Introducing environmental impact of food (state-of-art, gaps, needs)

Sirpa Kurppa, research professor
Natural Resources Institute Finland (Luke),
Bioeconomy and Environment, Sustainability Science and Indicators

SUSFOOD2

The food systems approach

- The food systems approach could help in identifying different aspects of sustainability and their interrelations like:
  - resource efficiency,
  - environmental stability,
  - resilience and
  - the public health agenda.
- A food system gathers all the elements and activities that relate to the production, processing, distribution, preparation and consumption of food, and the output of these activities, including socio-economic and environmental outcomes (HLPE 2014).
- *Emphasis to ecosystem and food system connections:*
  - *Sustainable food regions, local food and*
  - *Systematizing food composition approach (interaction of ingredients) such as amino acid composition versus food sourcing strategy (combination of plant based and insect based proteins)*
  - *Microbiome approach*

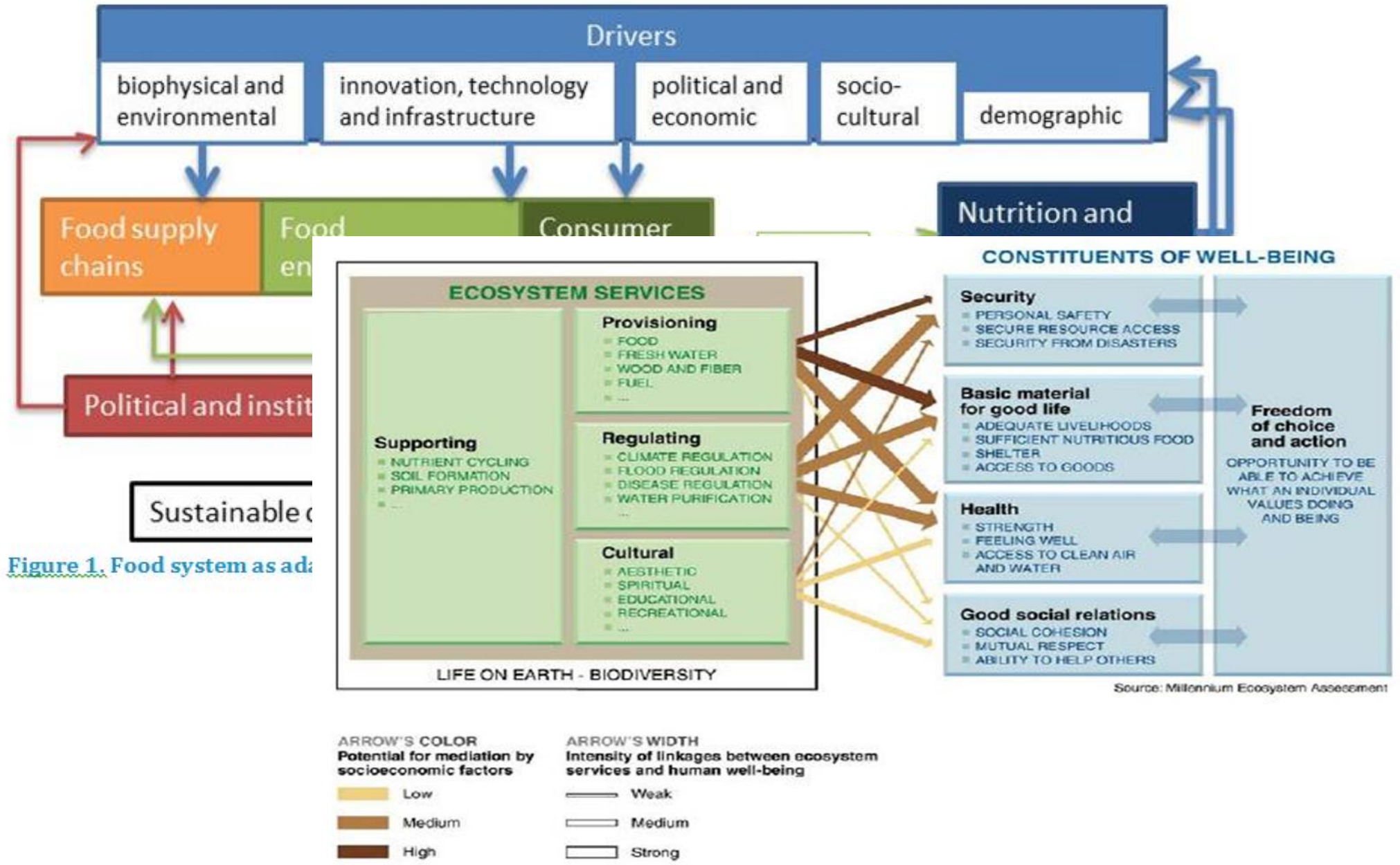


Figure 1. Food system as ada

Figure SDM - A - The MA framework

SUSFOOD2

Global food and nutrition security

- The SUSFOOD SRA uses FAO's definition for food security: "*Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life*".
- The expected growth of the world population to 9 billion in 2050 will lead to a near 60 % increase in food demand.
- Hunger and undernutrition, micronutrient deficiencies on the one hand, and on the other hand over nutrition exist in parallel and are partly connected. In 2016 worldwide 815 million people were chronically undernourished (FAO 2017).
- At the same time the worldwide obesity has nearly tripled since 1975 (WHO 2017). Socio-economical inequity, ageing and urbanization also have an effect on the way in which the food systems are established.

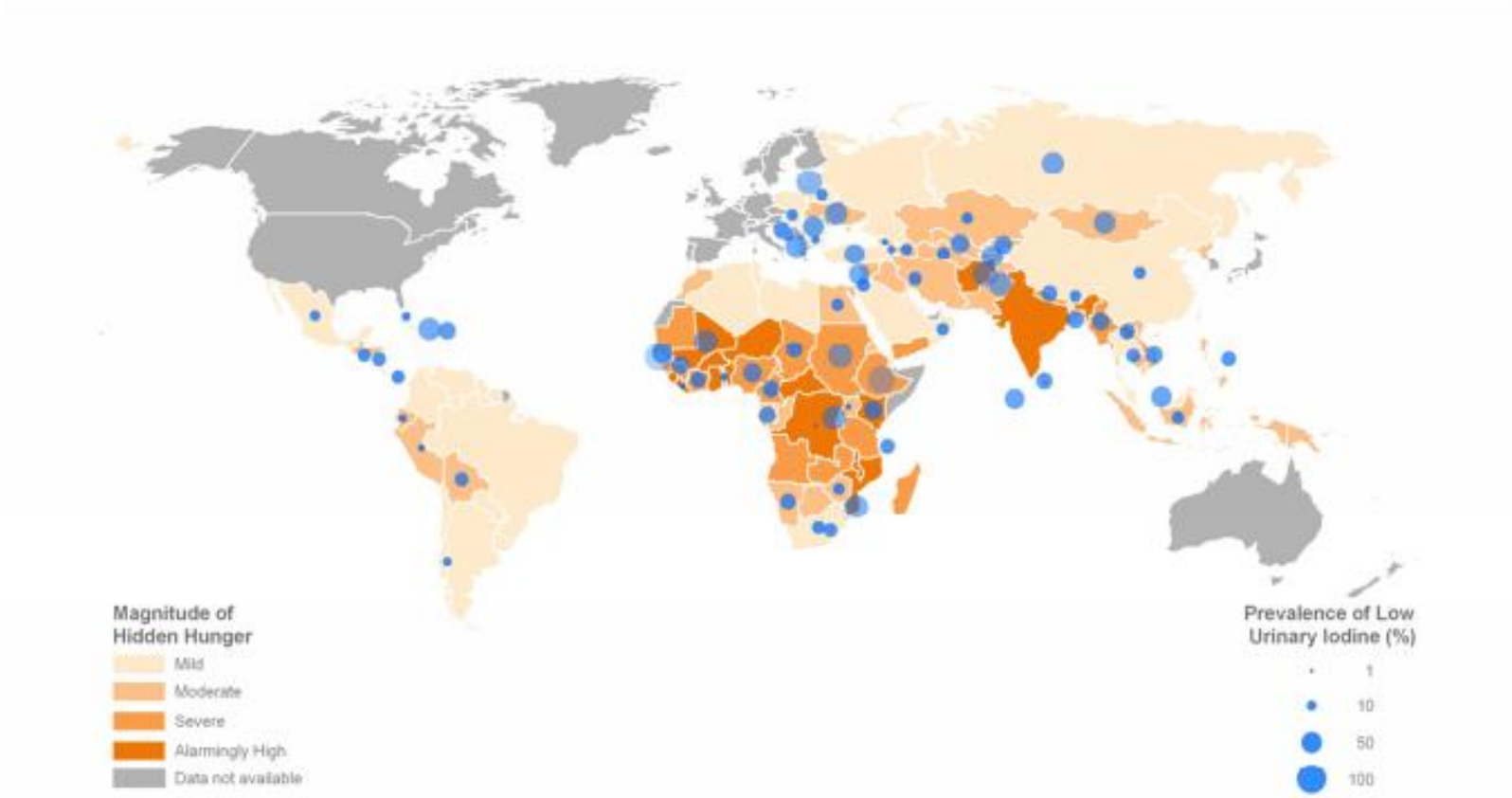
SUSFOOD2

Emphasis to hidden hunger – 2 billion hidden hungry

The Global Hidden Hunger Indices and Maps:

An Advocacy Tool for Action

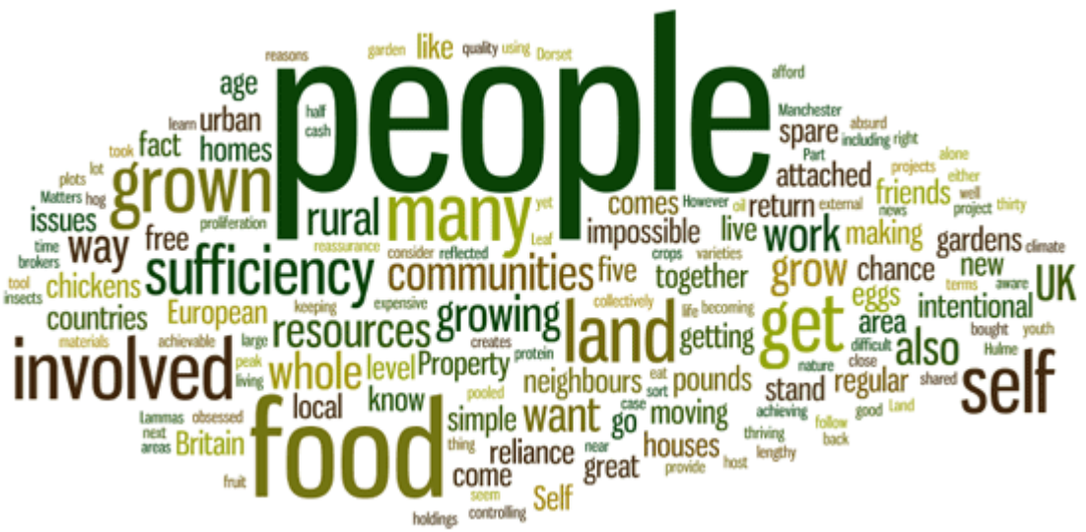
EXECUTIVE SUMMARY



SUSFOOD2

Future strategy for nutrition security

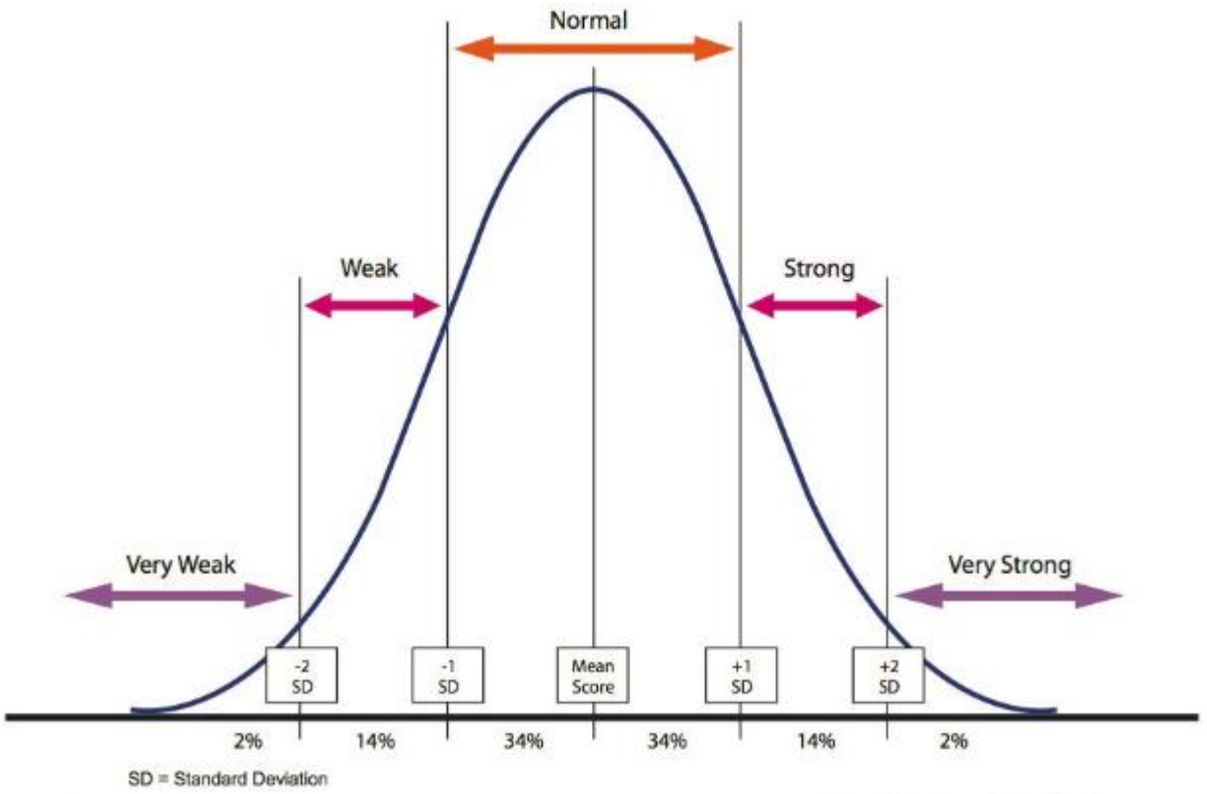
- Linked to the previous theme :
  - Getting rid of food transportation over the globe
  - Concentrating on regional and local food system development
  - Microbiome impacts
  - Sufficiency strategy

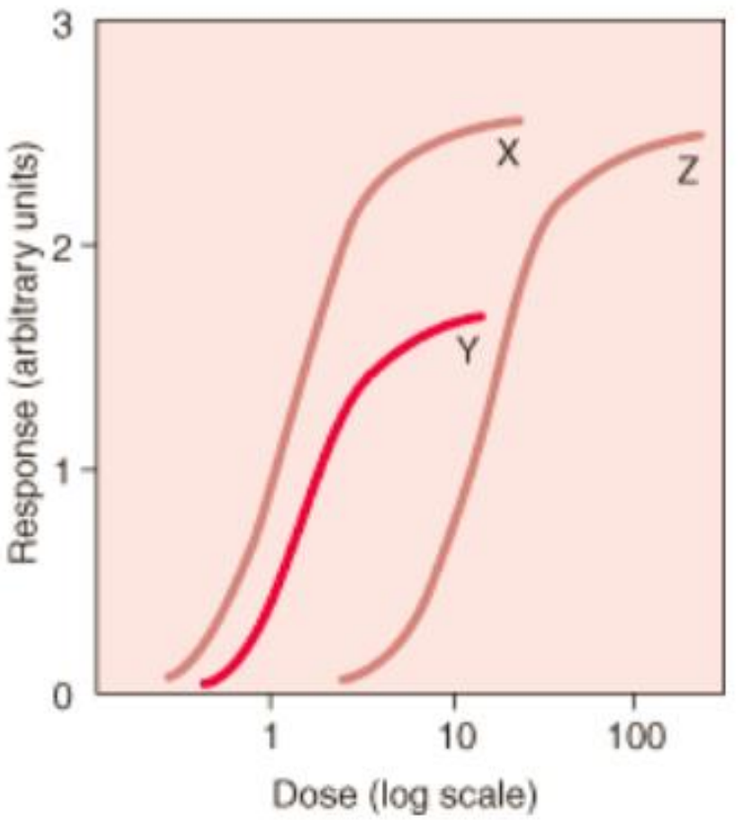


SUSFOOD2

Resource constraints and food industry

- Many of food systems are currently unsustainable from a natural resources perspective such as land degradation, depletion of fish stocks, nutrient losses, impacts on biodiversity, air, soil and water quality, and greenhouse gas emissions (UNEP 2016).
- An overarching issue is climate change which will affect what can grow and where.
- Food system activities beyond the farm gate contribute to environmental degradation through water use, pollution and energy use
- ***Emphasis to water efficacy, flexible nutrient an feed efficacy and total energy use (getting out or rebound effect)***

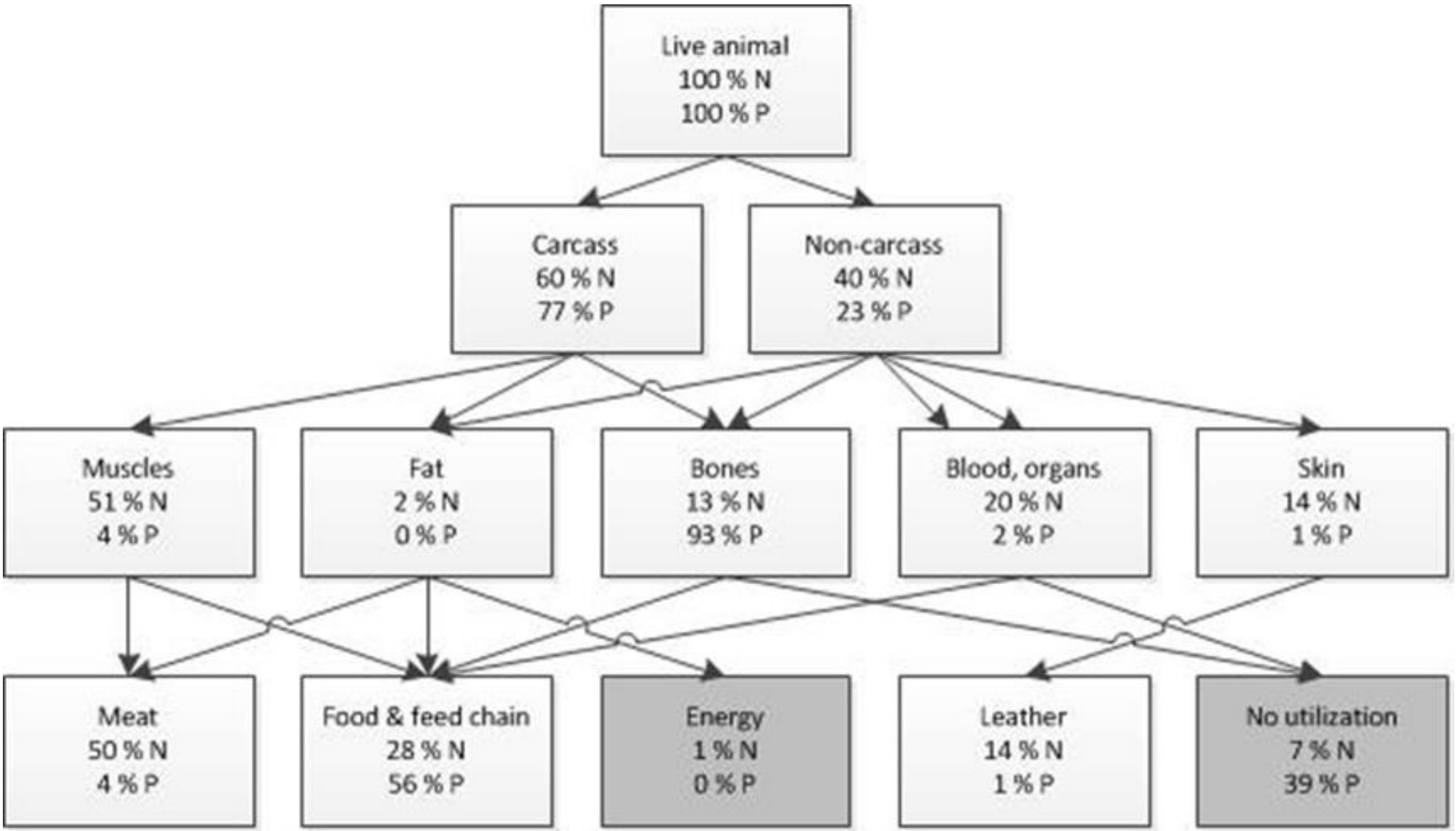

Normal
Weak
Strong
Very Weak
Very Strong
-2 SD
-1 SD
Mean Score
+1 SD
+2 SD
2%
14%
34%
34%
14%
2%
SD = Standard Deviation


Response (arbitrary units)
0
1
2
3
X
Y
Z
1
10
100
Dose (log scale)

SUSFOOD2

Food waste

- Food waste was the third global challenge in closer examination in SUSFOOD SRA. In this field progress has taken place in research and policy commitment.
- The problem is, however, not yet solved. More research, development and innovation are needed. One of the targets of Agenda 2030 is to halve per capita food waste at the retail and consumer level by 2030, and reduce food losses along the food production and supply chains.
- ***To be raised to holistic waste management starting from sustainable product design***



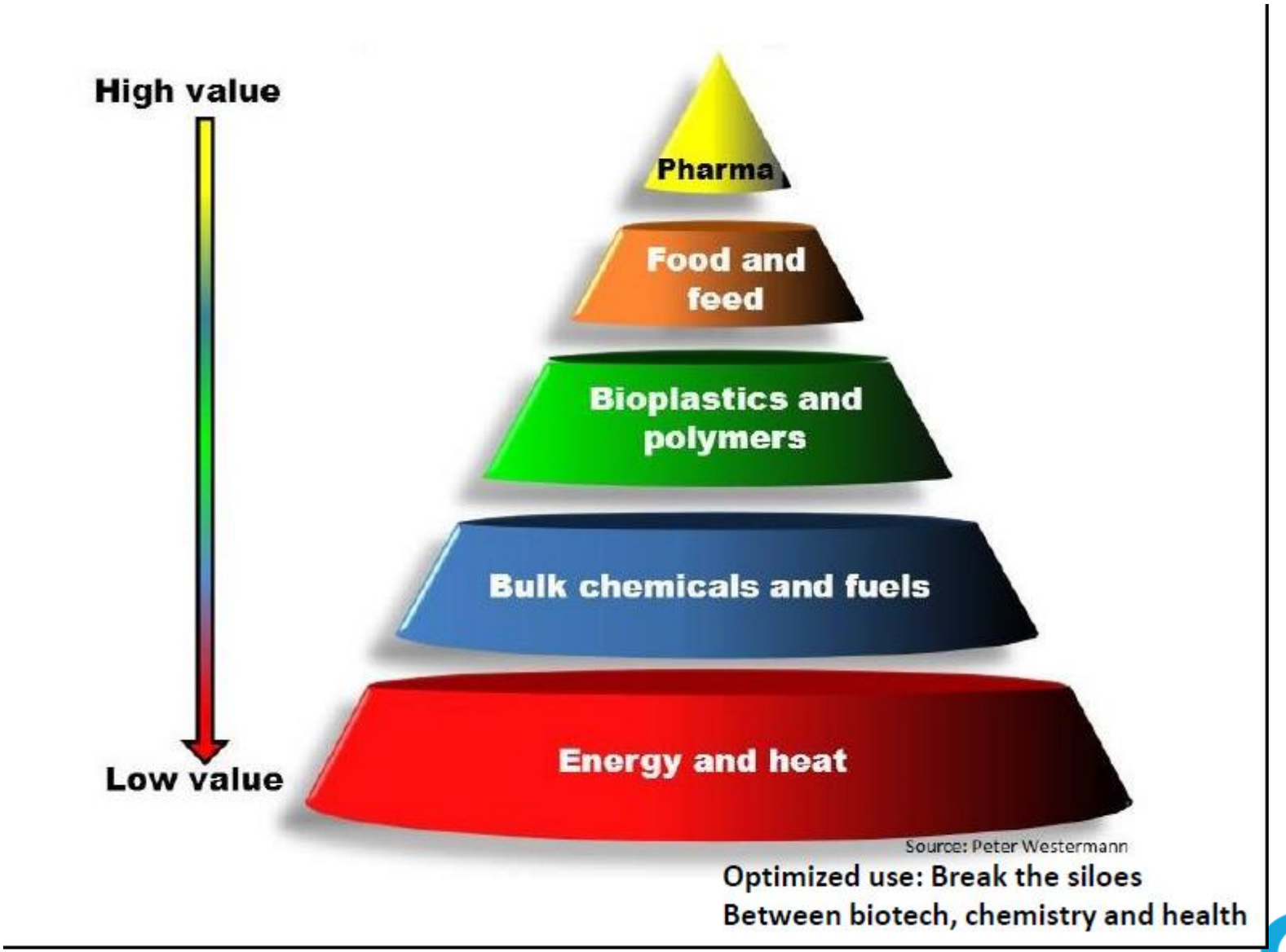
Flow of animal N and P from slaughter to retail. Grey boxes: the nutrients are not utilized after this step.

Re- concepts for sustainability or sufficiency

- **Reduce** – exploitation of resources,
- **Reuse** – commodities, infrastructure
- **Revive** – through consequent changes
- **Recycle** – materials, commodities
- **Redefine** – resource needs
- **Re-imagine** – potential uses
- **Redesign** – use flows, uses of materials and infra
- **Replace** – components, ingredients
- **Rebuild** - compounds
- **Regenerate** - renew
- **Reform** - reformulate
- **Reorganize** – processes/systems
- **Resilient:** adaptability, transformability, persistence, preparedness

© Luonnonvarakeskus

Cascading – utilize the value pyramid comprehensively



© Luonnonvarakeskus

SUSFOOD2

Grow your own food

- Growing meat or berries in laboratory is already possible. The price is still high but going down.
- People still value the “real” food higher but what if artificial food is more sustainable?
- On the other hand does it contain the same diversity of secondary metabolites or profitable microbes as the traditional food?
- ***Prosumerism***
  - *Availability of work in city context >< suburban food security*
  - *Capabilities – automatization*
  - *Circulation – robotics*
  - *Sanitation – city farming epidemics*

NATURAL RESOURCES, TECHNOLOGY

WATERS JPI
- IC4WATER CSA
- *WaterWorks2014
- *WaterWorks2015
- *WaterWorks2017

European Water Platform
4PRIMA CSA
ManuFuture
SusChem
PLATFORM
S3 Platform

AGRICULTURE

FACCE-JPI
- *ERAGAS
- *FACCE-SURPLUS
- *SusCrop

*CORE Organic Plus/Cofund
*SusAN
European Innovation Partnerships (EIP)
SWG AKIS
4PRIMA CSA
*LEAP-Agri
*ICT-AGRI 2
TP Organics
SCAR SWG on Food Systems
SCAR SWG AKIS
Biohorizon network
Euphresco network

AQUACULTURE

OCEANS JPI
EATiP
Biohorizon network
Blue bioeconomy PPP

CONSUMERS, HEALTH, SOCIETY

HDHL JPI
- *ERA-HDHL
- *HDHL-INTIMIC

ETP Food for Life
Plants for the Future
EU Platform on Diet, Physical Activity and Health
Global Food Security Programme
JPI Urban Europe
JPI Cultural Heritage
JPI Demographic
EATiP
EIT Food
FoodForce
SCAR SWG on Food Systems
FReSH

SUSFOOD2

INNOVATION, RESEARCH

European Regions Research and Innovation Network
4PRIMA CSA
PLATFORM
European Commission Joint Research Centre (JRC)
Coordination of nationally-funded research (COST)
European Innovation Partnerships (EIP)
National contact points
European Association of Development Agencies (EURADA)
European Food Alliance
FoodForce
FIT4FOOD 2030
SCAR SWG on Food Systems
ETP Food for Life

FOOD QUALITY AND SAFETY

AMR Transmission dynamics JPI
TP Organics
*CORE Organic Plus Cofund
Plants for the Future
EATiP
CSA Authent-Net
Global Food Security Programme
ETP Food for Life
SCAR SWG on Food Systems
AuthentNet

INDUSTRY

*ETB Pro
*Euro Trans Bio
ETP Food for Life
ManuFuture
TP Organics
Plants for the Future
SusChem
EATiP
Enterprise Europe Network
PPP- Bio-based Industries Joint Undertaking
FoodNexus

CLIMATE CHANGE, FOOD WASTE

FACCE-JPI
- *ERAGAS

Climate JPI
Belmont Forum
Global Research Alliance on Agriculture and Greenhouse Gases (GRA)
REFRESH
EU Platform on Food Losses and Food Waste
ETP Food for Life

Figure 2 Some initiatives in the fields related to SUSFOOD2. ERA-NETs are marked with *


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
SUSTAINABLE DEVELOPMENT GOALS

Sustainable development goals

Goal

- No poverty
- Zero hunger
- Good health and wellbeing
- Quality education

- Gender equality
- Clean water and sanitation
- Affordable and clean energy
- Decent work and economic growth
- Industry innovation and infrastructure

What could be done (gaps and needs)?

- Poverty gap path dependence
- Sufficiency
- Microbiome
- Proximities: cognitive, cultural, organisational, institutional, social, geographical
- Linked to quality gap
- Linked to climate change
- Food and energy security linked
- Effectuation theory and proximity context
- Frugal innovations

Sustainable development goals

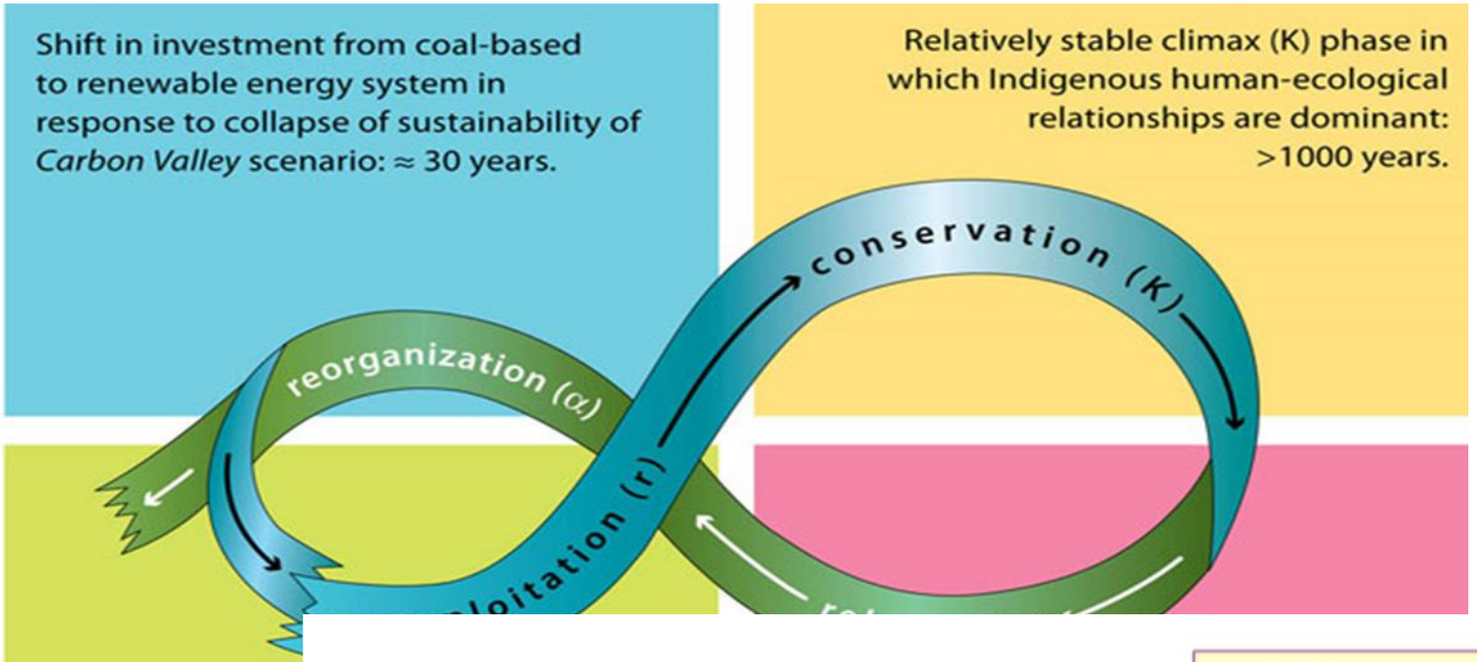
Goal

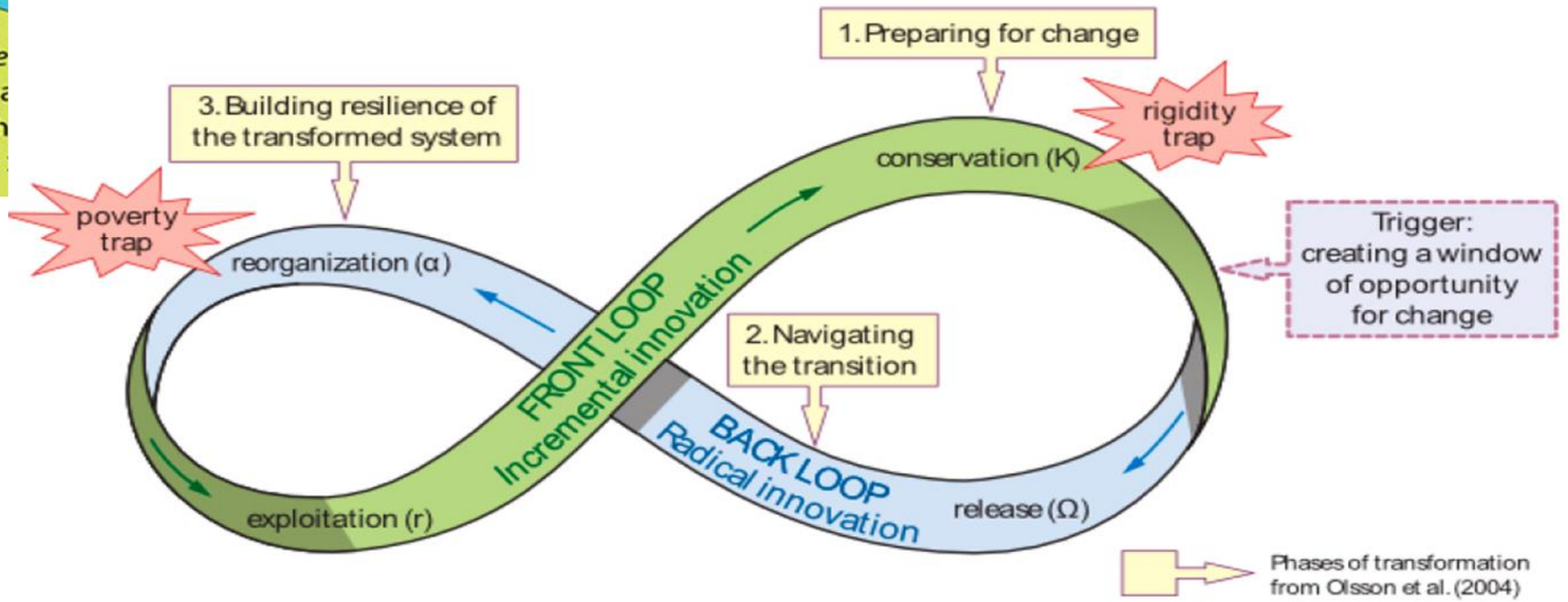
- Reduced inequalities
- Sustainable cities and communities
- Responsible consumption and production
- Climate action
- Life below water
- Life on Land
- Peace, justice and strong institutions
- Partnership for the goals

What could be done (gaps and needs)?

- Immigration
- Landless food production
- Diversity and biodiversity supportive
- Sufficiency
- New raw materials
- New raw materials
- Global standards
- Regional clusters

Resilience





http://www.theburningplatform.com/2013/09/

Resilience

THANK YOU FOR YOUR ATTENTION

https://www.luke.fi/en/personnel/sirpa-kurppa/
https://sites.google.com/site/sirpakurppa/
Mobile +358 40 5486968, +358 40 1426506
Email: sirpa.kurppa@luke.fi,
sirpa.kurppa@gmail.com
Skype: sirpa.kurppa
Twitter: @SirpaKurppa

SUSFOOD2

COORDINATOR

JUELICH (GERMANY)

PARTNERS

BELGIUM (EV-ILVO, HERMES FUNDS / VLAIO)
ESTONIA (MEM)
FINLAND (LUKE, MMM)
FRANCE (ACTIA, ANR)
GERMANY (BLE, BMBF, BMEL, PTJ)
IRELAND (DAFM)
ITALY (MIPAAF, MIUR)
LITHUANIA (MOA)
NORWAY (RCN)
ROMANIA (UEFISCDI)
SPAIN (ADE, COTI, INIA, MINECO)
SWEDEN (FORMAS)
THE NETHERLANDS (EZ, NWO)
THE UNITED KINGDOM (DEFRA)
TURKEY (GDAR)
ASSOCIATED:
FLANDER´S FOOD (BE), MBIE (NZ)