BÆREDYGTIGHED OG ØKOLOGI

AARHUS
UNIVERSITY
DEPARTMENT OF AGROECOLOGY

ØKOLOGI-KONGRES 2019
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RESEARCHER

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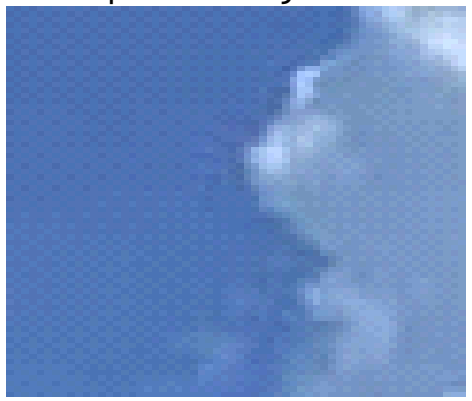
- Forsker ved Institut for Agroøkologi ved Århus Universitet og medlem af Klimarådet
- Agronom og ph.d. i livscyklusvurderinger af fødevarer
- Klima- og miljømæssig bæredygtighed af landbrugs- og fødevaresystemer, hvor jeg bruger livscyklusvurderinger - og underviser i jordbrug i globalt perspektiv.

MILJØPÅVIRKNING FRA FØDEVAREPRODUKTION

Klimapåvirkning



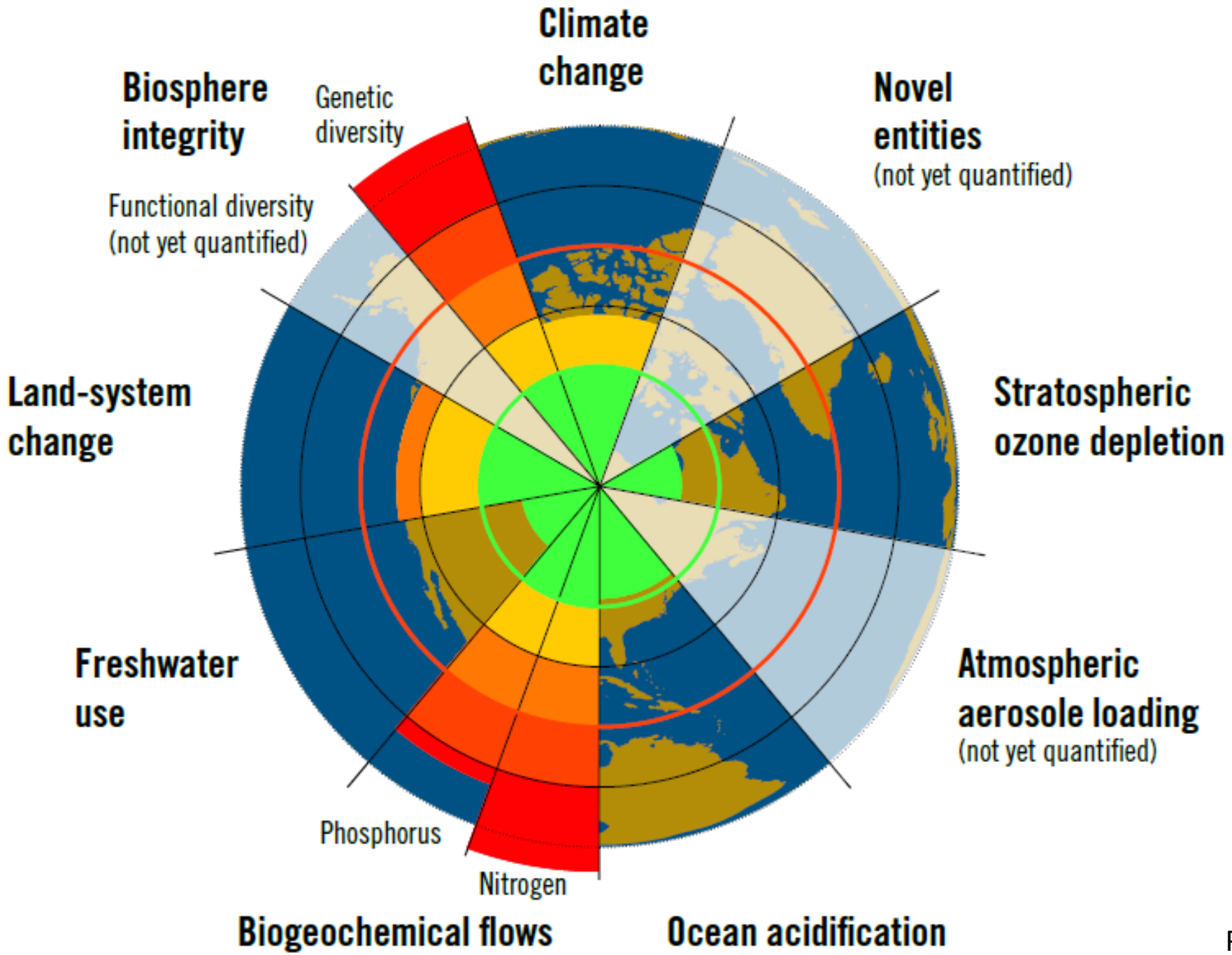
Næringsstofberigelse

Økotoxicitet

Jord og kulstoflagring

Biodiversitet

Dyrevelfærd

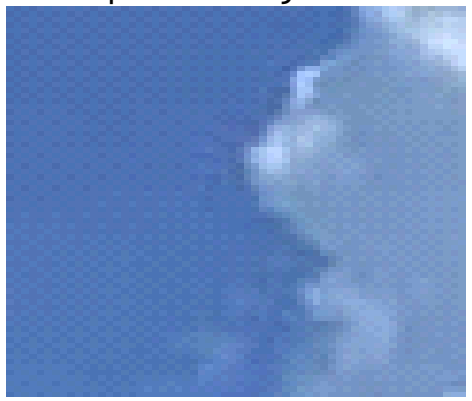


Rockström et al. (2015)


SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS

MILJØPÅVIRKNING FRA FØDEVAREPRODUKTION

Klimapåvirkning



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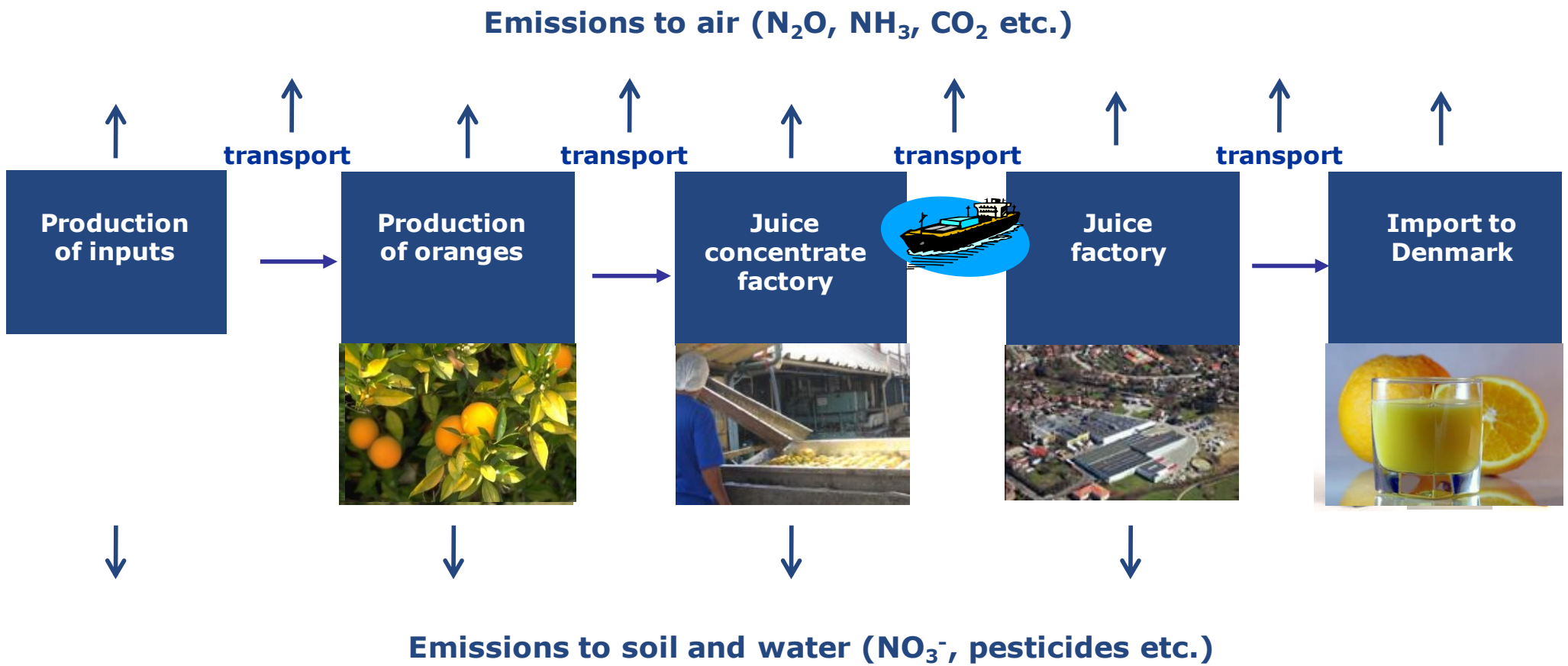
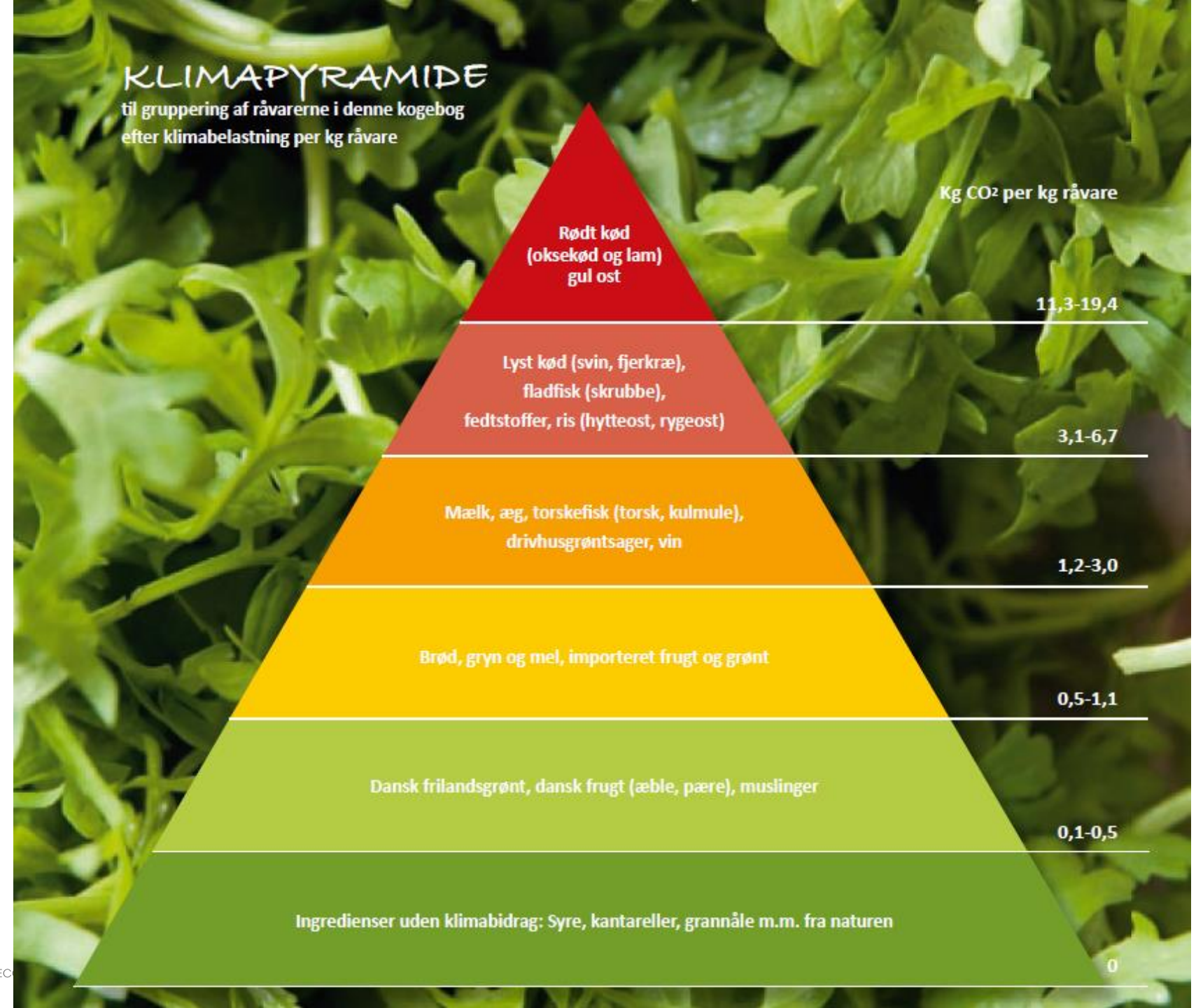
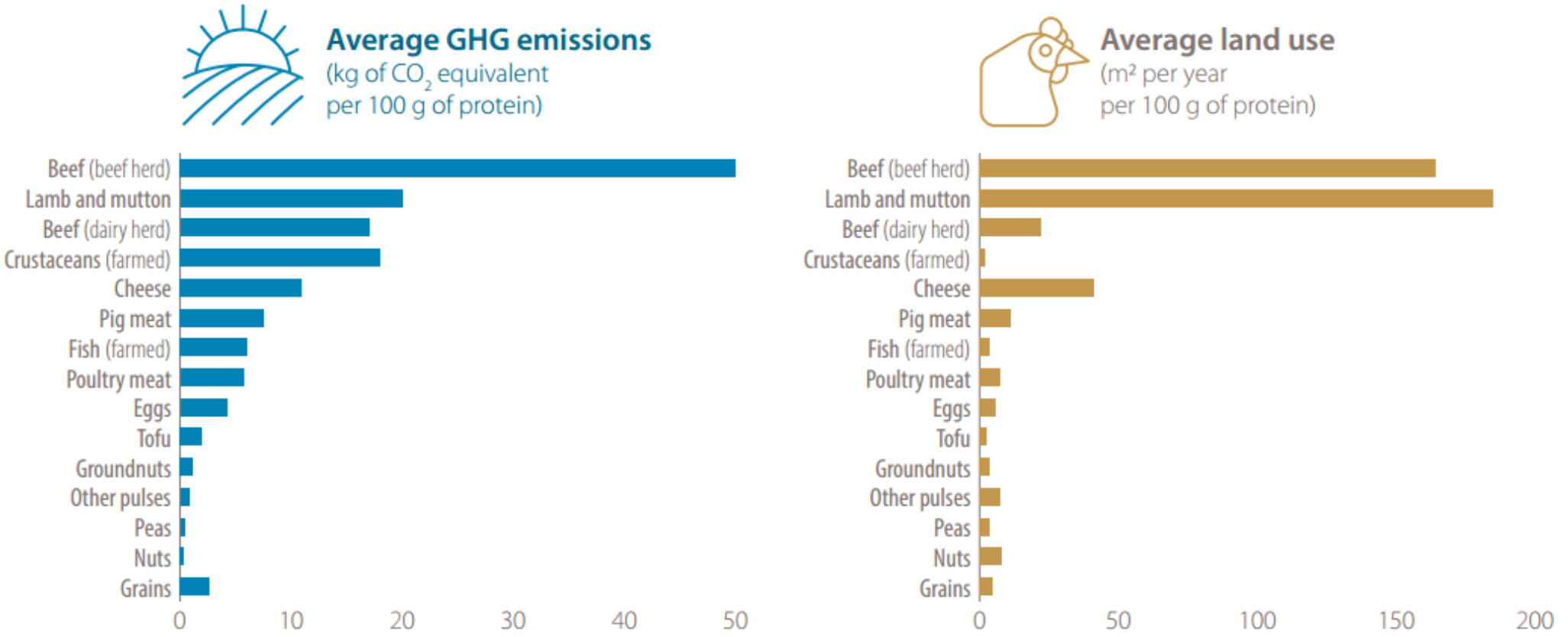
BEREGNET VIA LIVSCYKLUSVURDERINGER



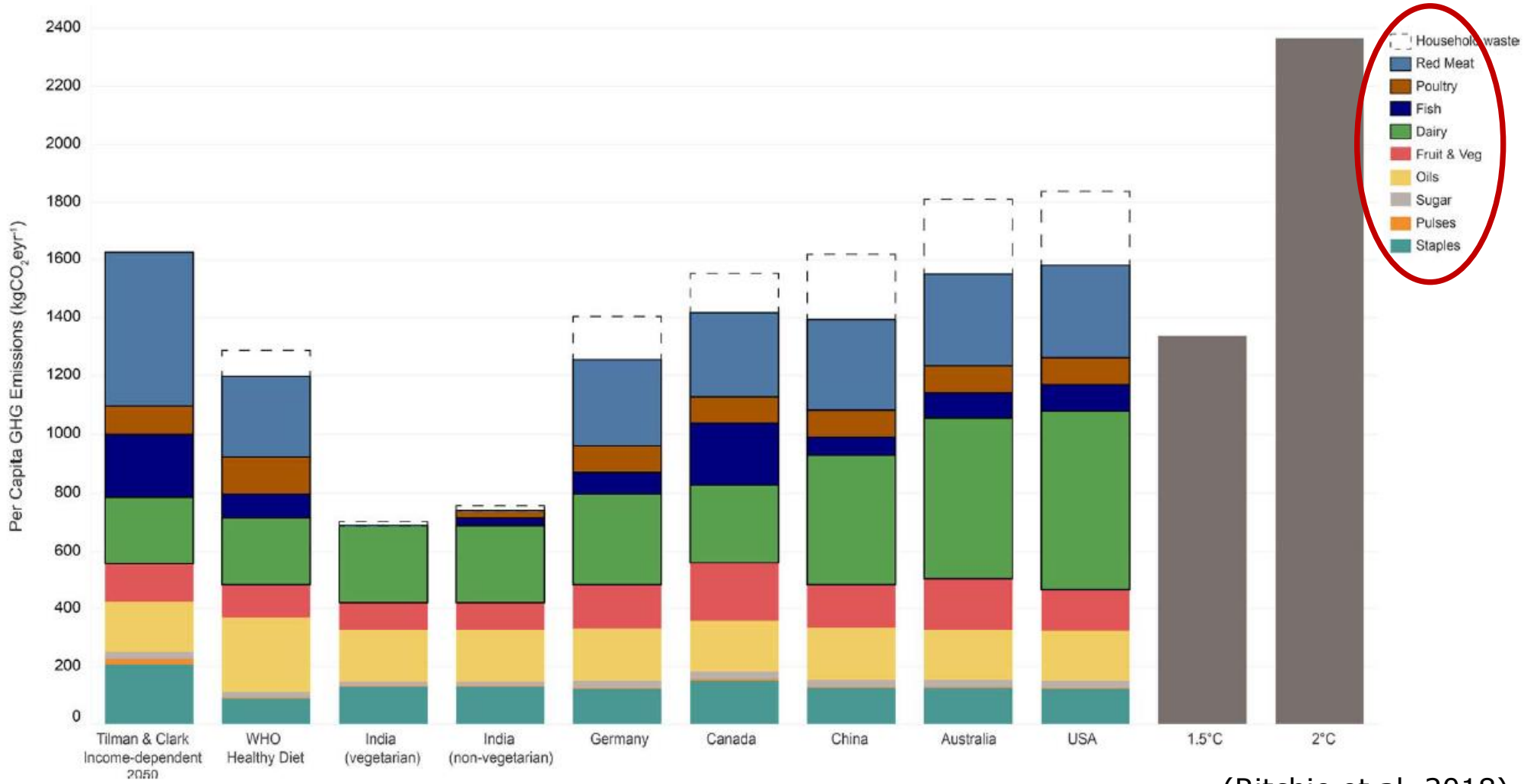

KLIMAPYRAMIDE
til gruppering af råvarerne i denne kogebog
efter klimabelastning per kg råvare
Kg CO2 per kg råvare
Rødt kød
(oksekød og lam)
gul ost
11,3-19,4
Lyst kød (svin, fjerkræ),
fladfisk (skrubbe),
fedtstoffer, ris (hytteost, rygeost)
3,1-6,7
Mælk, æg, torskefisk (torsk, kulmule),
drivhusgrøntsager, vin
1,2-3,0
Brød, gryn og mel, importeret frugt og grønt
0,5-1,1
Dansk frilandsgrønt, dansk frugt (æble, pære), muslinger
0,1-0,5
Ingredienser uden klimabidrag: Syre, kantareller, grannåle m.m. fra naturen
0

KLIMAAFTRYK OG AREALFORBRUG AF PROTEINER



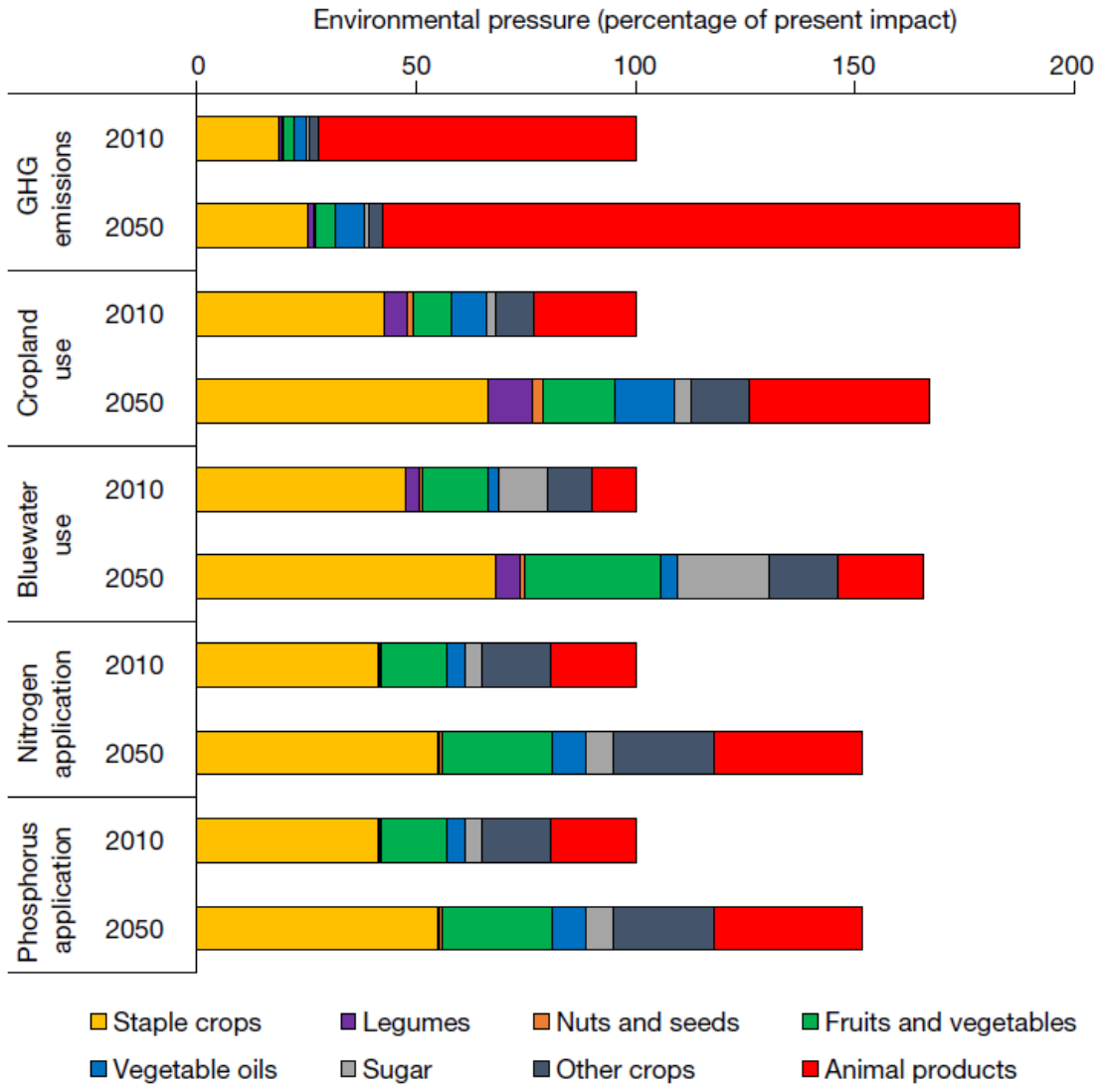
UN (2019)

FØDEVAREVALGET BETYDER NOGET!



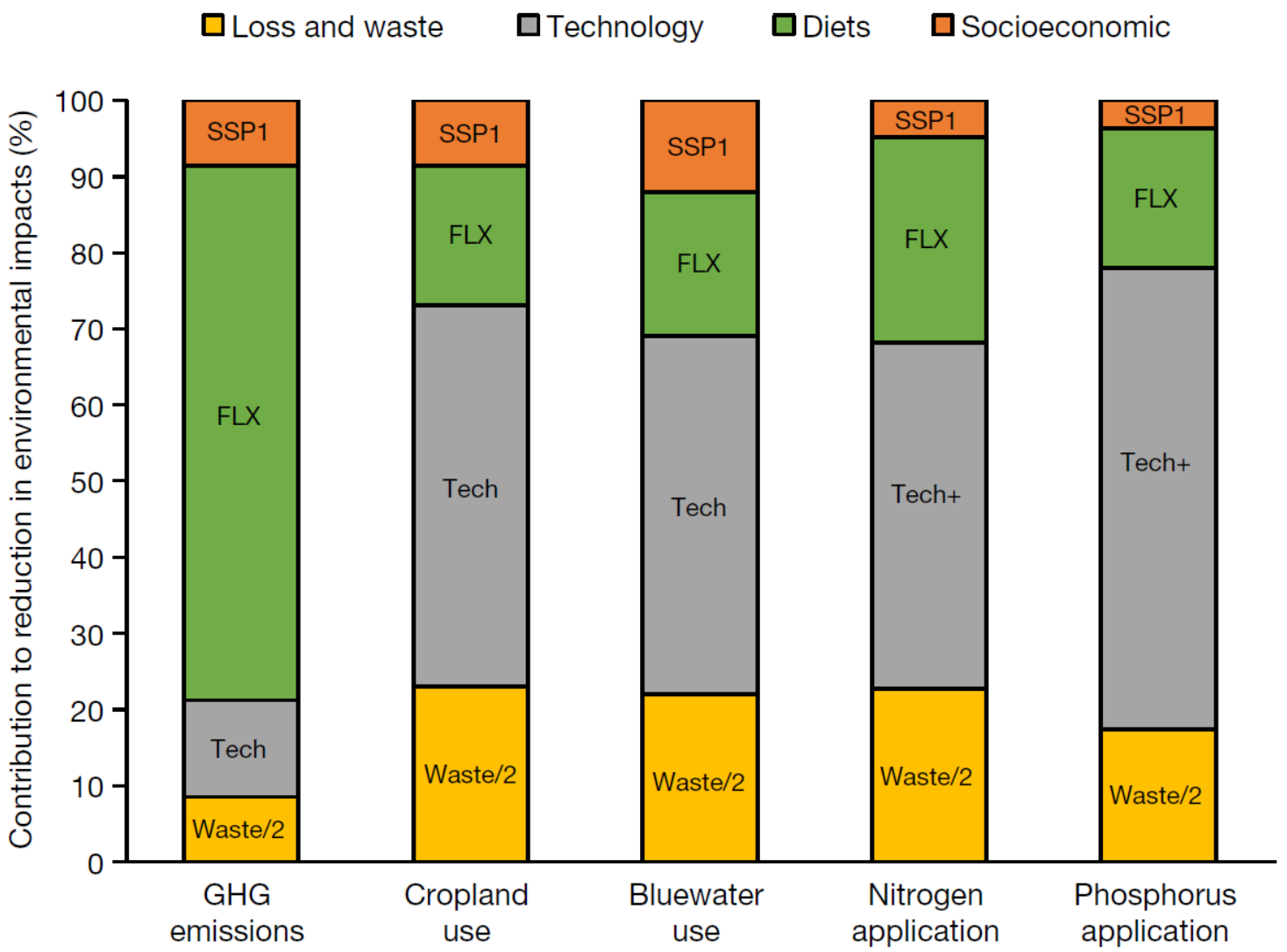
(Ritchie et al. 2018)

PROBLEMET ØGES MED EN STIGENDE MIDDELKLASSE



(Springman et al. 2018)

POTENTIALE FOR REDUKTION (SPRINGMAN ET AL. 2018, NATURE)



EAT-LANCET REPORT

> The food we eat, the ways we produce it, and the amounts wasted or lost have major impacts on human health and environmental sustainability.

> A diet that includes more plant-based foods and fewer animal source foods is healthy, sustainable, and good for both people and planet.

-

EAT-Lancet report, 2019

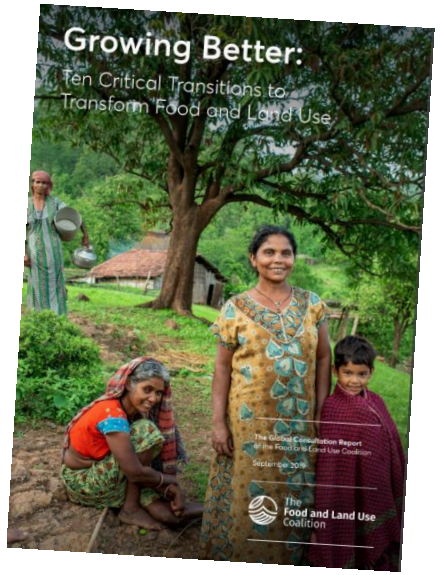
> Without a transformation of the global food system, the world risks failing to meet the UN Sustainable Development Goals (SDGs) and the Paris Agreement and the data are both sufficient and strong enough to warrant immediate action

- EAT-LANCET REPORT, 2019

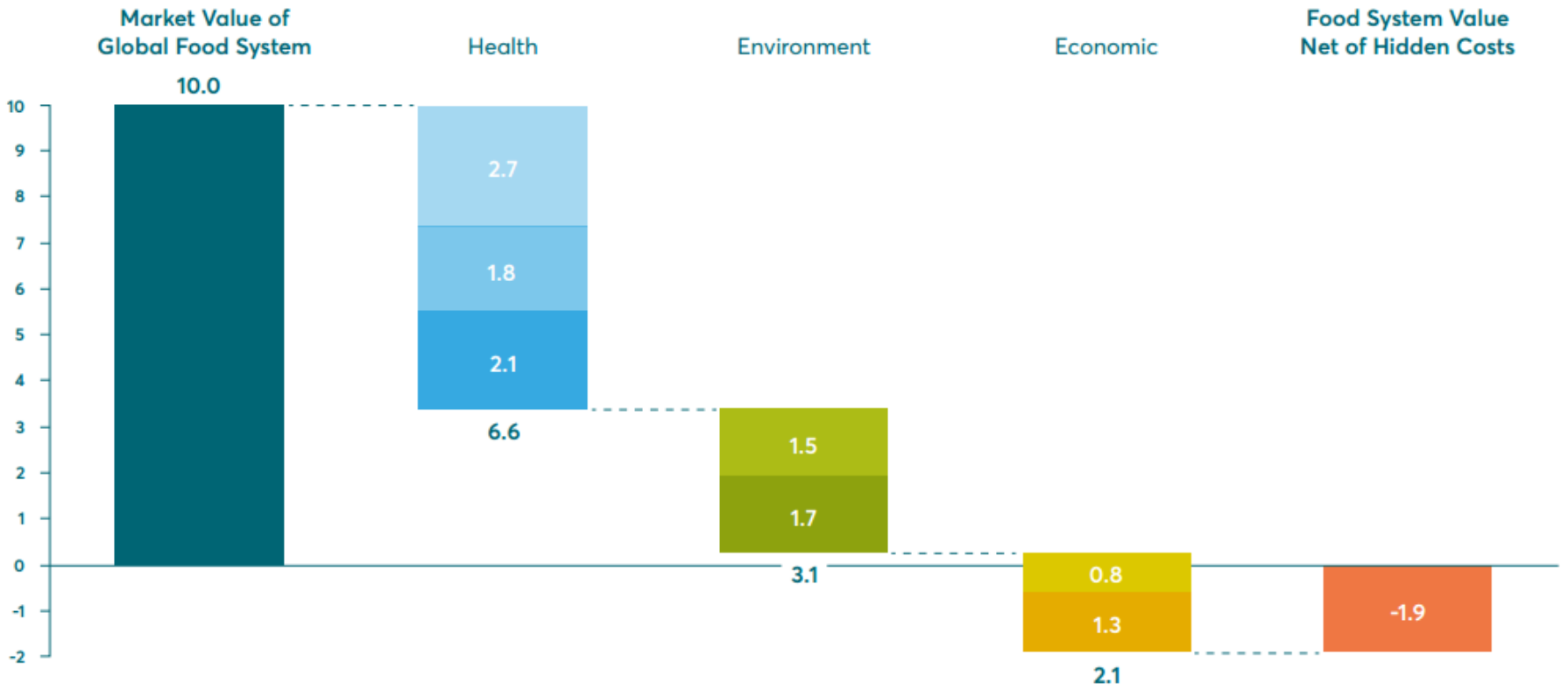
ET ÆNDRET FØDEVARESYSTEM ER ESSENTIELT FOR BÆREDYGTIG UDVIKLING

UN (2019)

DE SKJULTE OMKOSTNINGER I DET GLOBALE FØDEVARESYSTEM



Trillions USD, 2018 prices



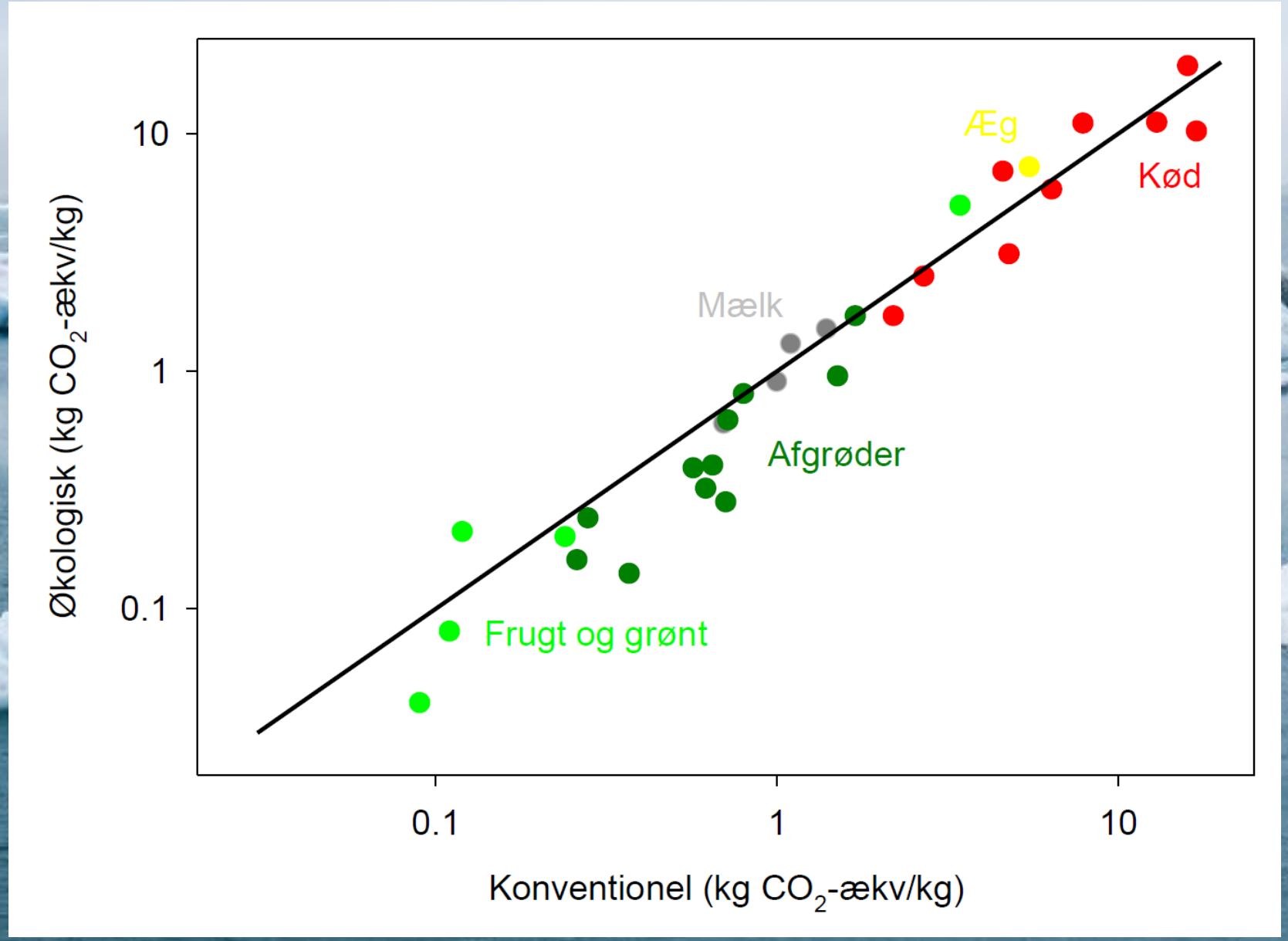
- Obesity
- Undernutrition
- Pollution, Pesticides & Anti-Microbial Resistance
- Greenhouse Gas Emissions
- Natural Capital Costs
- Rural Welfare
- Food Loss & Waste & Fertiliser Leakage

FOLU (2019)

Klimapåvirkning

ØKOLOGISKE FØDEVARER

KLIMAAFTRYK FRA FØDEVARER



INDIREKTE EFFEKTER

- Indirekte arealændringer (iLUC) pga. lavere udbytter?

  Men samtidig:

- Mindre kødforbrug hos økologiske forbrugere (Baudry et al. 2017)

- Rebound effekt: højere priser giver færre penge på budgettet til rejser mv.

Single Market for Green Products

Environmental Footprint pilot phase

- News
- The EF pilots
- Results and deliverables
- Policy background
- Development of PEF&OEF

Environmental Footprint transition phase

Events

Communicating to consumers

Questions and Answers

The development of the PEF and OEF methods

DG Environment has worked together with the European Commission's Joint Research Centre (JRC IES) and other European Commission services towards the development of a **harmonised methodology for the calculation of the environmental footprint of products and organisations** (including carbon).

Existing methods and initiatives were taken into account

- For the product angle, the International Reference Life Cycle Data System (ILCD) Handbook as well as other existing methodological standards and guidance documents (ISO 14040-44, PAS 2050, BP X30, WRI/WBCSD GHG protocol, Sustainability Consortium, ISO 14025, Ecological Footprint, etc).

requirements for calculating these emissions are not fully developed. Therefore, the assessment of emissions arising from indirect land use change is not included.

The final methods, called Product Environmental Footprint (PEF) and Organisation Environmental Footprint (OEF), were published as an Annex to the Commission Recommendation on the use of common methods to measure and communicate the life cycle environmental performance of products and organisations. The two methods are tightly interlinked and will have many elements in common.

This version was developed taking into account the results of 2011 road test, the results of the invited expert consultation and of a consultation between Commission services.

ØKOLOGISKE FØDEVARER

Klimapåvirkning

Næringsstofberigelse

Færre pesticidrester i urin (Hyland et al. 2019)

Økotoxicitet

Jord og kulstoflagring

Højere mikrobiel aktivitet i økologiske marker (Lori et al. 2017)

Bedre mulighed for at udfolde naturlig adfærd for husdyr og et lavere forbrug af antibiotika (Sørensen et al. 2015)

Biodiversitet

30% højere biodiversitet på de økologiske marker (Tuck et al. 2014)

Dyrevelfærd

Journal of Cleaner Production 52 (2013) 217–224

Contents lists available at SciVerse ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro

An approach to include soil carbon changes in life cycle assessments

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Keywords:
Carbon sequestration
Soil carbon
LCA
Straw
Bioenergy

ABSTRACT

Globally, soil carbon sequestration is expected to hold a major potential to mitigate agricultural greenhouse gas emissions. However, the majority of life cycle assessments (LCA) of agricultural products have not included possible changes in soil carbon sequestration. In the present study, a method to estimate carbon sequestration to be included in LCA is suggested and applied to two examples where the inclusion of carbon sequestration is especially relevant: 1) Bioenergy: removal of straw from a Danish soil for energy purposes and 2) Organic versus conventional farming: comparative study of soybean production in China. The suggested approach considers the time of the soil CO_2 emissions for the LCA by including the Bern Carbon Cycle Model. Time perspectives of 20, 100 and 200 years are used and a soil depth of 0–100 cm is considered. The application of the suggested method showed that the results were comparable to the IPCC 2006 tier 1 approach in a time perspective of 20 year, where after the suggested methodology showed a continued soil carbon change toward a new steady state. The suggested method estimated a carbon sequestration for the first example when storing straw in the soil instead of using it for bioenergy of 54.97

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Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

Characterization factors for land use impacts on biodiversity in life cycle assessment based on direct measures of plant species richness in European farmland in the 'Temperate Broadleaf and Mixed Forest' biome

Marie Trydeman Knudsen [a,*], John E. Hermansen [a], Christel Cederberg [b], Felix Herzog [c], Jim Vale [j], Philippe Jeanneret [c], Jean-Pierre Sarthou [d,e], Jürgen K. Friedel [f], Katalin Balázs [g], Wendy Fjellstad [h], Max Kainz [i], Sebastian Wolfrum [i], Peter Dennis [j]

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[e] INRA, UMR 1248 AGIR, Chemin de Borde-Rouge, Castanet-Tolosan F-31326, France
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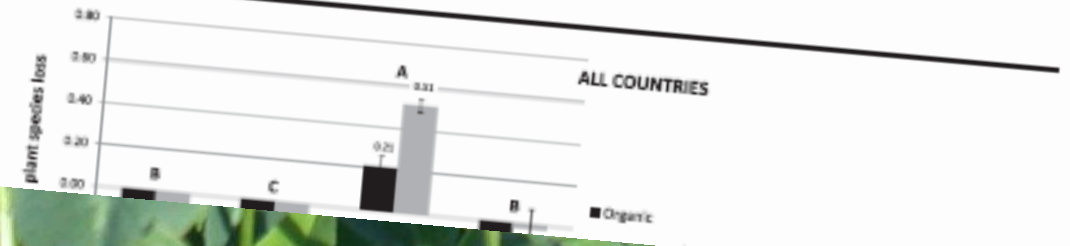
HIGHLIGHTS

- New characterization factors (CF) for land use impacts on biodiversity in LCA
- Provides CFs for different land use types and management (organic or conventional)
- Shows significant differences in CFs between organic and conventional fields

GRAPHICAL ABSTRACT



Journal of Cleaner Production 215 (2019) 433–443

Contents lists available at ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro

The importance of including soil carbon changes, ecotoxicity and biodiversity impacts in environmental life cycle assessments of organic and conventional milk in Western Europe

Marie Trydeman Knudsen [a, *], Teodora Dorca-Preda [a], Sylvestre Njakou Djomo [a], Nancy Peña [b], Susanne Padel [c], Laurence G. Smith [c], Werner Zollitsch [d], Stefan Hörtenhuber [d], John E. Hermansen [a]

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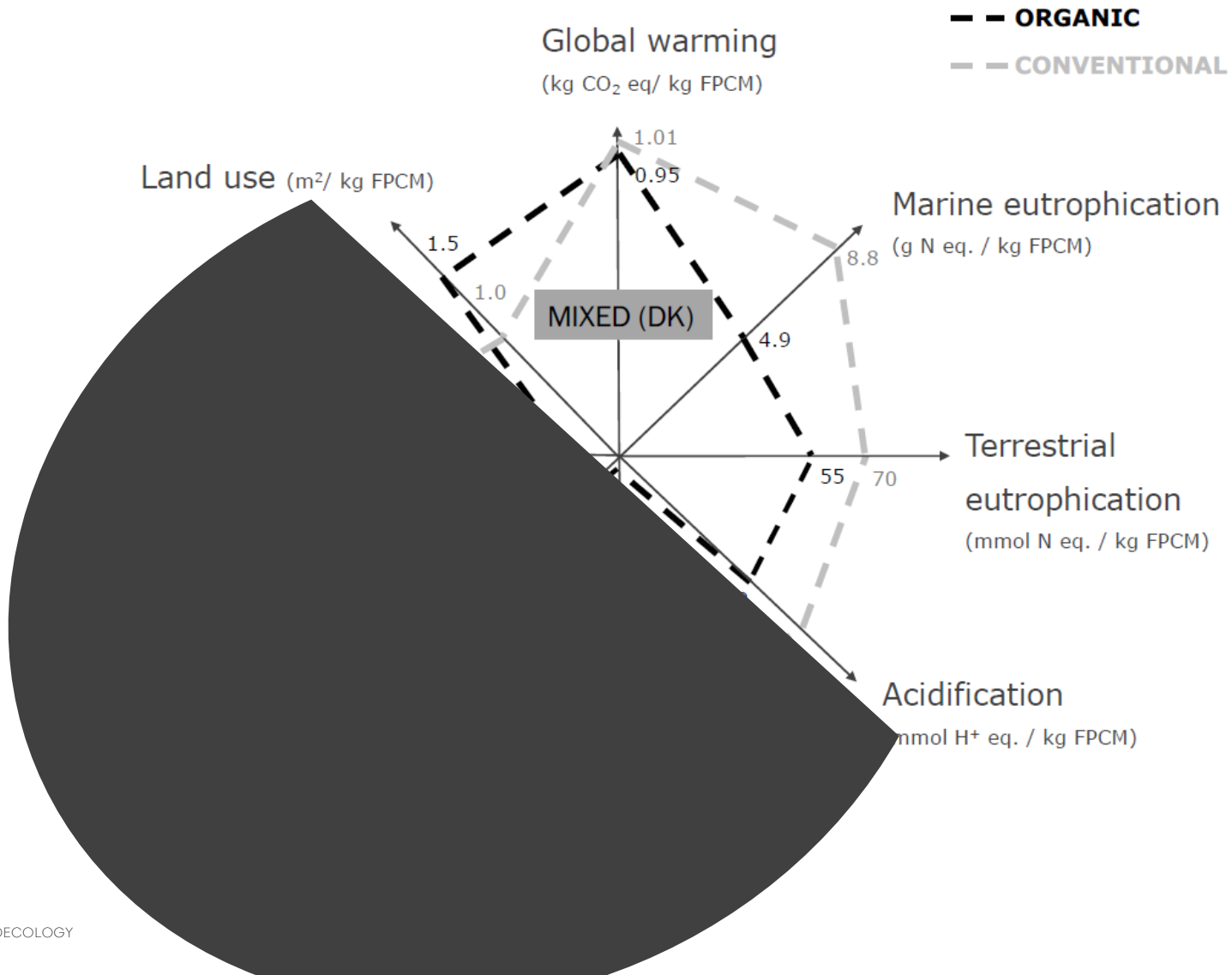
Keywords:
Organic
Biodiversity
Dairy

ABSTRACT

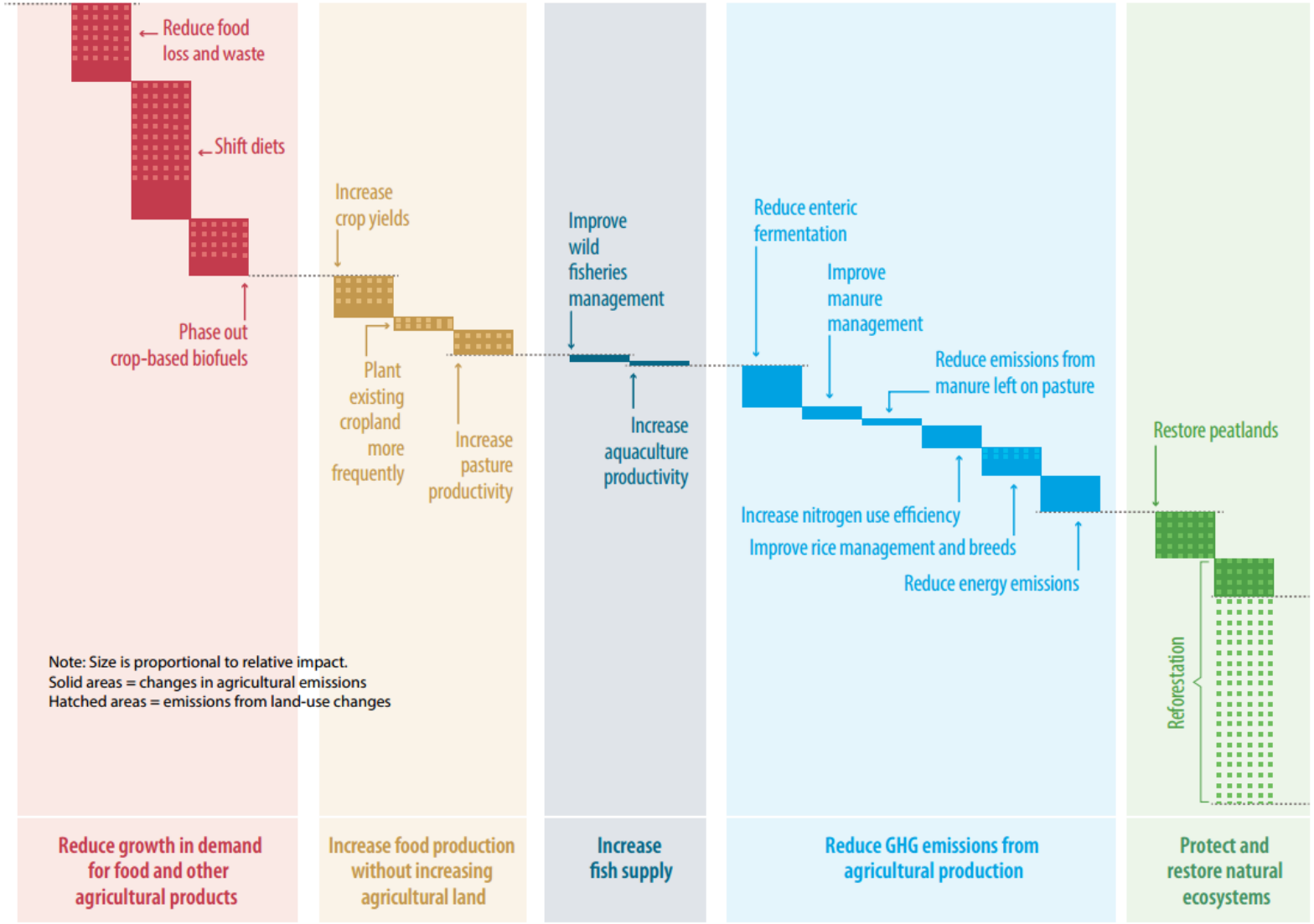
Estimates of soil carbon changes, biodiversity and ecotoxicity have often been missing from life cycle assessment based studies of organic dairy products, despite evidence that the impacts of organic and conventional management may differ greatly within these areas. The aim of the present work was therefore to investigate the magnitude of including these impact categories within a comprehensive environmental impact assessment of organic and conventional dairy systems differing in basic production conditions. Three basic systems representative of a range of European approaches to dairy production were selected for the analysis, i.e. (i) low-land mixed crop-livestock systems, (ii) lowland grassland-based systems, (iii) and mountainous systems. As in previous publications, this study showed that when assessing climate change, eutrophication and acidification impact organic milk has a slightly lower impact than conventional, although land-use, in

Mælks miljøpåvirkning



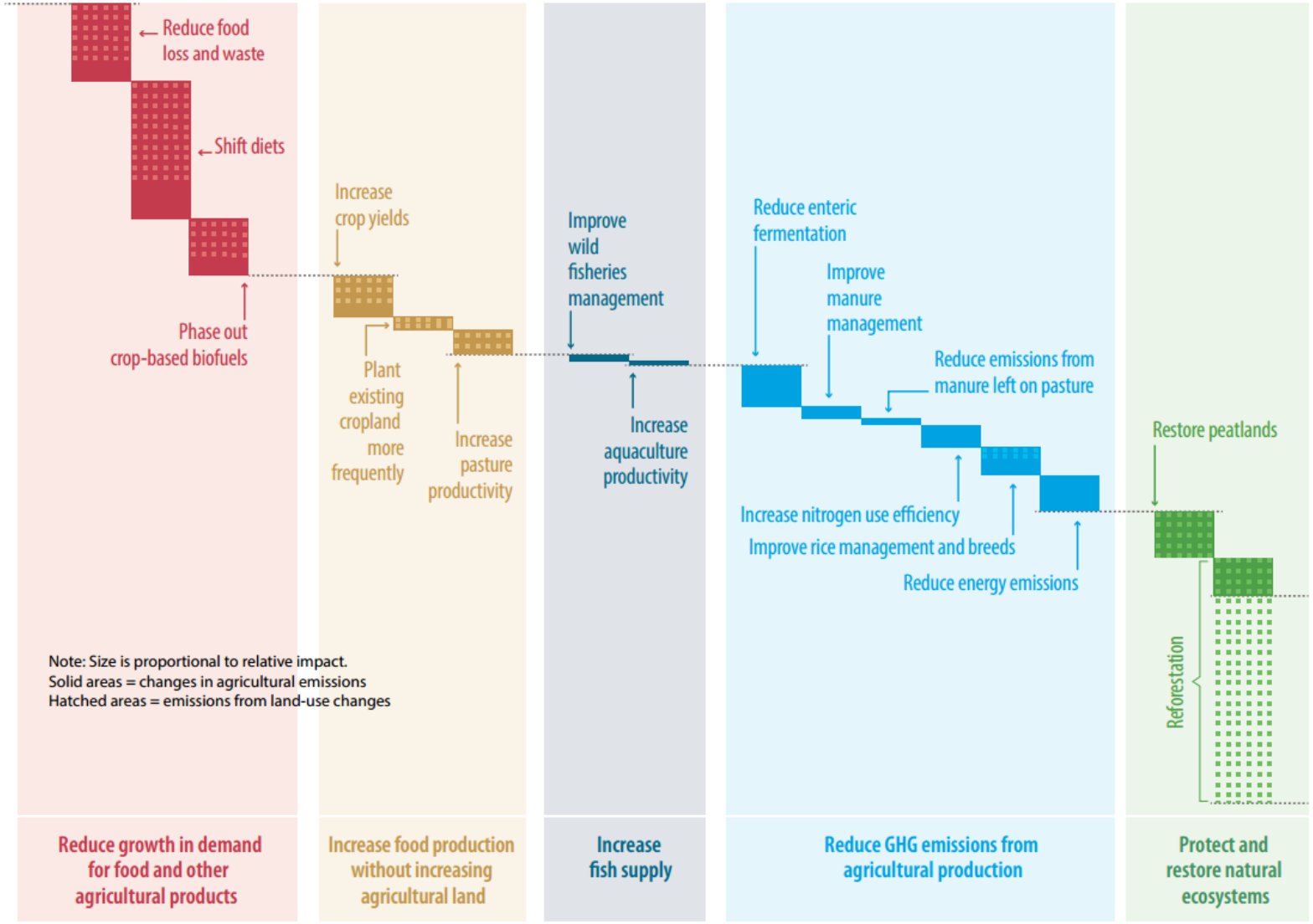
Knudsen et al. (2019)

MULIGHEDER FOR AT REDUCERE EMISSIONER FRA FØDEVARESYSTEMET



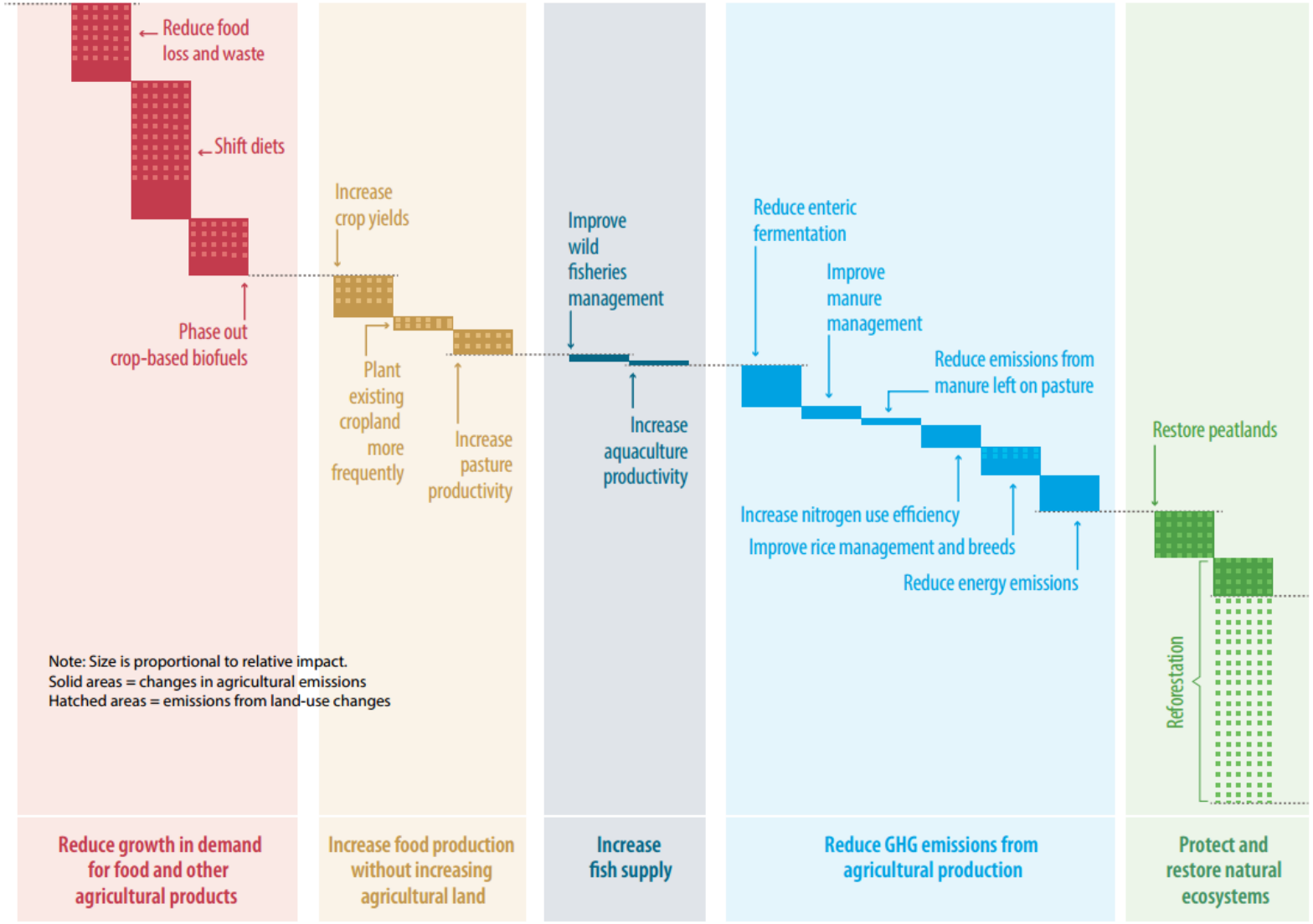
UN (2019)

MULIGHEDER FOR REDUKTION I FØDEVAREFORBRUGET



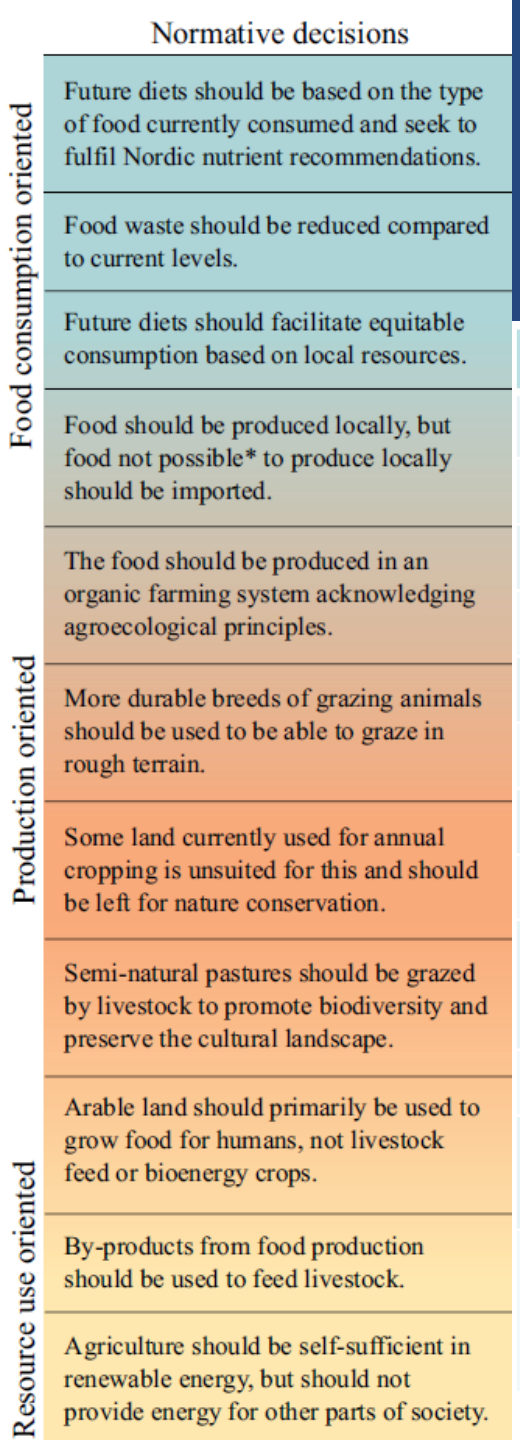
- Reducere forbruget af animalske produkter
- Reducere madspild

MULIGHEDER FOR REDUKTION I LANDBRUGET



- Øge N-udnyttelsen og mindske tab og emissioner – højere udbytter
- Reducere energiforbruget og producere energi (biogas)
- Binde CO_2 via træer og i jord – og udgå emissioner fra tørvejorde

En fødevarerevision fra Sverige
(Karlsson et al. 2018)

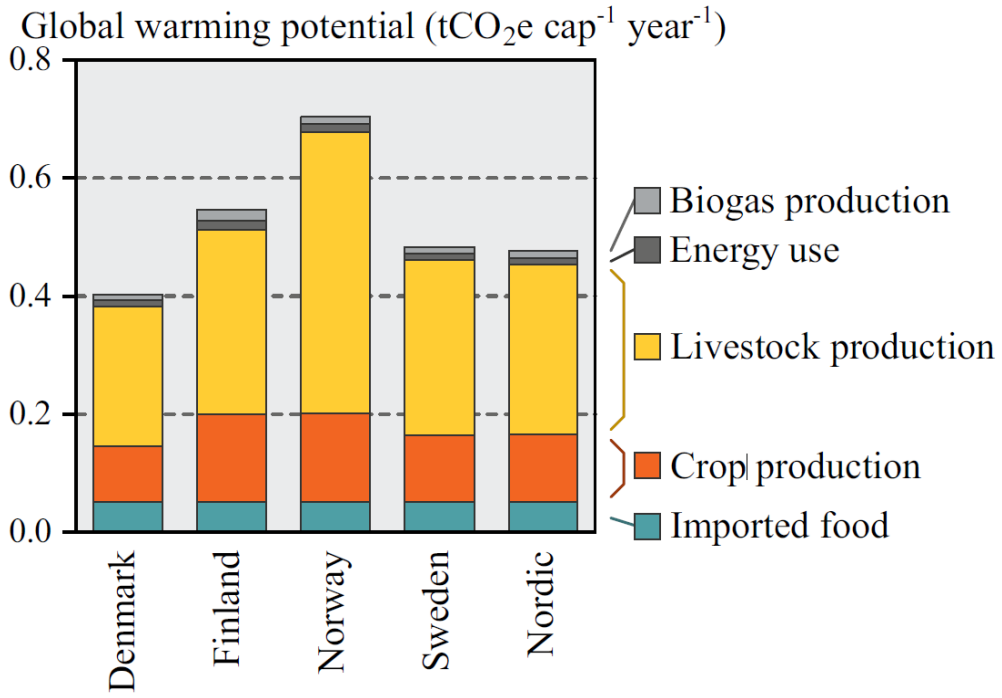


Madspild skal reduceres
Kosten skal baseres primært på lokale resourcer
Kosten skal produceres økologisk
Mindre produktive arealer skal gå til natur
Græs- og naturarealer skal afgræsses for naturpleje
Dyrkningsarealet skal primært bruges til plantebaserede fødevarer, ikke foder eller bioenergi
Biprodukter fra fødevareproduktionen bruges som foder
Landbruget skal være selvforsynende med fornybar energi, men ikke forsyne andre dele af samfundet med energi

En fødevarerevision fra Sverige
(Karlsson et al. 2018)

	Normative decisions
Food consumption oriented	Future diets should be based on the type of food currently consumed and seek to fulfil Nordic nutrient recommendations.
	Food waste should be reduced compared to current levels.
	Future diets should facilitate equitable consumption based on local resources.
	Food should be produced locally, but food not possible* to produce locally should be imported.
Production oriented	The food should be produced in an organic farming system acknowledging agroecological principles.
	More durable breeds of grazing animals should be used to be able to graze in rough terrain.
	Some land currently used for annual cropping is unsuited for this and should be left for nature conservation.
	Semi-natural pastures should be grazed by livestock to promote biodiversity and preserve the cultural landscape.
Resource use oriented	Arable land should primarily be used to grow food for humans, not livestock feed or bioenergy crops.
	By-products from food production should be used to feed livestock.
	Agriculture should be self-sufficient in renewable energy, but should not provide energy for other parts of society.

- Stor reduktion i kødforbruget
- Klimaaftryk der lever op til kravene fra Parisaftalen



KONKLUSION

Handling i forhold til klima er nødvendig, men ikke på bekostning af biodiversitet, toxicitet og dyrevelfærd

Reduktion af kødforbruget og madspild er to af de vigtigste ting for at reducere klimapåvirkningen fra fødevarerne

Bliver nødt til at se på både produktion OG forbrug af fødevarer – samt optimere både efter klima, biodiversitet, eutrofiering, toxicitet og dyrevelfærd

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