



Why Bioeconomy?

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BACKGROUND:

Traditional (conventional) agriculture

- experience – over generation information flow
- no additional resources – resource balance – circular economy
- no major externalities (external impacts)

BACKGROUND:

Green Revolution Success Story?

- Increased food production 1000+% by:
 - ◆ Using new crop varieties, irrigation, fertilizers, pesticides and mechanization
- Decreased famine 20%
- Increased global carrying capacity

Green Revolution Success Story?

- Did not eliminate famine
- Population still increasing
- Increased cost of production
- An increased negative environmental impact
- Didn't work for everyone

<http://wparks.myweb.uga.edu/ppt/green/tsld072.htm>

BACKGROUND:

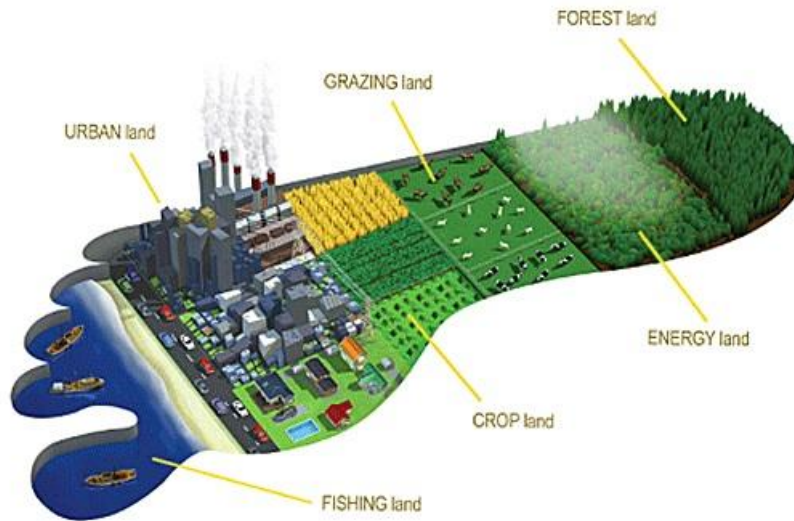
Industrialization – industrialized agriculture

- centralization – mass industry
- simplified processes – waste flows
- automatization – simplified processes without manual efforts

RECENT DEVELOPMENT:

Industrial ecology

- experience/observation – statistical black box
 - logic reasoning – dynamic modelling



Industrial ecology

- Allenby BR. 1999a. Industrial Ecology: Policy Framework and Implementation
- Ayres RU, Ayres LW. 1996. Industrial Ecology. Towards Closing the Material Cycle
- Boons F, Baas LW. 1997. Types of industrial ecology: the problem of coordination. *Journal of Cleaner Production* 5(1/2): 79–86
- Boons F, Roome N. 2000. Industrial ecology as a cultural phenomenon. *Journal of Industrial Ecology* 4(2): 49–54.
- Graedel TE. 1994. Industrial ecology – definition and implementation.
- Arun J. Basu and Dirk J.A. van Zyl. 2006. Industrial ecology framework for achieving cleaner production in the mining and minerals industry
- Brad Allenby. 2006. The ontologies of industrial ecology?
Stefan Seuring, Industrial Ecology, life cycles supply chains: Differences and Interrelations
- Hammer, B., 1996, What is the relationship between cleaner production, pollution prevention, waste minimization and ISO 14000? Posted by [Theodoros Galanos](#) at [21:03](#)

RECENT DEVELOPMENT:



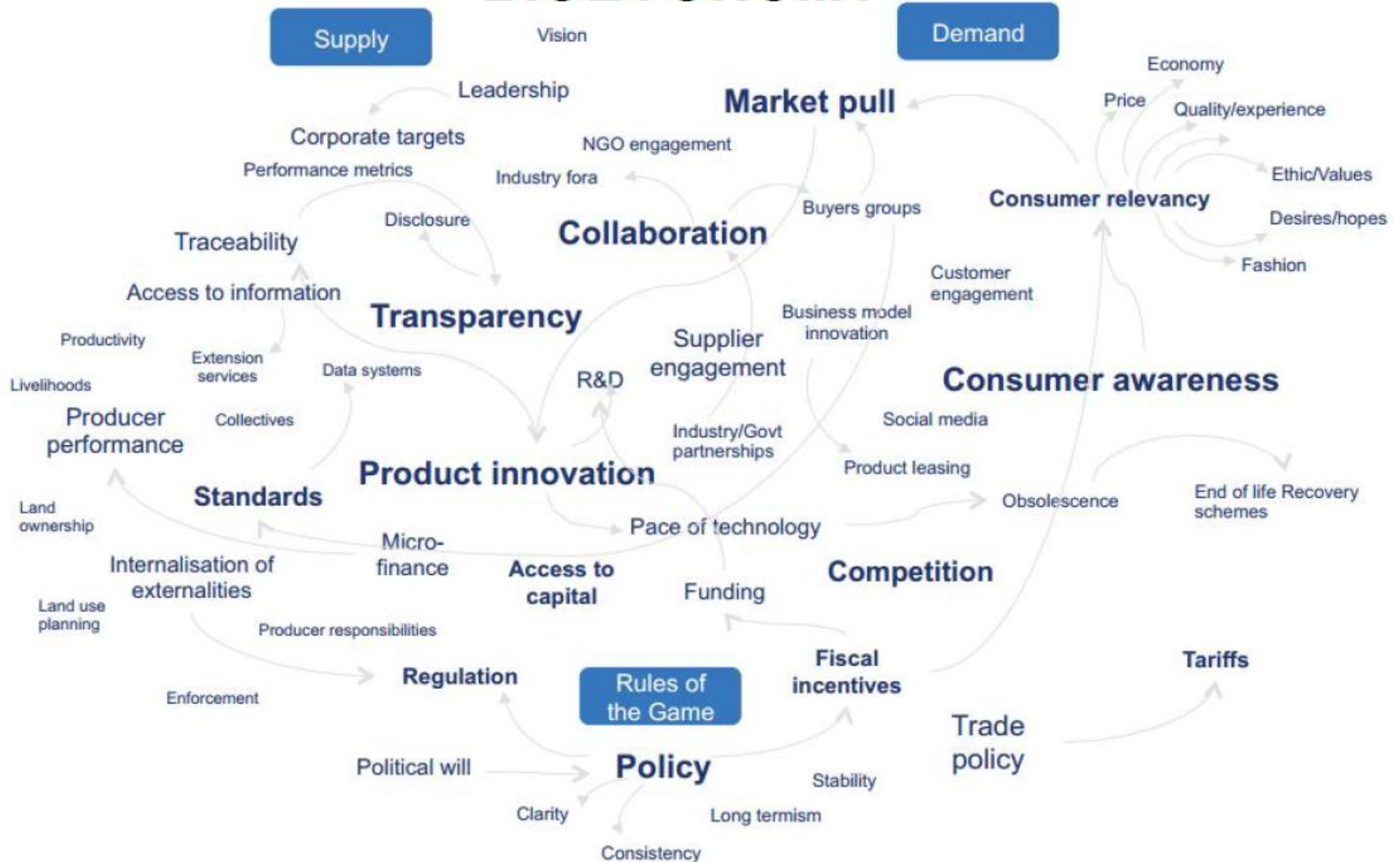
Bioeconomy – effort for aiming sustainability vision – new governance

- Ecological sustainability: safe guarding the environmental capacities and human health
- Social sustainability: a long-term, stable, dynamic society of equality
- Economic sustainability: sustainable management of human and material resources
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Bioeconomy

- *David Pearce, Anil Markandya and Ed Barbier* in “Blueprint for Sustainable Economy”.
- The term ‘bioeconomy’ was coined at an AAAS meeting in early 1990s
- “Economic activities related to the development and commercialization of products and processes – in whole or in part – using renewable biological sources from agriculture, forestry, and marine” (Farm Credit Canada, 2012)
- **“The bioeconomy includes all industries and economic sectors that produce, manage, or otherwise make use of biological resources including bio-waste”** (EU, 2012)

THE REAL GAME OF TRANSFORMING TO BIOECONOMY



Source: World Economic Forum – Industry Agenda, January, 2012.

Bioeconomy is

- Bioeconomy is the transition of the ***TOTAL ECONOMY and not just a subset of the*** economy
- Bioeconomy is a ***FUNDAMENTAL CHANGE in*** production and consumption
- Bioeconomy requires ***radical innovation***
- Bioeconomy is to ***FIND NEW WAYS to create*** products and services more efficiently
- Bioeconomy is a ***TECHNOLOGY-RICH, INNOVATION-DRIVEN and SERVICEFOCUSED*** economy

Bioeconomy requires a "re-" - actions



- **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** -
- **Rebuild** -
- **Regenerate** -
- **Reform** -
- **Reorganize** -
- **Resilient:** adaptability, transformability, persistence, preparedness

Globally

- The OECD (2010) “is mainstreaming green growth in its policy exercises and policy advices that is targeted to the needs of individual countries”
- UNEP: on its Green Economy Report, gives policy advice, technical assistance, and capacity building to governments in establishing green economy (e.g. Nepal, Jordan, Indonesia, China, South Africa, Mexico, Brazil)
- UNIDO an extensive program on Green Industry to decouple resource use and pollution from industrial development
- The World Bank, UNEP, OECD and Global Green Growth Institute (2012) have established a Global Green Growth Knowledge Platform with the task to identify and address major knowledge gaps in green growth theory and practice

The Staircase of Concepts

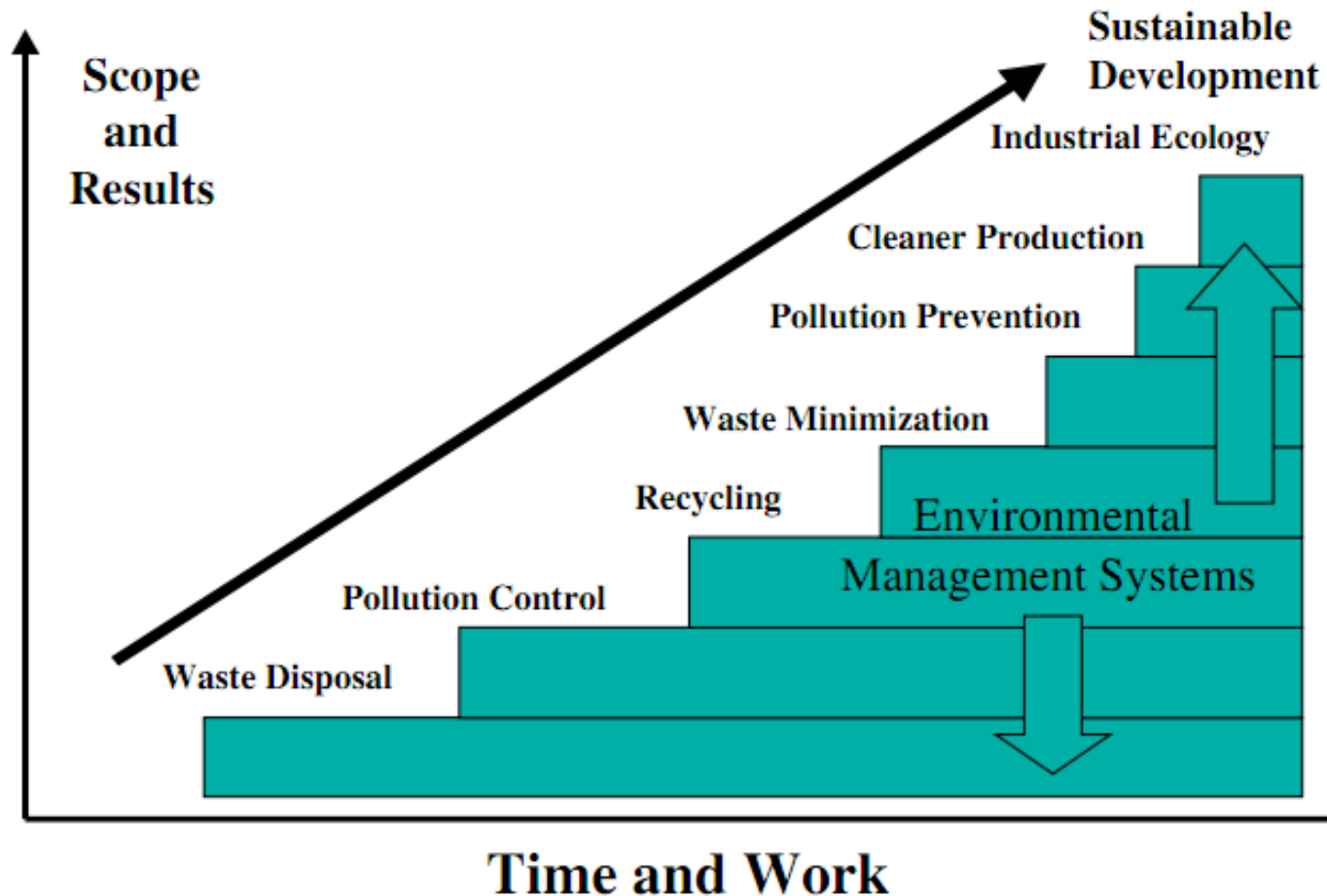


Fig. 1. The staircase of concepts for environmental management systems (after Hamner [6]).

At the worst case!

- The global economic development does not support
- Shifts in global economic power to those who are not aware or do not share the same awareness
- New fossil material resource - shalegas interfere the development
- Rebound is too effective
- The lack of reforms of the financial system – carbon bubble
- Finance, funding and access to crucial capital does not come through
- Costs for the required infrastructures too high “Can we really afford this?”
- Governmental silos stop collaboration
- Connectivity is not there
- Taking simplistic approach for modernization

What we expect about bioeconomy?

Bioeconomy is:

- **Resource efficient**
- **Circular economy**
- **Inclusive:** ecological & social & economic
- **Knowledge based**
- **Adaptive – transformative – persistent - prepared**
- **Dynamic**
- **Innovative**
- **Transparent**
- **Competitive**
- **Demand driven**
- **End user oriented**



Thank you so much!

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