

ScenoProt seminar, mars 2021
 Pathways to self-sufficiency and
 to sustainable and healthy protein
 system

Sustainable food systems as a driving force for improved public health

Bryndís Eva Birgisdóttir

Unit for Nutrition Research,
 Faculty of Food Science and Nutritiono &
 Landspítali-University Hospital



HÁSKÓLI ÍSLANDS



Food for a family of 4 for a week in year 1900 (Professor Laufey Steingrimsdóttir)



Heimild: Reykvíska eldhúsið, matarsetur.is
Byggt á fæðuframboði, Guðm. Jónsson

Laufey Steingrimsdóttir,
Matur saga menning

Food for a family of 4 for a week in year 2000 (professor Laufey Steingrimsdóttir)



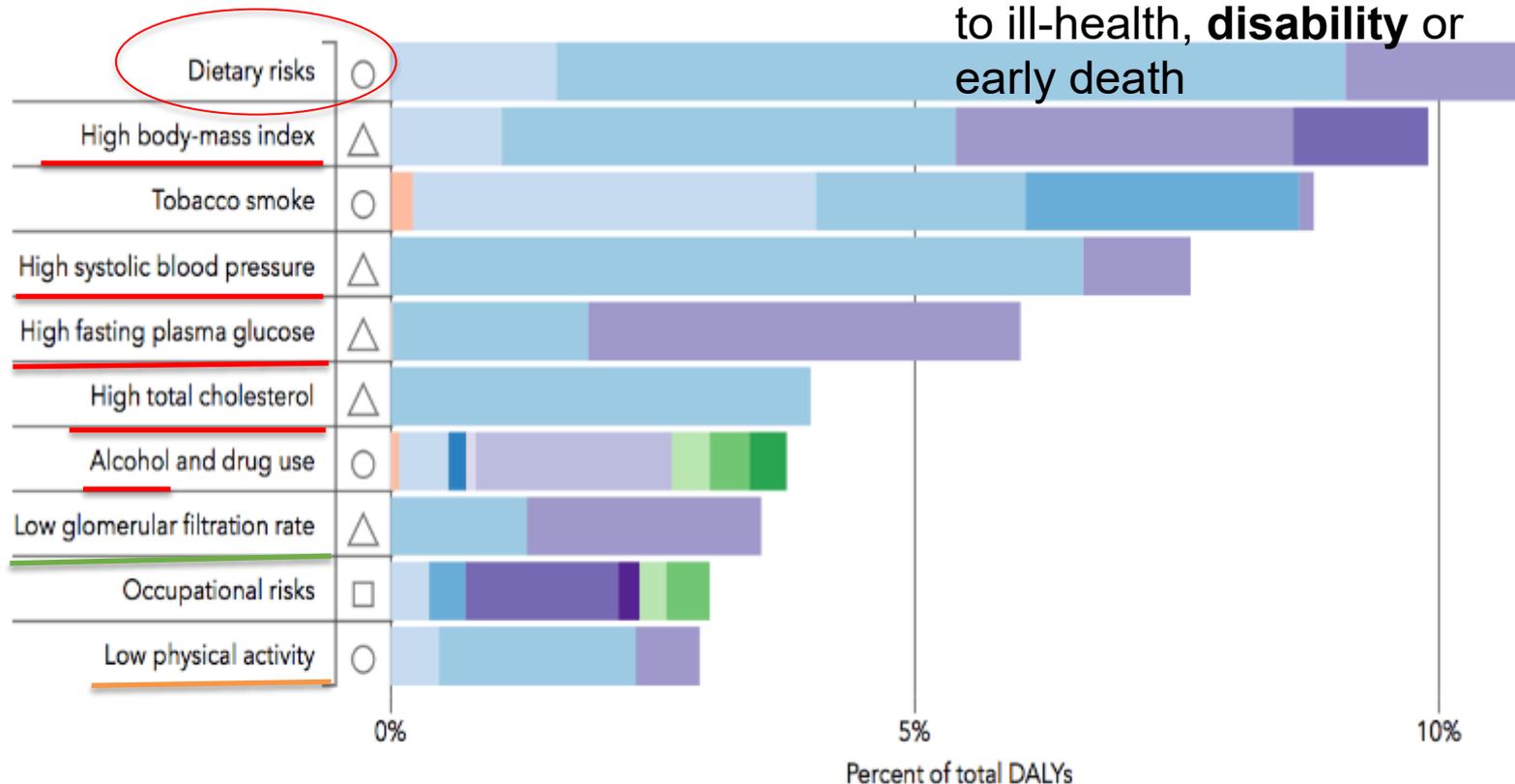
Heimild: Reykvíska eldhúsið, matarsetur.is
Byggt á fæðuframboði, Guðm. Jónsson

Laufey Steingrimsdóttir,
Matur saga menning

BURDEN OF DISEASE ATTRIBUTABLE TO LEADING RISK FACTORS, 2013 , Iceland

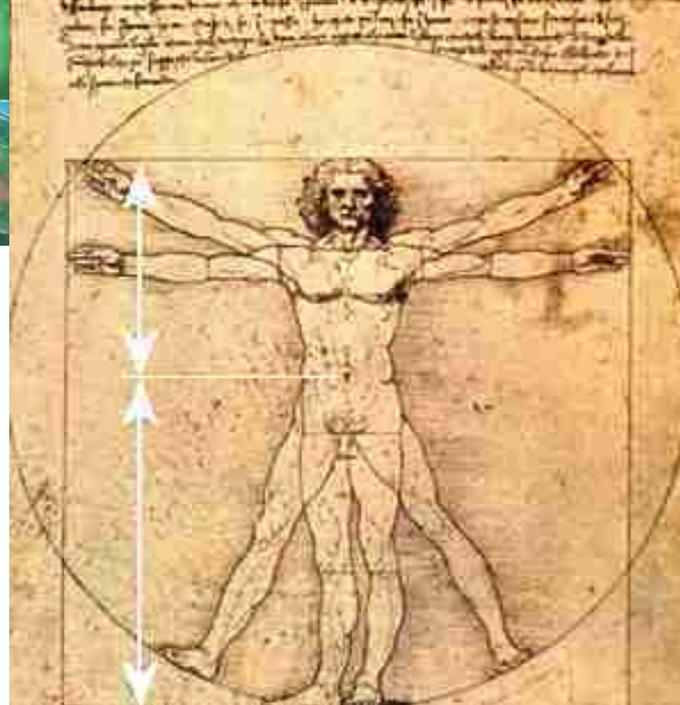
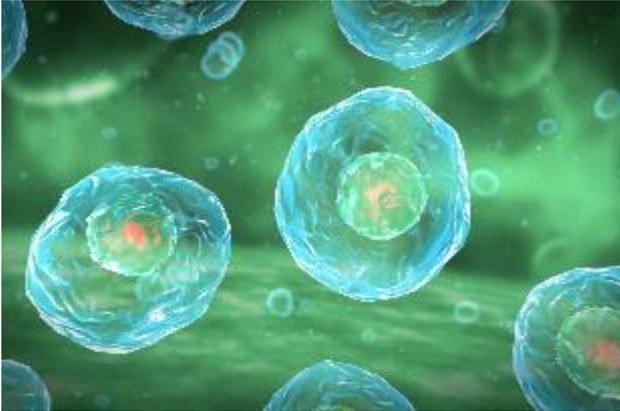
- △ Metabolic risks
- Environmental/occupational risks
- Behavioral risks

The **disability-adjusted life year (DALY)** is a measure of overall disease burden, expressed as the number of **years** lost due to ill-health, **disability** or early death



LÍFALDUR OG GLÖTUÐ GÓÐ ÆVIÁR

Optimal nutritional status - balance



AN ALL-NATURAL BANANA



INGREDIENTS: WATER (75%), **SUGARS (12%)** (GLUCOSE (48%), FRUCTOSE (40%), SUCROSE (2%), MALTOSE (<1%)), STARCH (5%), FIBRE E460 (3%), **AMINO ACIDS (<1%)** (GLUTAMIC ACID (19%), ASPARTIC ACID (16%), HISTIDINE (11%), LEUCINE (7%), LYSINE (5%), PHENYLALANINE (4%), ARGININE (4%), VALINE (4%), ALANINE (4%), SERINE (4%), GLYCINE (3%), THREONINE (3%), ISOLEUCINE (3%), PROLINE (3%), TRYPTOPHAN (1%), CYSTINE (1%), TYROSINE (1%), METHIONINE (1%)), **FATTY ACIDS (1%)** (PALMITIC ACID (30%), OMEGA-6 FATTY ACID: LINOLEIC ACID (14%), OMEGA-3 FATTY ACID: LINOLENIC ACID (8%), OLEIC ACID (7%), PALMITOLEIC ACID (3%), STEARIC ACID (2%), LAURIC ACID (1%), MYRISTIC ACID (1%), CAPRIC ACID (<1%)), ASH (<1%), PHYTOSTEROLS, E515, OXALIC ACID, E300, E306 (TOCOPHEROL), PHYLLOQUINONE, THIAMIN, **COLOURS** (YELLOW-ORANGE E101 (RIBOFLAVIN), YELLOW-BROWN E160a), **FLAVOURS** (3-METHYLBUT-1-YL ETHANOATE, 2-METHYLBUTYL ETHANOATE, 2-METHYLPROPAN-1-OL, 3-METHYLBUTYL-1-OL, 2-HYDROXY-3-METHYLETHYL BUTANOATE, 3-METHYLBUTANAL, ETHYL HEXANOATE, ETHYL BUTANOATE, PENTYL ACETATE), 1510, NATURAL RIPENING AGENT (ETHENE GAS).

One food item
can easily
contain
> 6000 different
substances

FOOD COMPOSITION

A: Additives/ aroma

Innsatsfaktorer food prod.:

- Pesticides
- Medication (animal)
- Migrating subst. from packaging

B: Contaminants

toxins from mold

- algae toxins
- pollutants
 - metals/ halogenated substances

C: Stoffer fra bearbejding

varmebehandling

- Heterocyclic amines
- Akrylamid
- HMF (Hydroxymethylfurfural)
- PAH (*Polycyclic aromatic hydrocarbons*)

Fermentation

- Uretan

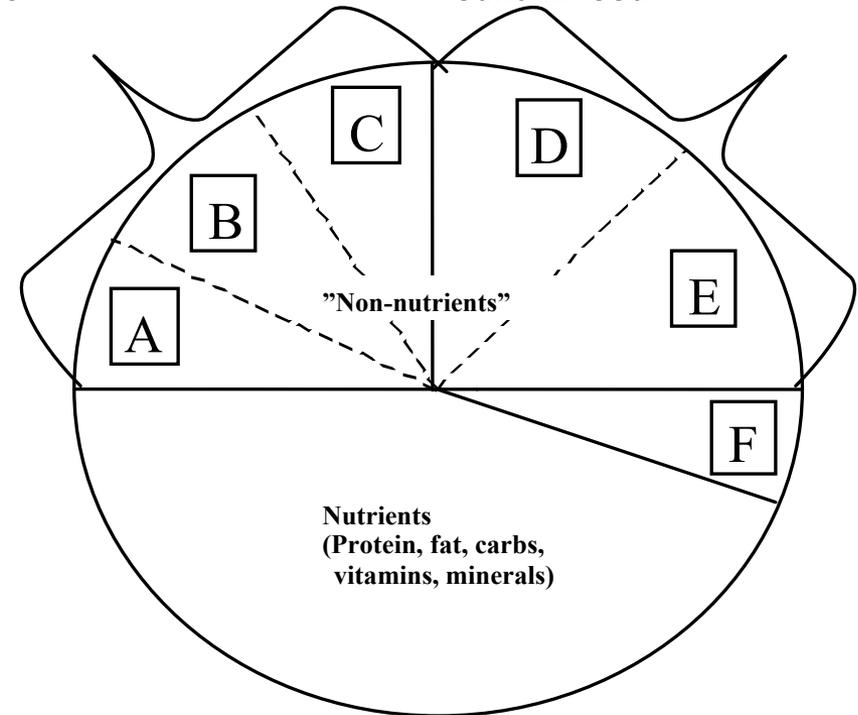
D Industrial change

Hardening of fat

- Trans fatty acids

Substances that are not in food from natural causes

Toxins and biological active substances that are naturally found in food

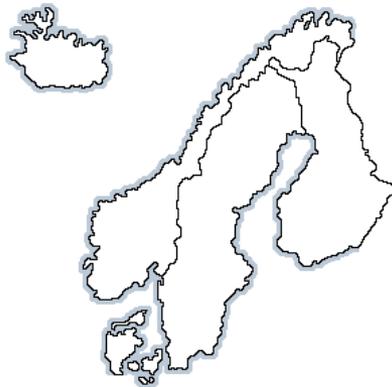


E. Natural toxins

F. Naturlige, positive 'ikke næringsstoffer' "Neutraceuticals"

- flavonoider / plantefenoler
- karotenoider
- plantesteroler





The Nordic countries collaborate in setting recommendations for nutrient intake by publishing the Nordic Nutrition Recommendations (NNR) – last in 2014

Food based dietary guidelines (FBDG) are published in each country



UNIVERSITY OF ICELAND
SCHOOL OF HEALTH SCIENCES

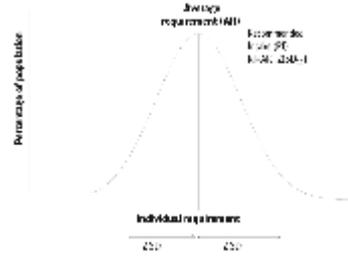
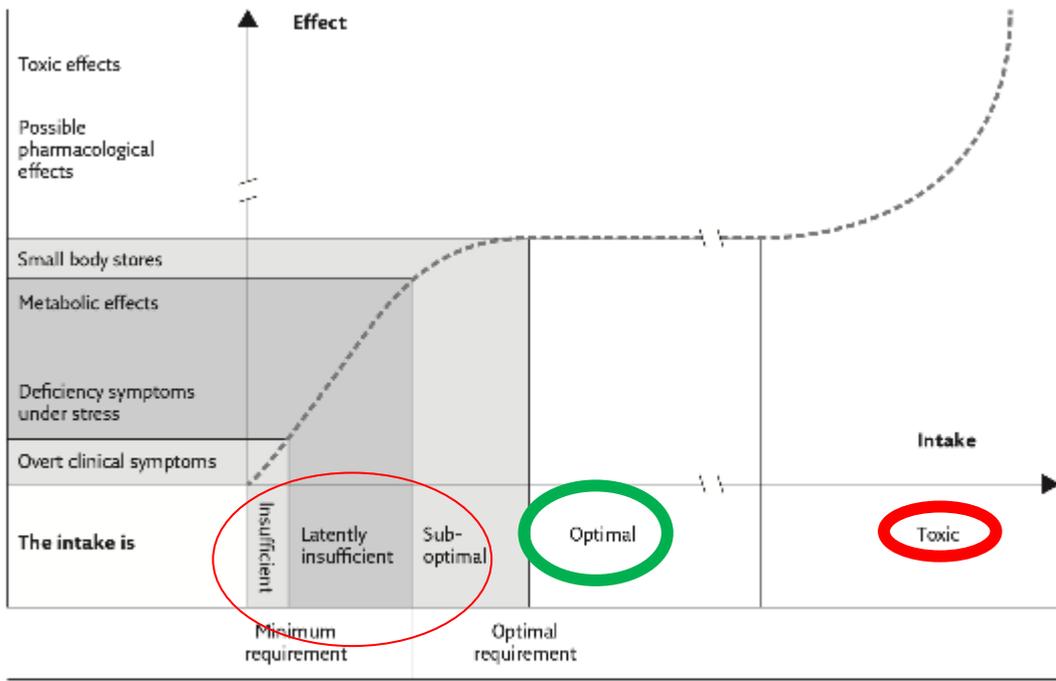


Nord 2014:002 Nordic Nutrition Recommendations 2012

Nordic Nutrition Recommendations 2012

Integrating nutrition and physical activity





Aim: That everyone can live as long as possible without diseases in good nutritional status.

Foods for the immune system?

Figure 2.1. The theoretical relationship between intake of a nutrient and the effect on the organism



- **Mediterranean diet**
 - Vegetables and fruits
 - Olive oil
 - Seafood all types
 - Optimal amount of meat and **red wine**
 - Beans and nuts
 - Whole grains
 - Low intake of sugar and other heavily processed food
 - Yogurt and cheese



- **Nordic diet - FBDG**
 - Vegetables and fruits/berries
 - Rapeseed oil
 - Seafood all types
 - Optimal amount of meat
 - **Cod liver oil (IS, NO)**
 - Beans and nuts
 - Whole grains
 - Low intake of sugar and other heavily processed food
 - Milk products and cheese



<http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/publications/2018/what-national-and-subnational-interventions-and-policies-based-on-mediterranean-and-nordic-diets-are-recommended-or-implemented-in-the-who-european-region,-and-is-there-evidence-of-effectiveness-in-reducing-noncommunicable-diseases-2018>

Search

[Health topics](#) > [Disease prevention](#) > [Nutrition](#) > [Publications](#) > What national and subnational interventions and policies based on Mediterranean and Nordic diets are recommended or implemented in the WHO European Region, and is there evidence of effectiveness in reducing noncommunicable diseases? (2018)

Nutrition

- [News](#)
- [Events](#)
- [Policy](#)

What national and subnational interventions and policies based on Mediterranean and Nordic diets are recommended or implemented in the WHO European Region, and is there evidence of effectiveness in reducing noncommunicable diseases? (2018)

[Health topics](#) > [Disease prevention](#) > [Nutrition](#) > Fostering healthier and more sustainable diets – learning from the Mediterranean and New Nordic experience

Nutrition

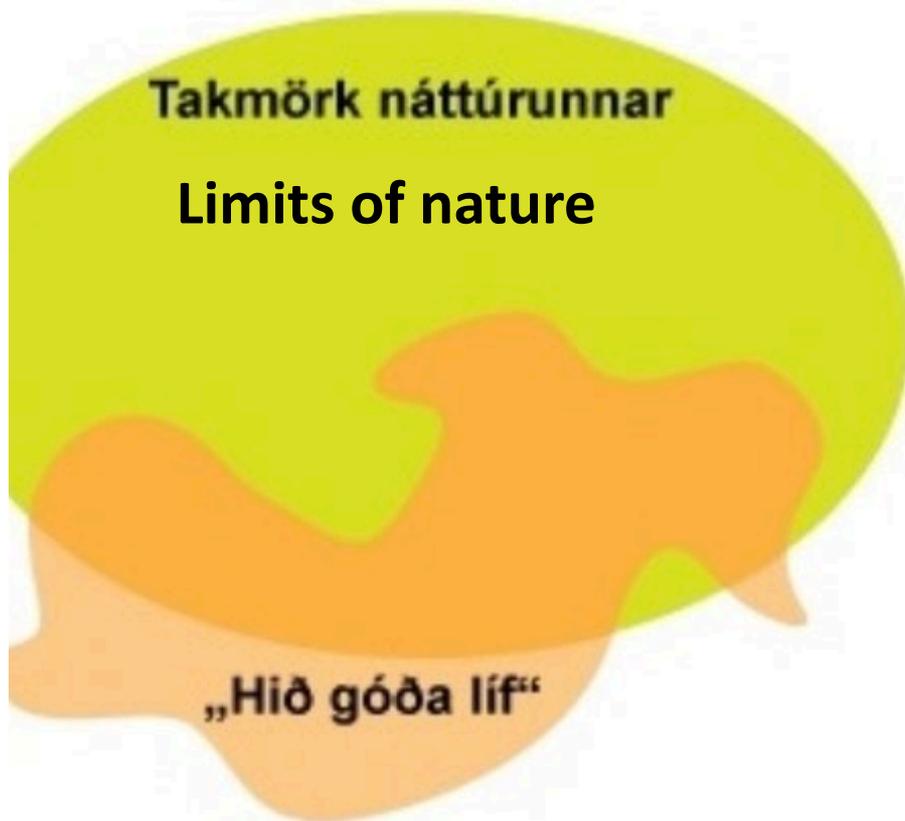
- [News](#)**
- [Events](#)

Fostering healthier and more sustainable diets – learning from the Mediterranean and New Nordic experience

07-05-2018

<http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/news/news/2018/5/fostering-healthier-and-more-sustainable-diets-learning-from-the-mediterranean-and-new-nordic-experience>

What are we aiming for?



OPEN ACCESS UNEDITED VERSION

Environmental Research Letters

Sustainable food systems—a health perspective

Line J Gordon^{1,2}, Viorica Blajut¹, Beatrixe Crono^{1,2}, Patrick J B Henriksen^{1,2}, Tracy Van Holt^{1,2,3}, Malin Jonell¹, Thorsteinn Lindahl¹, Max Troell¹, Stephan Barthol^{1,2}, Lisa Deutsch¹ [+ Show all authors & affiliations](#)



Concept Paper

“Eat as If You Could Save the Planet and Win!” Sustainability Integration into Nutrition for Exercise and Sport

Nanna Meyer^{1,2*} and Albu Reguant-Closa²

OPEN ACCESS

The Impacts of Dietary Change on Greenhouse Gas Emissions, Land Use, Water Use, and Health: A Systematic Review

Laura A. M. Bazzani^{1,2,3*}, Rosemary Green⁴, Edward J. N. Jay⁵, Frederick A. J. Hayes⁶

1 Department of Food and Nutrition Science, Uppsala University, Uppsala, Sweden, 2 Department of Food and Nutrition Science, Uppsala University, Uppsala, Sweden, 3 Department of Food and Nutrition Science, Uppsala University, Uppsala, Sweden, 4 Department of Food and Nutrition Science, Uppsala University, Uppsala, Sweden, 5 Department of Food and Nutrition Science, Uppsala University, Uppsala, Sweden, 6 Department of Food and Nutrition Science, Uppsala University, Uppsala, Sweden

* [Correspondence to: Laura A. M. Bazzani](#)

[https://doi.org/10.1371/journal.pone.0215881](#)

OPEN ACCESS

RESEARCH ARTICLE

Dietary changes needed to improve diet sustainability: are they similar across Europe?

Environmental Research Letters

EDITORIAL • OPEN ACCESS

Rewiring food systems to enhance human health and biosphere stewardship

Line J Gordon^{1,2}, Viorica Blajut¹, Beatrixe Crono^{1,2}, Patrick J B Henriksen^{1,2}, Tracy Van Holt^{1,2,3}, Malin Jonell¹, Thorsteinn Lindahl¹, Max Troell¹, Stephan Barthol^{1,2}, Lisa Deutsch¹ [+ Show all authors & affiliations](#)



Environmental Research Letters

Development of healthy and sustainable food-based dietary guidelines for the Netherlands

Line J Gordon^{1,2}, Viorica Blajut¹, Beatrixe Crono^{1,2}, Patrick J B Henriksen^{1,2}, Tracy Van Holt^{1,2,3}, Malin Jonell¹, Thorsteinn Lindahl¹, Max Troell¹, Stephan Barthol^{1,2}, Lisa Deutsch¹ [+ Show all authors & affiliations](#)

* [Correspondence to: Line J Gordon](#)



The Lancet Commission

Environmental Research Letters

EDITORIAL • OPEN ACCESS

Rewiring food systems to enhance human health and biosphere stewardship

To cite this article: Line J Gordon et al (2019) Rewiring food systems to enhance human health and biosphere stewardship

View the [article online](#) for updates and enhancements

Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

— ADVANCE UNEDITED VERSION —

6 May 2019

THE LANCET



The Global Dynamics of Obesity, Undernutrition, and Climate Change: The Lancet Commission report

The Lancet Commission on Obesity, Undernutrition, and Climate Change. The Lancet Commission report. [https://doi.org/10.1016/S0140-6736\(19\)30453-4](#)



Mathematical Optimization to Explore Tomorrow's Sustainable Diets: A Narrative Review

Line J Gordon^{1,2}, Viorica Blajut¹, Beatrixe Crono^{1,2}, Patrick J B Henriksen^{1,2}, Tracy Van Holt^{1,2,3}, Malin Jonell¹, Thorsteinn Lindahl¹, Max Troell¹, Stephan Barthol^{1,2}, Lisa Deutsch¹ [+ Show all authors & affiliations](#)



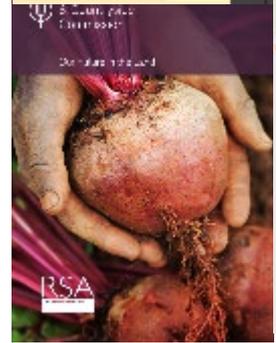
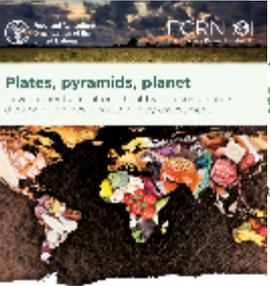
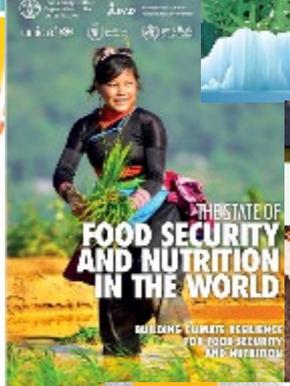
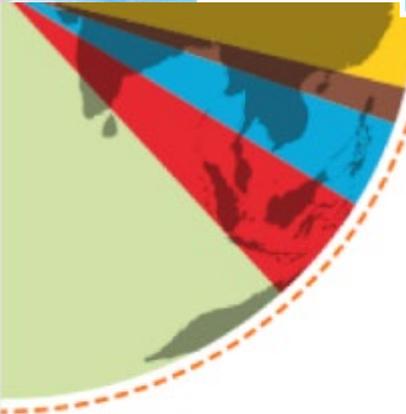
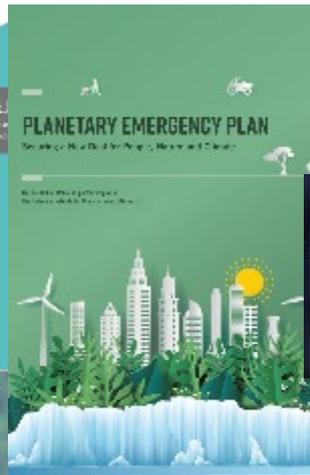
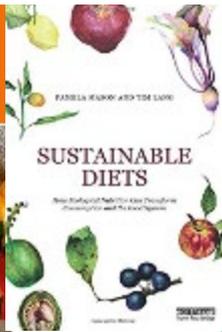
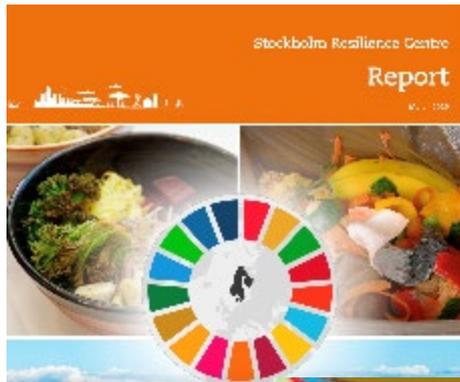
Even Food System Metrics of Sustainable Nutrition Security

Line J Gordon^{1,2}, Viorica Blajut¹, Beatrixe Crono^{1,2}, Patrick J B Henriksen^{1,2}, Tracy Van Holt^{1,2,3}, Malin Jonell¹, Thorsteinn Lindahl¹, Max Troell¹, Stephan Barthol^{1,2}, Lisa Deutsch¹ [+ Show all authors & affiliations](#)

PLOS ONE

OPEN ACCESS
Integrating water availability to food production into when identifying sustainable diets: How do climate change and water scarcity impact?

Line J Gordon^{1,2}, Viorica Blajut¹, Beatrixe Crono^{1,2}, Patrick J B Henriksen^{1,2}, Tracy Van Holt^{1,2,3}, Malin Jonell¹, Thorsteinn Lindahl¹, Max Troell¹, Stephan Barthol^{1,2}, Lisa Deutsch¹ [+ Show all authors & affiliations](#)





“Transformation to healthy diets by 2050 will require substantial dietary shifts. Global consumption of fruits, vegetables, nuts and legumes will have to double, and consumption of foods such as red meat and sugar will have to be reduced by more than 50%. A diet rich in plant-based foods and with fewer animal source foods confers both improved health and environmental benefits.”

Food is the single strongest lever to optimize human health and environmental sustainability on Earth.

<https://eatforum.org/eat-lancet-commission/>

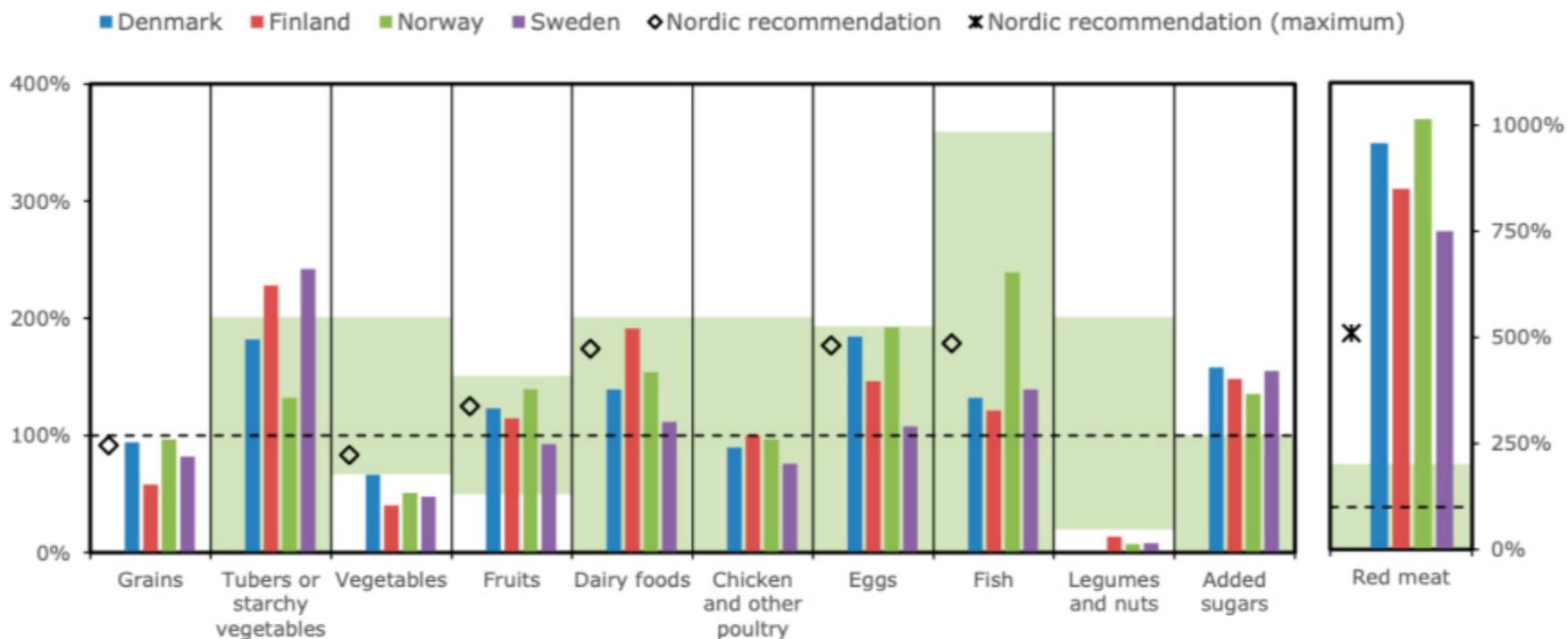


Figure 16. Comparison of the EAT-Lancet targets to current per-capita food consumption in each Nordic country and to Nordic dietary recommendations. Per-capita consumption is determined from dietary survey data. The dotted line at 100% indicates the EAT-Lancet dietary targets, and the green shaded areas represent the EAT-Lancet ranges. The Nordic dietary guidelines are indicated by a diamond, except for the red meat recommendation, which is a maximum (rather than average) recommendation.

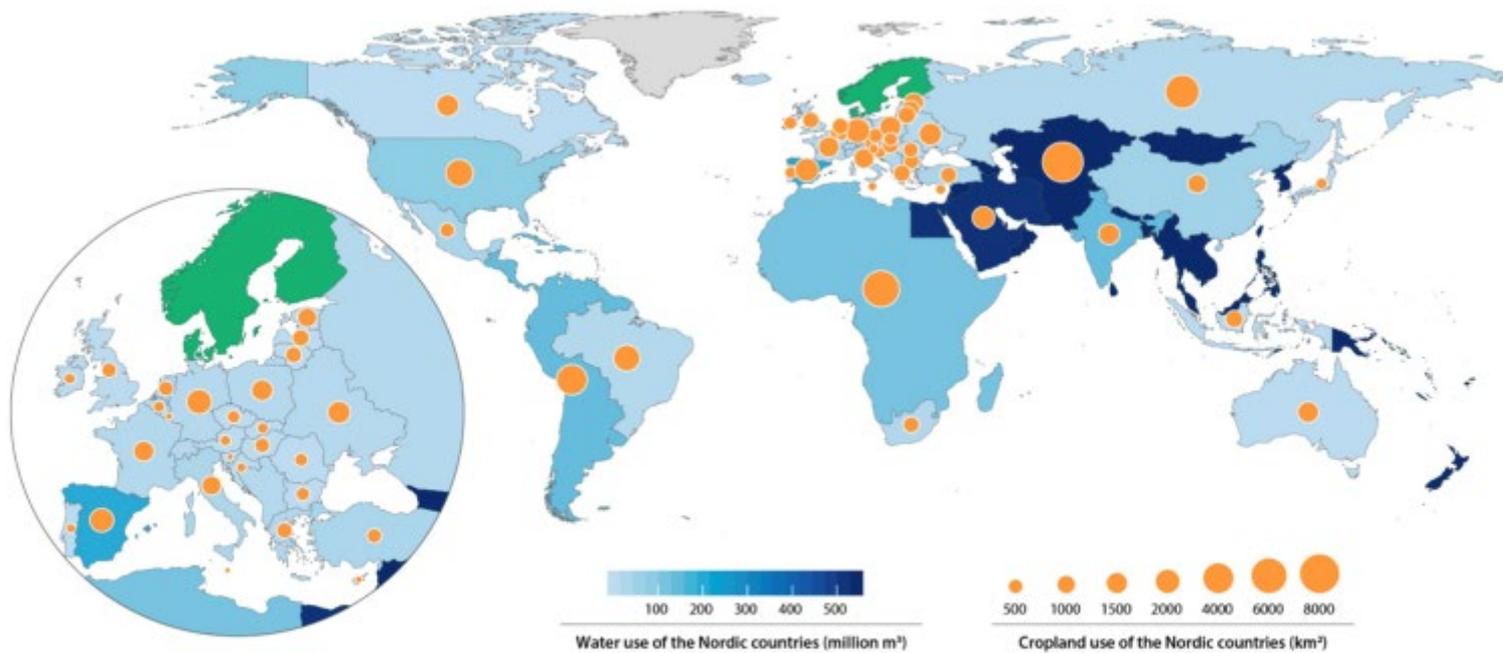


Figure 15. Cropland area and blue water used around the world by Nordic food consumption in 2015.

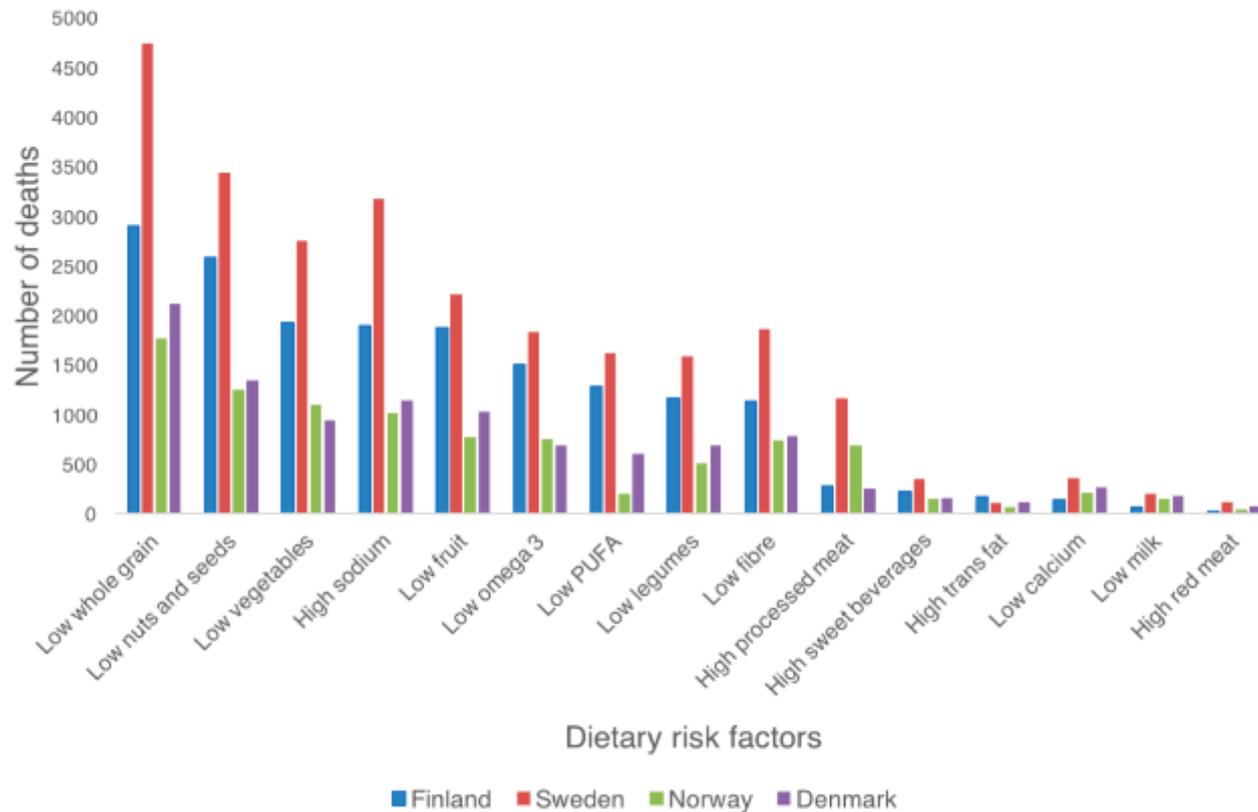


Figure 11. Deaths attributable to different dietary risk factors in the Nordic region in 2017 (adapted from original data of the Global Burden of Disease database, IHME).² This figure illustrates the absolute number of deaths. Due to different population sizes across countries [e.g. larger population size in Sweden relative to other Nordic countries], these estimates should not be used to compare the proportion of deaths across countries.

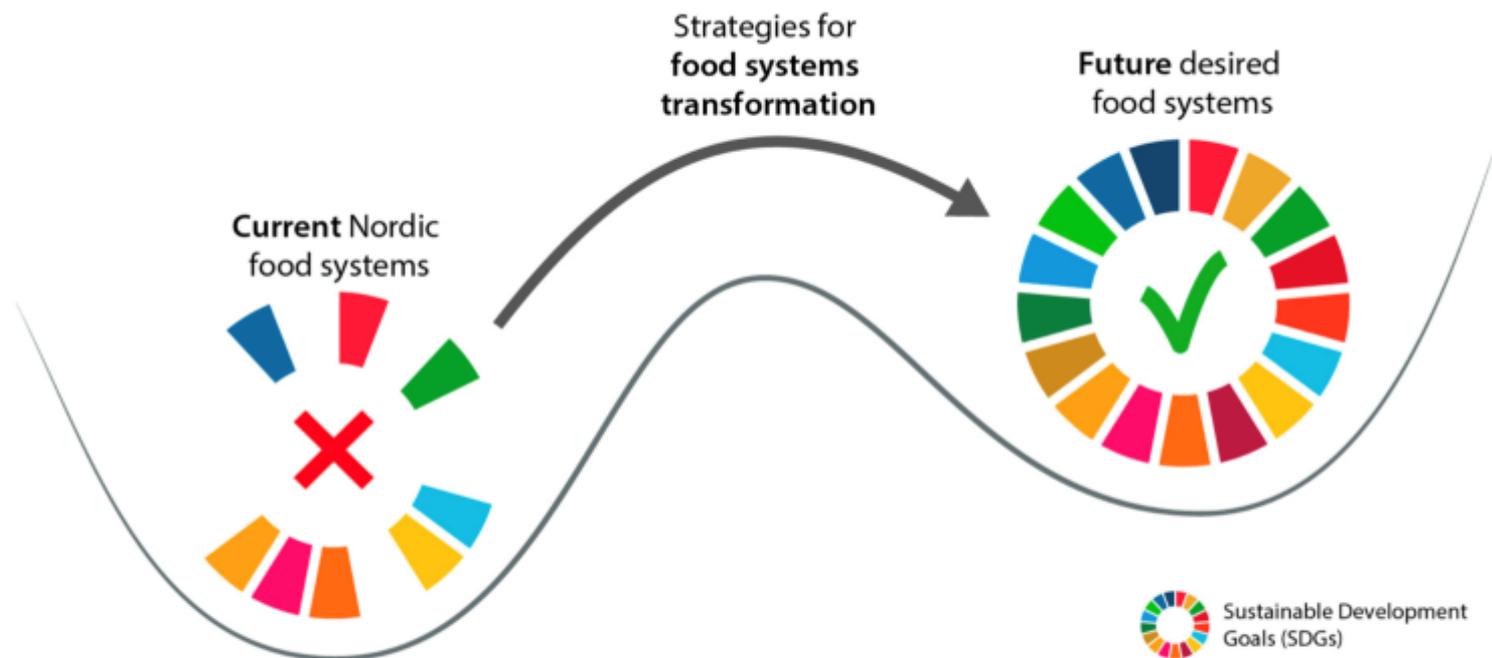


Figure 3. The Nordic food systems need transformation to reach the SDGs. Current Nordic food systems are stuck in a stable basin of attraction (left) and do not deliver on the integrated set of SDGs. To move to future desired food systems that deliver on global commitments (right), ambitious strategies will be needed to overcome the inertia of current food systems, illustrated as the 'bump' between the two stable basins.

The situation



- We are at a point in time where relatively rapid changes in diet would host great benefit for both our health and health of the planet.
- We need to **change our perspective** on food, each other and nature - focusing on our children.
- We urgently need to **speed up the transition** with focus on both nutrition and environmental sustainability – *the sustainable nutrition transition*

Non-healthy sustainable diets and healthy non-sustainable diets

<p>Lower impact but unhealthy</p> <ul style="list-style-type: none"> Mainly grains (except rice), tubers & legumes Low in nutrient rich foods e.g. fruits, vegetables & animal products Lacking diversity Low waste & energy but high risk storage & cooking practices <p>Poor in low income countries</p>	<p>Healthy & lower impact</p> <ul style="list-style-type: none"> Eat enough – but not too much Eat more tubers, whole grains, fruit and vegetables Eat meat sparingly if at all – (nose to tail) Dairy products in moderation /fortified replacements Unsalted seeds and nuts Small quantities of fish, from certified sources Limit processed foods high in fats, sugars and salt Don't waste food & cook efficiently
<p>High impact & unhealthy</p> <ul style="list-style-type: none"> High in animal products Low in vegetables and fruits Low in grains & tubers High in energy & fat dense, nutrient poor processed foods High waste & inefficient cooking <p>Rich and emerging economies</p>	<p>Healthy but high impact</p> <ul style="list-style-type: none"> Moderate levels of lean meats High impact vegetables and fruits (e.g. air freighted produce & hothoused vegetables & salads) Fish consumed from unsustainable stocks Chilled fresh food produce Inefficient cooking & high waste <p>healthy The wealthy</p>



DTU

Food for Good & Sustainable 2022
The University of Copenhagen



DTU Fødevareinstituttet

Råd om bæredygtig sund kost

Fagligt grundlag for et supplement til De officielle Kostråd

No one can do everything
but everyone can do
something



<https://www.food.dtu.dk/nyheder/Nyhede?id={B8072640-AF60-4BF9-8952-19867CC4FB70}>

Spis planterigt, varieret og ikke for meget

Spis flere grøntsager og frugter



Spis mad med fuldkorn



Spis mindre kød – vælg bælgfrugter og fisk



Sluk tørsten i vand



Vælg planteolier og magre mejeriprodukter



Spis mindre af det søde, salte og fede



De officielle Kostråd - godt for sundhed og klima



<https://altomkost.dk/raad-og-anbefalinger/de-officielle-kostraad-godt-for-sundhed-og-klima/>

Vigtige tips:

- Begræns madspild
- Gå efter Nøglehullet



En sund og bæredygtig kost er mere plantebaseret

As a researcher it is easy to get frustrated by the slow uptake of scientific evidence in society. However, a few weeks ago, I had reason to feel genuinely proud and happy to be both Swedish and a researcher in the field of sustainable food systems, when the Swedish Food Agency (SFA) announced the launch of its **new dietary guidelines**. For the first time these are not based solely on what is a suitable diet from a human health perspective; they take into account the health of the planet.

FCRN Blogs : Elin Roos

Community

Blogs

Interviews

Member snapshots

Environmental concerns now in Sweden's newly launched dietary guidelines

Elin Roos



The Food Climate Research Network conducts, synthesises, and communicates research at the intersection of food, climate, and broader sustainability issues. Based at the University of Oxford, we work to inform and connect stakeholders with a common interest in understanding and building sustainable food systems.

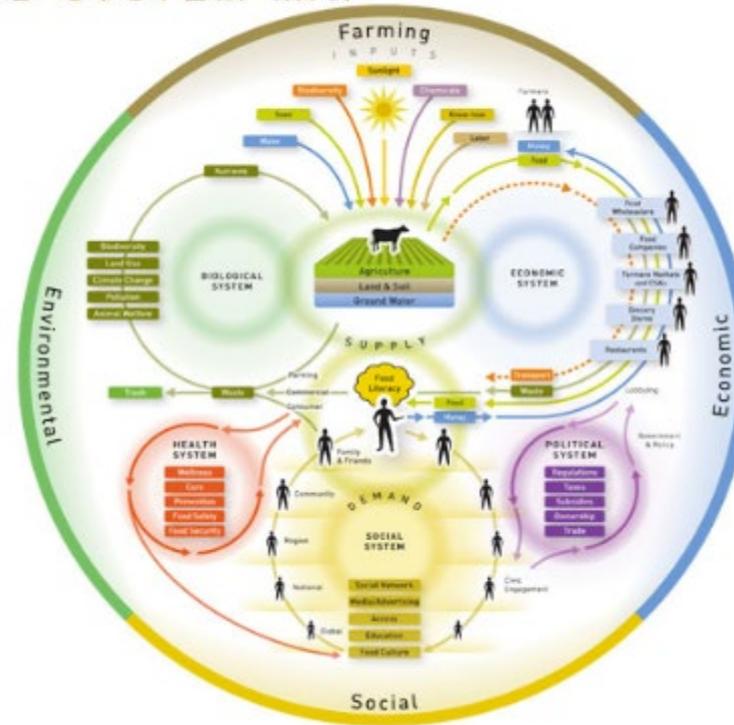
<http://www.fcrn.org.uk/about>



Challenges

- Today 1/3 of the world is malnourished (under- or overnutrition)
- **Malnutrition** in all its forms can exist and co-exist at all levels of the population — country, city, community, household, and individual.
- This results in lower resilience to **both communicable and non-communicable diseases**.
- Malnutrition often has its roots in **faulty food systems**, especially due to interactions between commercial determinants, food environments and food miscommunication and policy.

FOOD SYSTEM MAP



<http://www.ourishlifeline.org/food-system-toolkit/>

Nutrition within Sustainable Food Systems

<https://globalnutritionreport.org/>

Monitoring is important

food & nutrition
research

ORIGINAL ARTICLE

Insufficient iodine status in pregnant women as a consequence of dietary changes

Solveig Adalsteinsdottir¹, Elen Alma Tryggvadottir¹, Laufey Hrolfsdottir^{1,2}, Thorhallur I. Halldorsson^{1,3}, Bryndis Eva Birgisdottir¹, Ingibjorg Th. Hreidarsdottir⁴, Hildur Hardardottir^{1,2}, Petra Aronoka⁵, Iris Erlund⁶ and Ingibjorg Gunnarsdottir^{1*}

Popular scientific summary

- Despite Iceland's historically high iodine consumption, decreased fish and dairy consumption among women of reproductive age have been a concern.
- The median UIC of 89 µg/L in the present study indicates insufficient iodine status in the population of pregnant women in Iceland.
- Action needs to be taken on public health level to attend to the matter.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6958617/pdf/FNR-64-3653.pdf>

Proteins and amino acids become special interest with the transition in diet

Challenges

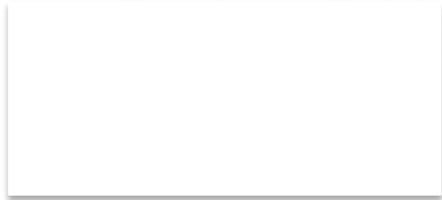
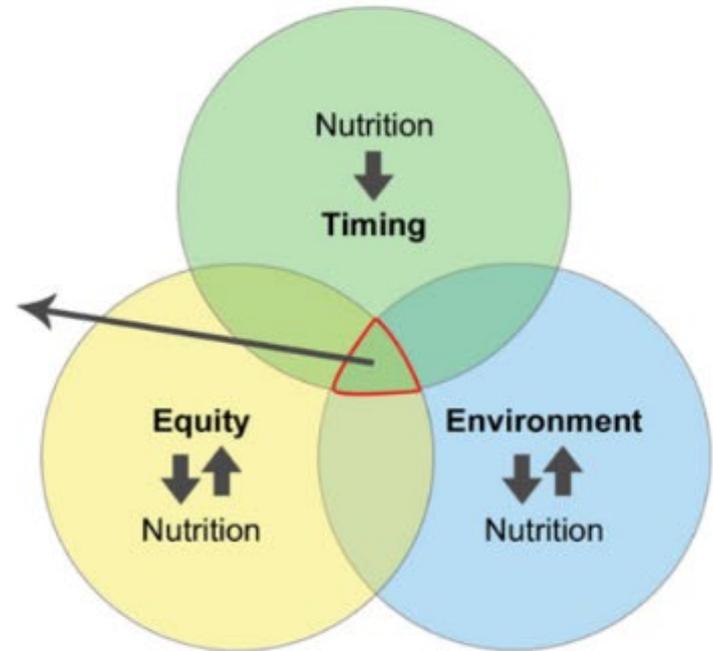
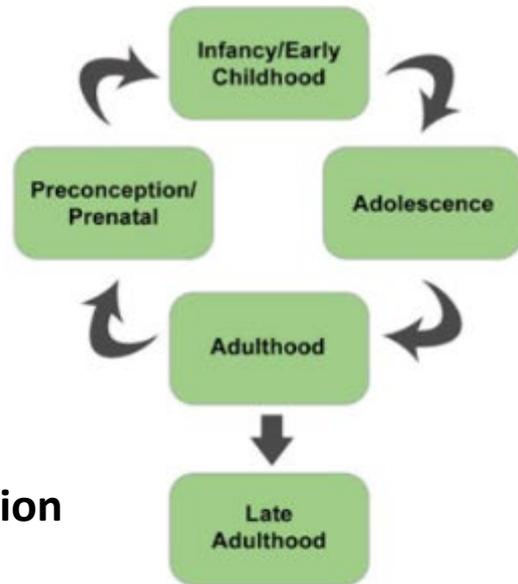


Illustration of the life course perspective applied to nutrition

Timeline

Cumulative Impact of Nutrition Across Generations



Herman et al 2013

THE BEYOND BURGER® WEIGH-IN



THE BEYOND®
BURGER®
PLANT-BASED BURGER PATTIES



1/4 LB
PATTY



ANIMAL-BASED
BEEF®
RAW UNSEASONED 80/20 BEEF

20	PROTEIN (G)	19
25%	IRON (DV)	12%
5	SATURATED FAT (G)	9
8	CHOLESTEROL (MG)	80
22	TOTAL FAT (G)	23
290	CALORIES	287
✓	PLANT-BASED	✗
✓	ANTIBIOTIC-FREE	?
✓	HORMONE-FREE	?
✓	GMO-FREE	?
✓	SOY-FREE	✓
✓	GLUTEN-FREE	✓

1/4 LB BEYOND BURGER TOTAL PATTY USDA NATIONAL MEATPACK PACKAGE

BEYOND BURGER®

BEEF BURGER
1/4 LB US BEEF BURGER



VS



99% LESS WATER



93% LESS LAND



90% FEWER GHGE



46% LESS ENERGY

Current knowledge on long term effect of diets based on a different food items

Monitoring important – WE MUST be able to see what happens with both
- nutritional status and
- health
both in the short and long run

New types of food – health effects?

What is the effect of processing?

The Icelandic Food Circle

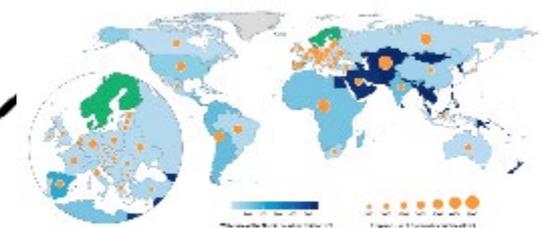


Figure 1: The Icelandic Food Circle. Source: Icelandic Food Circle.

- There is a range of **possible interventions/actions** to solve nutritional problems within different communities or countries, ranging from focus on improving the existing food systems towards more sustainability to involving the art of commensality.
- Due to the **interconnectedness** of over- and undernutrition, double-duty actions that simultaneously **address more than one dimension** must be implemented for policy recommendations to be effective.

Possibilities



-Adapted from Heise, L., Ellsberg, M., & Gottemoeller, M. (1999)

ABOUT TKC

RESOU



GET INVOLVED HOME



CHANGING LIVES THROUGH FOOD

A unique collaborative of medical professionals, chefs, educators, researchers, and food system experts dedicated to the improvement of personal and public health.

LEARN MORE ABOUT US

<https://teachingkitchens.org/>

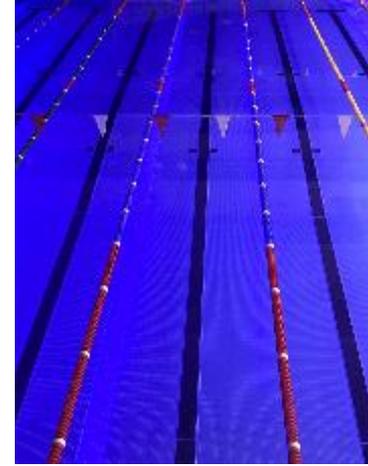
- On a positive note; Human beings seem to be more prone to make changes for a larger cause than themselves.
- To fight for planetary health through diet can therefore seem as a more important mission than changing the diet for oneself.





Systems thinking

What can you do?

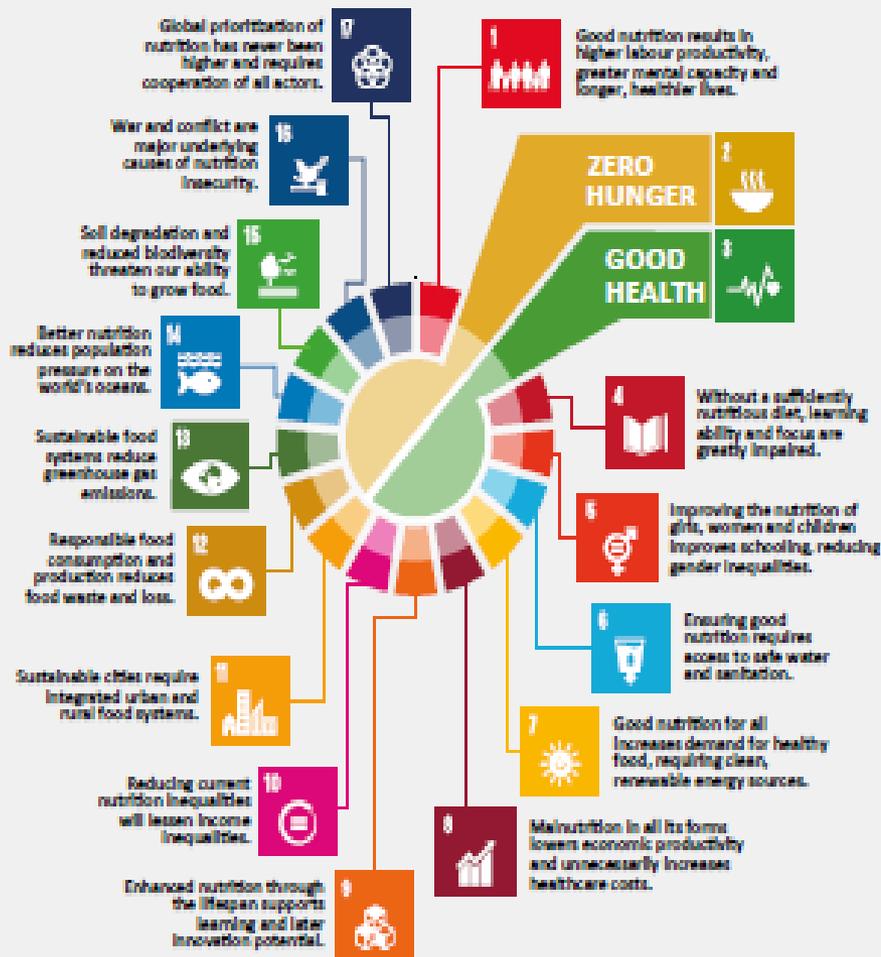


- Dive in, learn more, together.
- Work from where you are and contribute to the sustainable diet and food systems conversation.
- When engaged in projects relating to nutrition and health – bring environmental sustainability to the table.
- Interrupt - shape the future.



NUTRITION AND THE SDGs

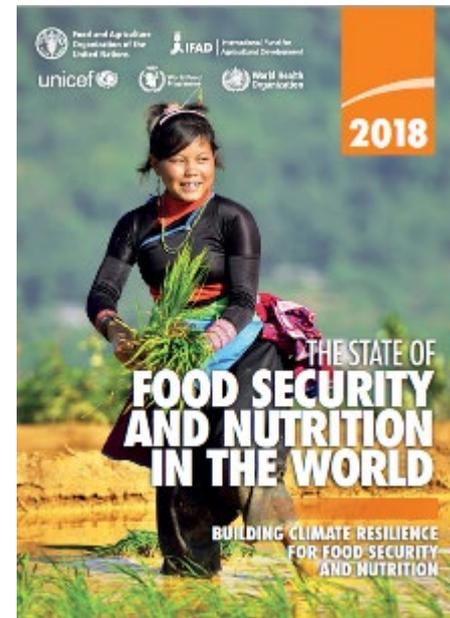
CENTRAL TO THE 2030 AGENDA

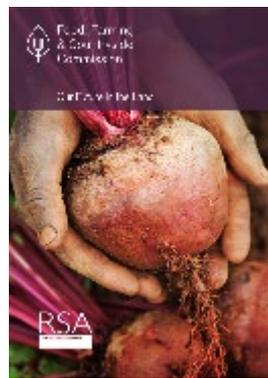


UNITED NATIONS DECADE OF
ACTION ON NUTRITION



2016-2025





Reconnect people with nature to boost health and wellbeing

WHAT IS THE CIRCULAR ECONOMY?

The Commission follows the Ellen MacArthur Foundation in defining the circular economy as an approach that “redefines growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three principles: designing out waste and pollution; keeping products and materials in use; regenerating natural systems.”

SYSTEMS THINKING, AND SYSTEMS CHANGE

Peter Senge defines systems thinking as “a context for seeing wholes... a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static snapshots.” In other words, we inhabit a living and adapting ecosystem and we must understand the way its various elements interact with one another to avoid our efforts to reform one part of the system causing disruption elsewhere.

Too often policy works in siloes, concentrating on one small part of the system at a time and in doing so producing unintended results in other parts of the system. Or else, as with pollution for example, it works on cleaning up the mess made by the system rather than dealing with the problem at root. Systems change, by contrast, focusses on reforming the system as a whole, rather than one particular piece of it.

THE 2021 FOOD SYSTEMS SUMMIT

The Secretary-General will convene this Summit to launch bold new actions to transform the way the world produces and consumes food, delivering progress on all 17 Sustainable Development Goals.



<https://www.un.org/en/food-systems-summit>

Farmers and rights groups boycott food summit over big business links

Focus on agro-business rather than ecology has split groups invited to planned UN conference on hunger



<https://www.theguardian.com/global-development/2021/mar/04/farmers-and-rights-groups-boycott-food-summit-over-big-business-links>

We can build a just and resilient world where no one is left behind



We are all connected

We are ecological creatures
– our health is woven into the earth's ecosystem



Ecological
creatures,
Whalqvist M
2017



FOODSCAPES
ERRO 1964