

# Challenges for Agriculture and Sustainable Solutions for Food Security

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# Lead Questions



- (1) What are the most serious challenges to agriculture and food production we are facing now and in the near future?**
- (2) Which Sustainability concepts and solutions can be applied to counter such challenges?**

# Lead Questions



**(1) What are the most serious challenges to agriculture and food production we are facing now and in the near future?**

# General Challenges for agriculture and food production



Provision of  
Habitats &  
Biodiversity

Shaping  
Culture &  
Landscape



Climate change /  
Neo-ecology



Food and  
Nutrition  
quantity and  
quality

Biomass



Vital Rural  
Areas (Urban-  
Rural  
divide)

Competitiveness,  
structural change



Ressource-  
Management  
and efficiency

# Global Megatrends

## with relevance for agriculture and food production



**„Megatrends (...are) large social, economic, political, and technological changes (...), they influence us for some time – between seven and ten years, or longer.“ [John Naisbitt, 1982]**

# Megatrends with relevance for agriculture and food production

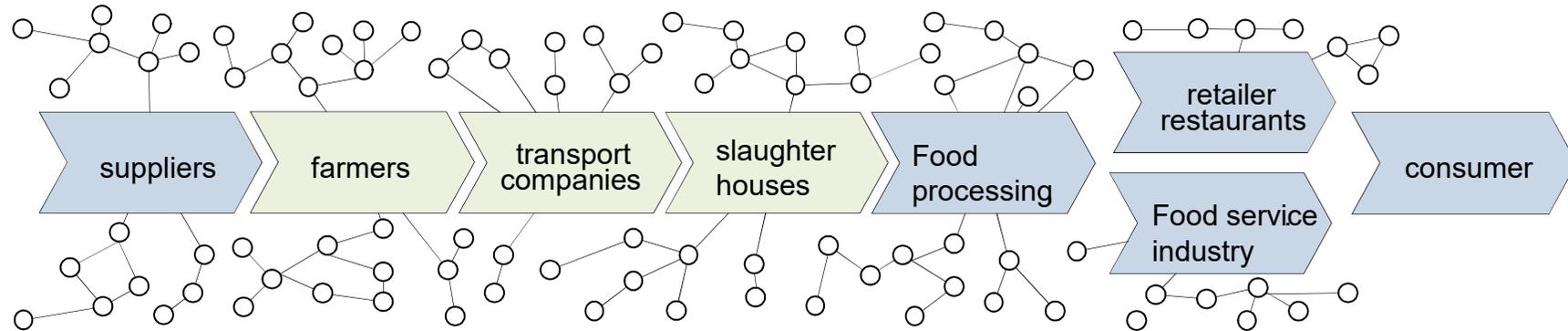
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- **Digitalization and disruptive technological changes**
- **Demographic change / Changes in structures of societies / Silver society**
- **Climate change / Neo Ecology**
- **Energy transformation – towards larger shares of renewables**
- **Urbanization vs. vital rural areas (urban-rural divide)**

# Agro-food supply chains – the example of pork

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**Complication: Multi level, highly complexe**

# Lead Questions



**(2) Which Sustainability concepts and solutions can be applied to counter such challenges?**

# Genesis and milestones

(Source: Pufé, 2012)



Quelle: © ernstboese - Fotolia.com

## ❖ **v. Carlowitz' forest management principle**

(“only chop so much wood, as well as can grow”;

Hans Carl of Carlowitz, Chief mining am kursächsischen Oberbergamt in Freiberg, 1713)

## ❖ **The confines of growth**

(Meadows et al.: report from 1972; Beginning of the younger scientific discussion with sustainability)

## ❖ **The Brundtland-report**

(Our Common Future Report 1987; “To keep options open for future generations, the present generation must begin now, and begin together, nationally and internationally”)

## ❖ **The summit in Rio**

(1992; 12 days, 178 states; Rio declaration on environment and development with 27 principle and anchoring of the right to sustainable development)

- ❖ Agenda 21, **Rio** 1992
- ❖ The millennium development goals of the **United Nations**, in 2000
- ❖ The World climate summit in **Durban** 2011
- ❖ The 2030 Agenda for Sustainable Development of the **United Nations**, September 2015
- ❖ World Climate Summit in **Paris**, December 2015
- ❖ World Climate Summit in **Sharm el-Sheik**, November 2022, Egypt)



COP21 · CMP11  
PARIS 2015  
UN CLIMATE CHANGE CONFERENCE



**The 2030 Agenda for Sustainable Development** (at September 25th, 2015: the 193 members of the UN General Assembly ratified this resolution in New York and agreed upon a total of 17 priority sustainability goals)

# Controversies: Strong or weak sustainability

## Strong or weak sustainability

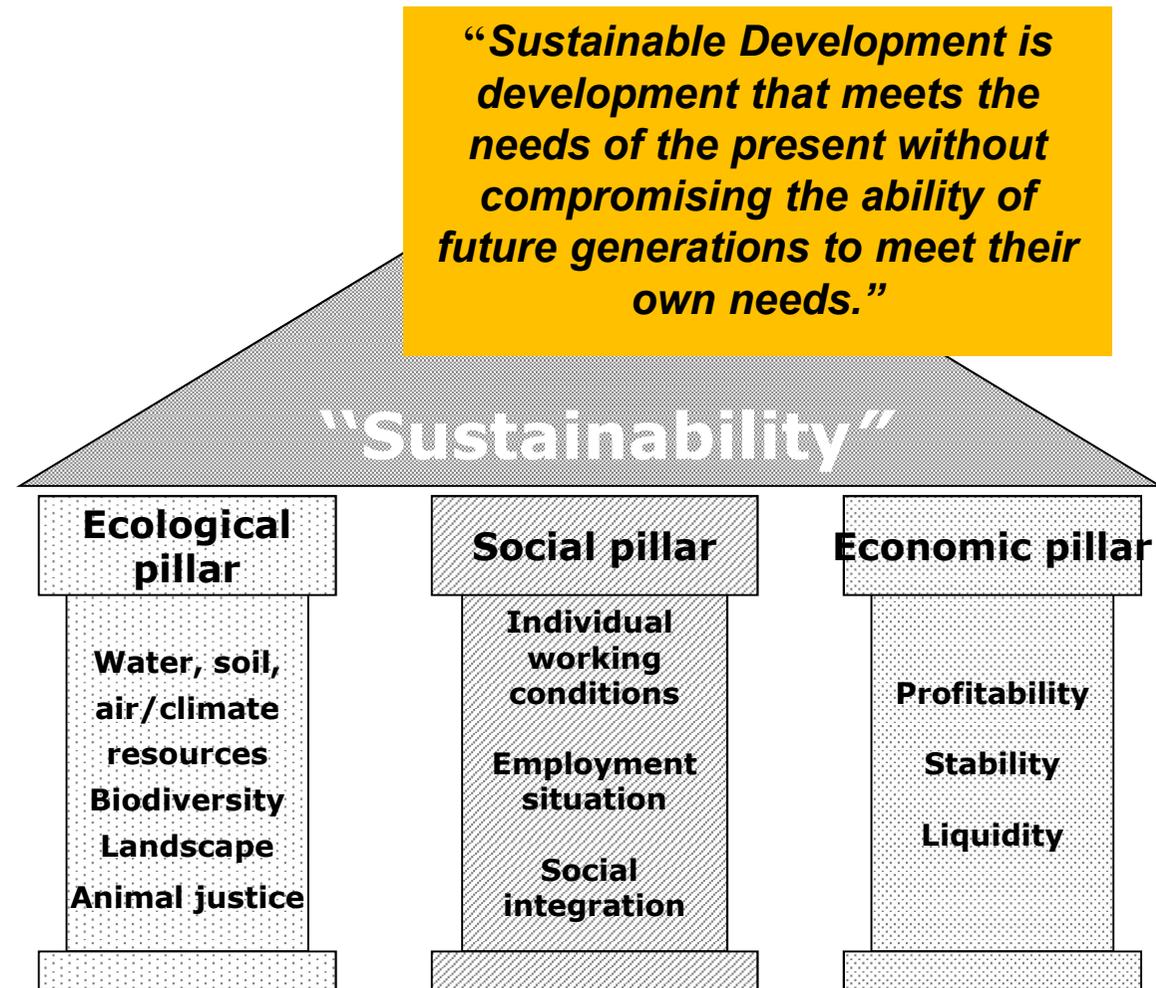
### **weak:**

substitution of the reduction of the nature stock by accumulation of capital goods

### **strong:**

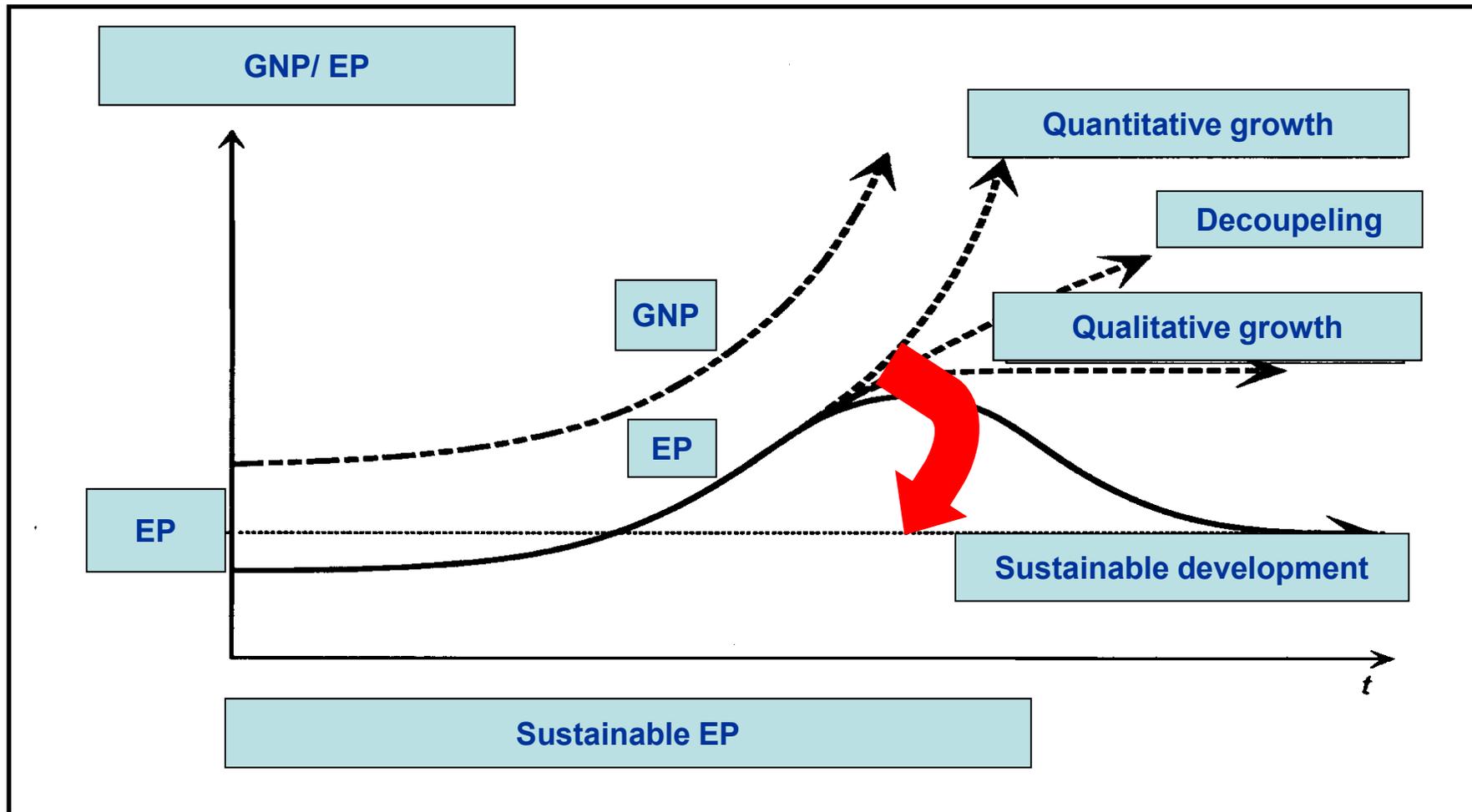
No interchangeability of natural and artificial resources

*“Sustainable Development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”*



# Controversies:

## Economic Growth (EG) and Environmental Pressure (EP)



Source: Minsch, J.; Eberle, A.; Meier, B. und Schneidewind, U. (1996:19): Mut zum ökologischen Umbau, Birkhäuser Verlag.

# Social sphere of activity

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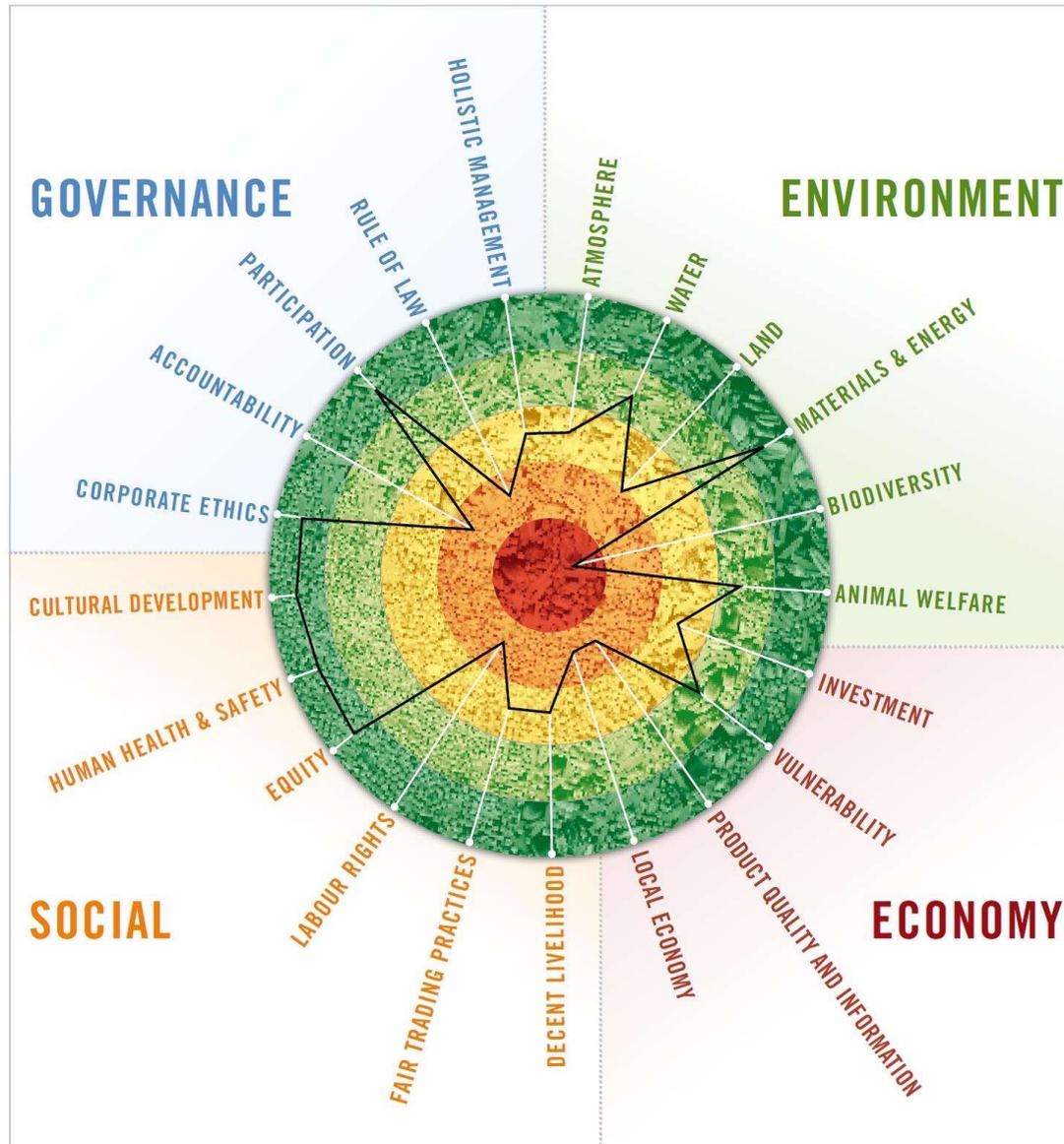


(Source: based on Grunwald and Kopfmüller, 2012)

- **Housing and construction**
  - adequate living space for all people
- **Mobility**
  - with increasing division of labor and global economy
- **Energy**
  - Basis for existence and development of a society
- **Climate**
  - Basis for life generally and human life in particular
- **Water**
  - availability and quality for human health
- **Labor**
  - prerequisite for value and satisfaction of needs
- **Agriculture**
  - central food supplier, land user, water and phosphate consumer
- **Nutrition**
  - high-quality food in sufficient quantity as a central basic need of people

# SAFA – for quantitative sustainability assessment

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Source: FAO, 2013



- (1) Numerous quite serious challenges for agriculture and food production can be identified**
- (2) Counter measures should be an option: Strategic development and policy making based on SDG and 3-pillar and strong sustainability concept**
- (3) Complexity of agro-food supply chains may not be underestimated**
- (4) Policy makers and members of agro-food supply chains should strongly commit themselves to sustainable development**
- (5) Strategies / Policies should focus on production increases, quality and safety of food products and reducing losses and waste**
- (6) Such strategies and policies can be implemented and fostered by law and/or incentives (e.g. subsidies)**

榛子  
纸皮核桃  
新杏仁  
开心果  
新松子  
新核桃  
新杏仁  
开口银杏  
花杏肉  
25-

# 谢谢

Thank you  
for your kind  
attention!