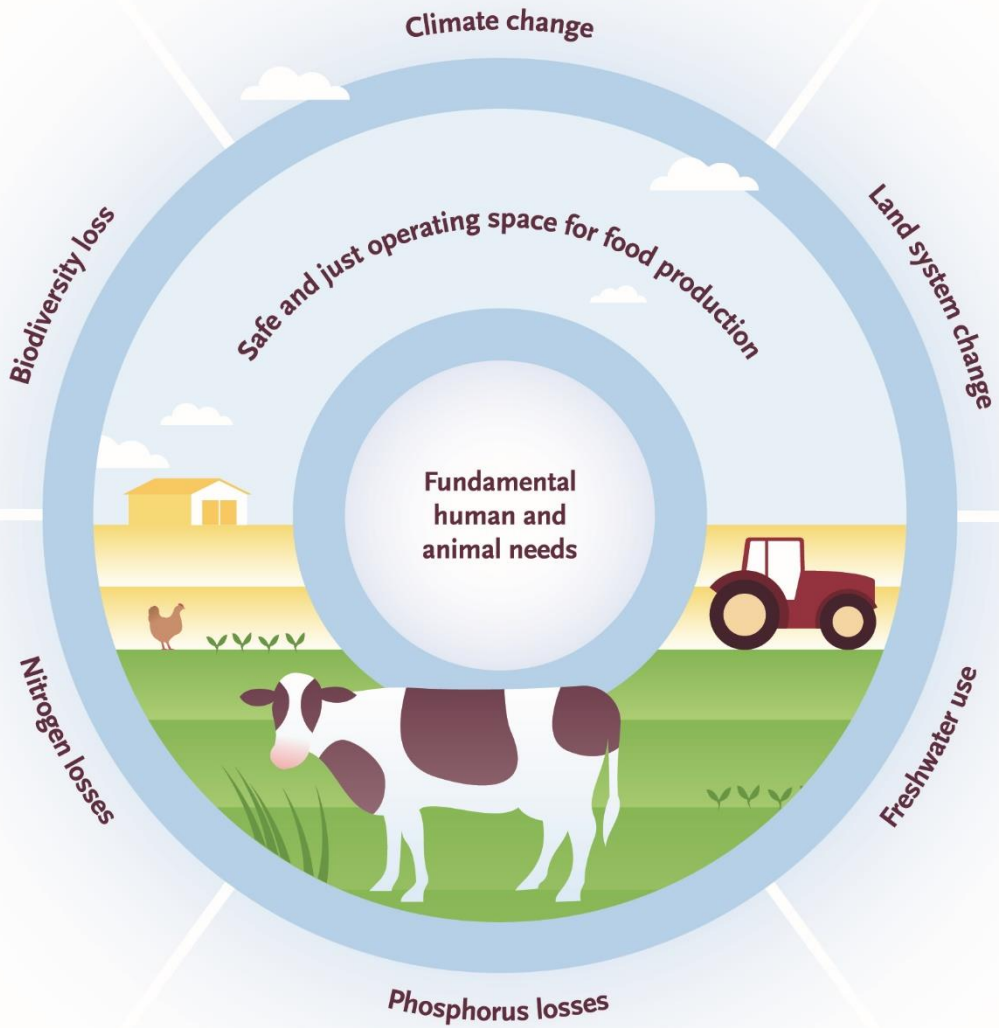


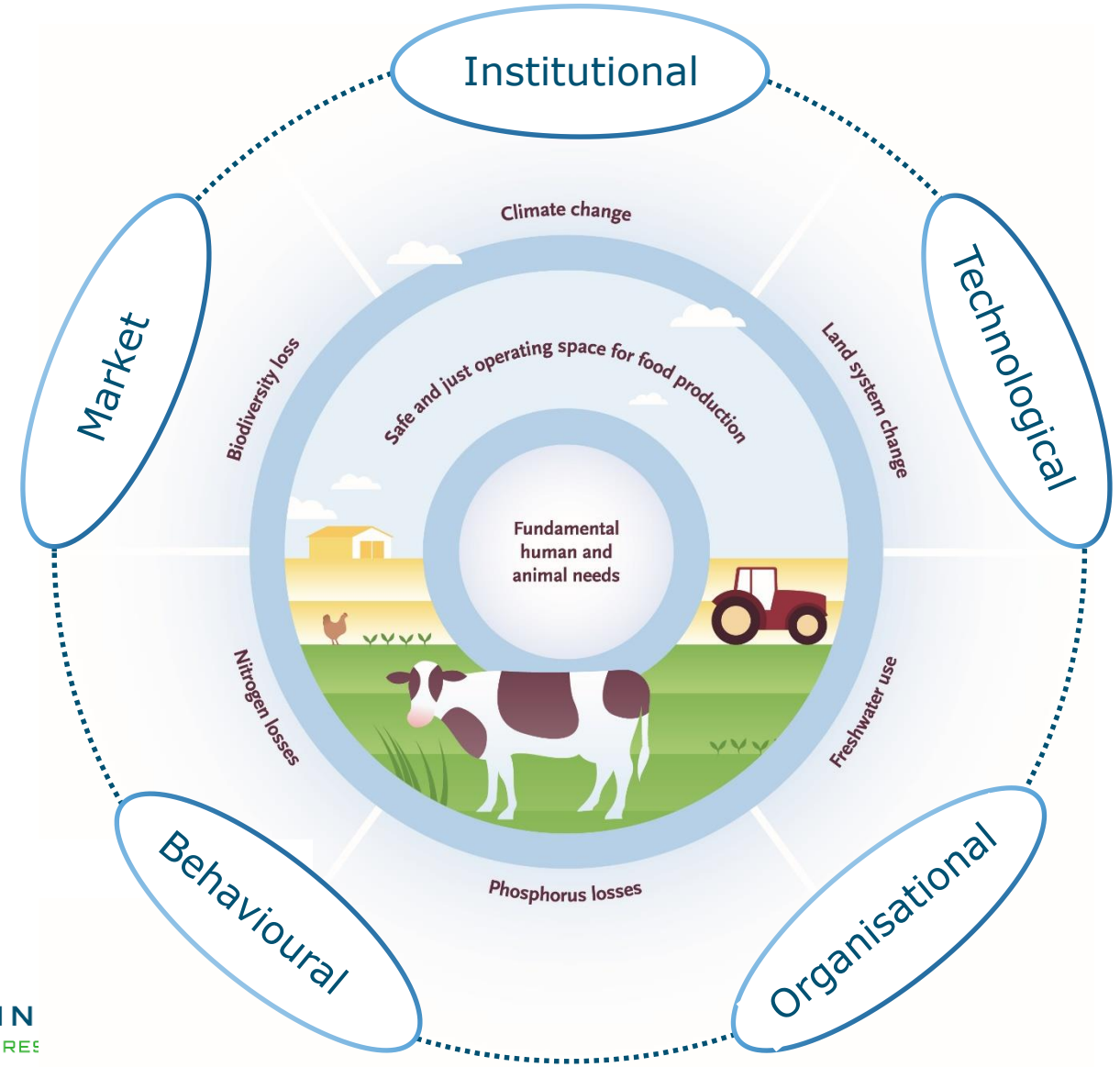
5. Energy Principle

Non-renewable energy sources, minimise energy use

Safe-and-just operating space



Systems change



Economic perspectives?

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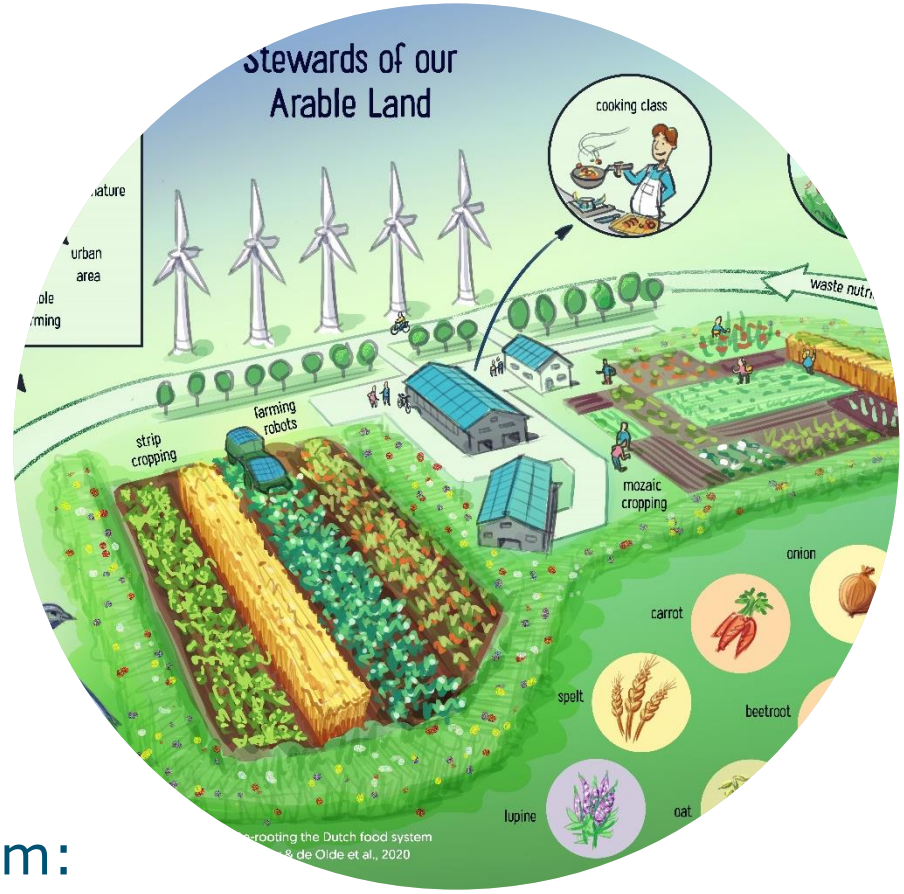
Thank you for your attention



Re-rooting the Dutch Food System:

from more to better

https://media-openideo-rwd.oiengine.com/attachments/daea677e-e90b-43de-a605-cf51b31d3293.pdf

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