

Transition pathways and implications for research - visions from SCAR's 3rd Foresight

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Outline

- Messages from SCAR's 3rd Foresight
 - Scarcity challenges
 - Transition pathways
 - Building blocks for a vision 2050
- Implications for research and knowledge management
- Implications for research policies

Background

Standing Committee for Agricultural Research (SCAR) has commissioned Third Foresight Exercise:

FEG 3: July 2010 – January 2011

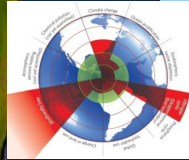
- 8 experts: Freibauer (DE, chair), Mathijs (BE, rapporteur), Brunori (I), Damianova (BU), Faroult (F/EC), Girona i Gomis (ES), O'Brien (IE), Treyer (F)
- Meta-review of existing studies
- Stakeholder involvement via workshop
- **Final aim: building blocks for longer-term perspective to prepare a smooth transition towards a world with resource constraints and environmental limits**

Approach

Starting point:

Extreme ends, assumptions, simplifications in relation to scarcities and transitions

New insights since FEG2



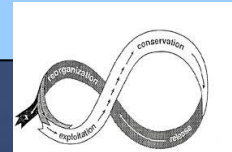
Narratives of food production and consumption



Biophysical scarcities

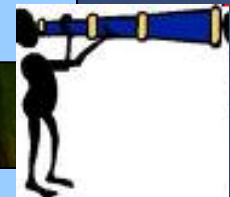
Socio-economic and political context

Transition pathways



Conclusions from insights

Long-term vision
Research needs

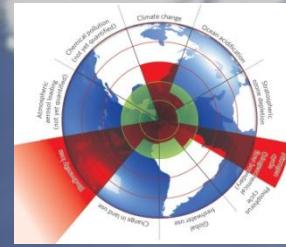


Conclusions from vision and research needs

Research policy implications

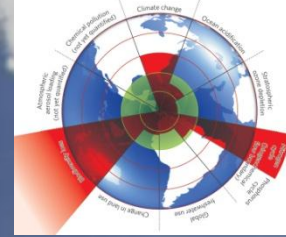
→ directions for solutions but even more, how research can direct us towards them

Key messages: Scarcities



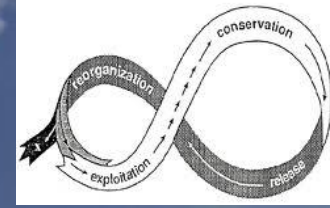
- “Many of today’s food production systems compromise the capacity of Earth to produce food in the future. (FEG3)”
- “The increasing scarcity of natural resources and destabilization of environmental systems represents a real threat not only to future food supplies, but also to global stability and prosperity, as it can aggravate poverty, disturb international trade, finance and investment, and destabilise governments. (FEG3)”

Key messages: Scarcities



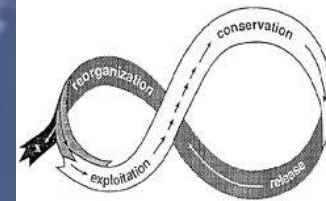
- **A new dimension of speed and uncertainty**
 - Climate change, biodiversity loss and bad governance aggravate the traditional challenges (land, nutrients, water, energy).
 - Scarcity mechanisms are unquantified: time lags, regional trends and vulnerability, shortage, distribution (excess versus shortage)
 - Interactions between scarcities are manifold and non-linear, often positive feedbacks: larger, faster changes of individual scarcities are likely but unknown
 - Uncertainty and surprise will become the rule.
- **Drastic change is needed in regard to food demand and supply**
 - Resource use efficiency and optimality
 - Resource conservation (phosphorus, biodiversity, land, groundwater): positive feedbacks between scarcities!
 - Diversity and inclusion of actors for resilience

Transitions: Consumer driven pathways



- The average Western diet, with high intakes of meat, fat and sugar, represents a risk to individual health, social systems and the environmental life support systems.
- Increasing variety of food consumption, changing habits, the divergence in diet between the rich and poor: **'health gap'**
- Unfreeze the lock-in in consumer habits: consciousness, health links, social logic (address the **'behaviour gap'**)
- Food industry, the retail sector and the media play a key role in changing consumer habits.

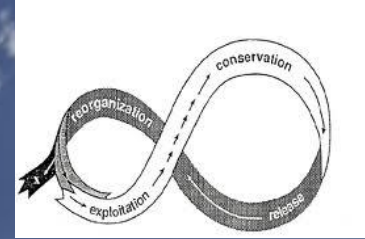
Transitions: Technological innovation



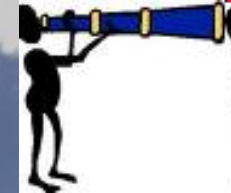
- **Elements:** Agricultural and food technologies (Bio-, nanotech, ICT), agro-ecological approaches, supply chain innovations, KBBE, biomaterials, bioenergy
- Sustainable intensification: Make the food system more efficient (grow more with less resources and less environmental impact): close the **'yield gap'**
- Speed up the uptake of research and innovation by farmers and suppliers (**'innovation gap'**)
- Diversity, regionally adapted solutions, agrobiodiversity: Make the food system resilient to surprise (**'resilience gap'**)
- Technological innovation has risks and opportunities: acceptance and uptake by practice requires integration with organisational and social innovation from the very beginning (**'socio-technology gap'**)
- KBBE: don't forget the human factor and traditional knowledge

Transitions: enabling conditions

Governance and institutions



- Global political institutions, regional cooperation, governance from local to global level:
 - Successful operation of some system of multilateral governance to promote consultation and cooperation between nations
 - Innovations in governance, public policies, and organisations to speed up the necessary transitions
- The private sector: food as service, corporate social responsibility, multi-stakeholder platforms for informed consumer choices...



Building a long-term vision

Scarcities and transitions in productivity and sufficiency narratives, e.g.

- New technologies to increase agricultural productivity in a sustainable manner
- Application of existing technologies to close the existing 'yield gap'
- Changes in consumer behaviour and institutional arrangements.

Towards resilient, sustainable and equitable agricultural systems, via

- Sufficiency-oriented research
- Innovation
- Communication

Research needs and priorities, education and skills



The new challenges require changes in the way food is produced, stored, processed, distributed, and accessed that are as radical as those that occurred during the 18th, 19th, and 20th-century agricultural revolutions“ (Godfray et al., Science 2010)

- Raise production in a sustainable manner
- Increase resilience of systems to deliver food security, feed, fuel, fibre, and ecosystem services in a changing climate
- Sound scientific foundations and innovative policies for new farming practices
- EU responsibility beyond EU-27: vulnerable Africa and bread-basket former Soviet Union states

Research needs and priorities, education and skills



Sufficiency-oriented research, innovation and communication must become the priority

- A better understanding of scarcities and how they are interrelated
- How to speed up transitions
 - Productivity
 - Sufficiency
 - Demand
 - From innovation to fully implemented best practice
- Geopolitical and global governance
 - Decision making mechanisms
 - European leadership

Research implications: approaches

- Anticipatory, from blue sky to applied research
- Interdisciplinarity: natural and social sciences
- Transdisciplinarity (farmers, food processors, retailers, consumers) who would make innovation and transition happen: a true two-way exchange and valuation of traditional knowledge
- Strong experimentation: test, show, exchange experience, disseminate
- Diversity in approaches and regional diversity is a strength: keep all options open (sufficiency and productivity) but at the same time:
- A much stronger system of evaluation and regular watch out to tune the innovation pathway towards sustainability

Research implications: themes

- Better understand the complex interlinkages in scarcities: long-term observations and experiments!
- Driver interactions: environmental – social are critical and poorly studied, governance and knowledge systems are important
- Improve existing farming and food chain systems („sustainable intensification“, „no waste chains“): Systems science for resource use optimality, include on-farm trials
- Develop radically new farming systems (landless, urban, ...)
- Exploit resources for feed and fibre that don't compete with food

Research policy implications

- Approach with two extreme narratives very useful in structuring debate and working on hidden assumptions – which frame the future!
- Continued and increased investment in relevant research and innovation (e.g. importance of sufficiency-oriented topical research in FP8)
- Strong and critical role of public research, focus on sufficiency (so far understudied)
- Strong monitoring and impact evaluation of research along sustainability and efficiency pathway, stringent follow-up for innovation and wider use in practice
- Coordination: research should be better coordinated across thematic domains as well as Member States. Public involvement: strong public investment into research remains crucial to safeguard the rapid transition into sustainable pathways

Conclusions

- **A radical change in food consumption and production in Europe is unavoidable to**
 - meet the challenges of scarcities and
 - make the European agro-food system more resilient in times of increasing instability and surprise.
- **Sufficiency-oriented research, innovation and communication must become the priority**