

Sustainability: Concept, Strategies, Dimensions



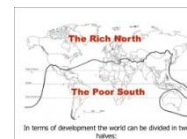
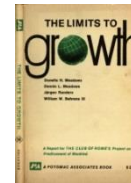
Content

- The formation of a Term
- Main concepts from Bruntland
- Weak/Strong sustainability
- Strategies, Dimensions and side-effects

The formation of a Term: the concept of Sustainability

Five documents to establish the Founding Narrative for Sustainability

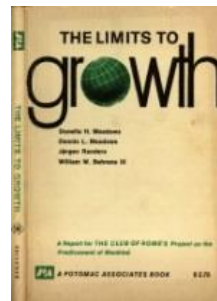
- Meadows Report 1972
- Stockholm Conference 1972
- Brandt Report 1980
- Brundtland Report 1987



The formation of a Term: the concept of Sustainability



Silent Spring
1962



Meadows
Report

Brundtland
Report
1987

Club of
Rome
1968

Stockholm
Conference 1972

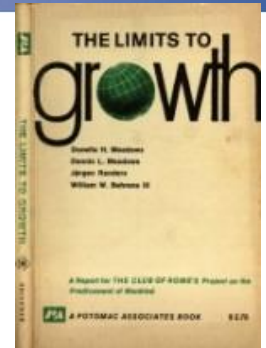
Brandt
Report
1980



25 years

The formation of a Term: the concept of Sustainability

Meadows Report, The limits to growth, 1972



Approach:

- System
- Global
- Long term perspective
- Interdependencies between various areas

Main Topics:

- Scarcity of resources
- Degradation of environmental quality
- Interdependencies between various socio-economic areas

The formation of a Term: the concept of Sustainability

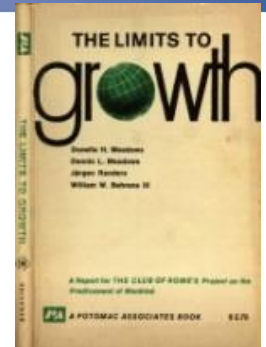
Meadows Report, The limits to growth, 1972

Five major trends – driving factors:

- Accelerating industrialisation
- Rapid population growth
- Widespread malnutrition
- Depletion of non-renewable resources
- Deteriorating environment

Limits of the(ir) “limits”:

- Global, systemic but deterministic approach!



The formation of a Term: the concept of Sustainability

Meadows Report, *The limits to growth*, 1972

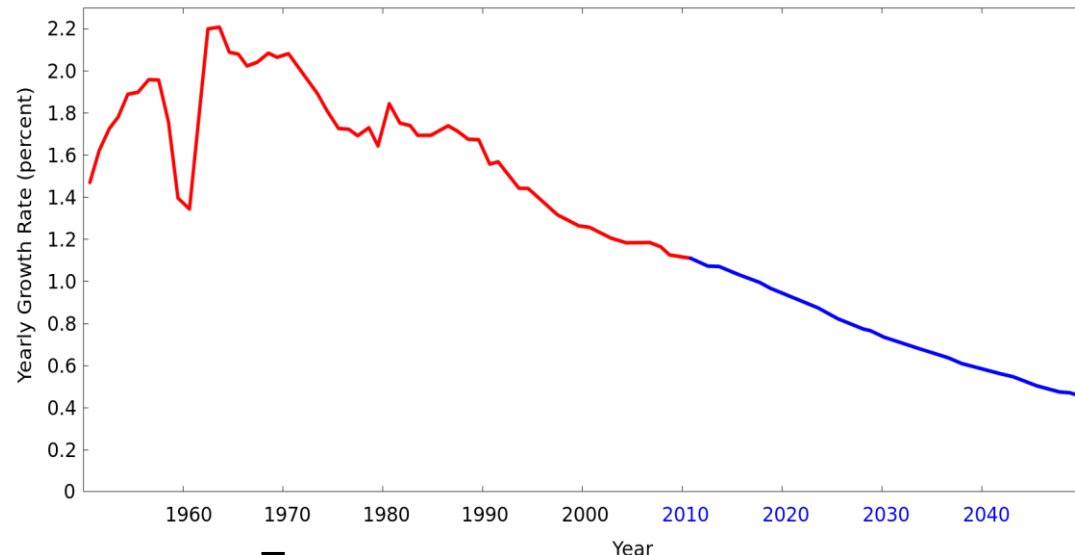
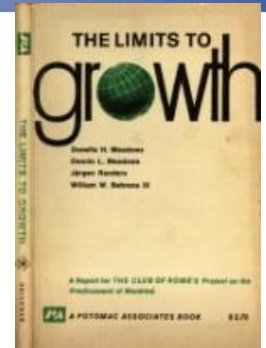
Limits of the(ir) “limits”:

- Global, systemic but deterministic approach!

“In 1970 the population totaled 3.6 billion and the rate of growth was 2.1 percent per year.² The doubling time at this growth rate is 33 years. Thus, not only has the population been growing exponentially, but the rate of growth has also been growing.

We might say that population growth has been “super”- exponential; the population curve is rising even faster than it would if growth were strictly exponential.”

(Meadows 1972: 34)



The formation of a Term: the concept of Sustainability

Stockholm Conference, 1972

Only One Earth UN Conference on the Human Environment

- First UN Conference on the environment
- 1200 participants, 113 countries
- Establishment of UNEP (Nairobi)

Topics & Issues:

- Frame is more the man than the environment
- Critical towards catch-up development/catch up modernisation



The formation of a Term: the concept of Sustainability

Stockholm Conference, 1972

Only One Earth UN Conference on the Human Environment

Main contribution to the sustainability concept:

- Brings in North-South conflict (developing vs industrialised countries) and connects this topic with Meadow's nature catastrophe perspective
- The social global dimension is now in the centre
- Addressing the states / policy



The formation of a Term: the concept of Sustainability

Brandt Report, 1980

Just, participation and sustainable society

Topics:

- Concrete challenge of catch up modernisation/development
- Development vs growth
- “The rich north vs the poor south”

Main contribution to the sustainability concept:

- Names precisely the conflict between development (catch-up modernisation, one path) and growth
- Multicultural approach



In terms of development the world can be divided in two halves:

Main concepts from Bruntland Report: the concept of Sustainability

Brundtland Report, 1987

First Definition:

“Sustainable Development is a development that meets the needs of the present without comprising the ability of future generations to meet their own needs. [...]

It contains within it two key concepts:

- *The concept of ‘needs’, in particular the essential needs of the world’s poor, to which overriding priority should be given, and*
- *The idea of **limitations imposed by the state of technology and social organisation** on the environment’s ability to meet present and needs.”*

(Brundtland 1987: 41)



Main concepts from Bruntland Report: the concept of Sustainability

Brundtland Report, 1987

“... technology and social organization can be both managed and improved to make way for a new era of economic growth.”

(Brundtland 1987: 41)

- Development is principally controllable
- Growth is requested, but should be qualitative – i.e. sustainable
- Innovative future oriented technologies get in the focal point!

- Out of 22 principles, 21 are addressing the state/political system



Main concepts from Bruntland Report: the concept of Sustainability

Common features from the five documents

- System approach
- Interdisciplinary
- Complexity
- Crisis driven
- Future oriented
- Manageability / Controllability of the development

Content

- The formation of a Term
- Main concepts from Bruntland
- **Weak/Strong sustainability**
- **Strategies, Dimensions and side-effects**

Weak vs. Strong sustainability

Weak sustainability:

Natural capital and human capital are exchangeable -

i.e. Natural capital loss can be compensated by growth in human capital

Strong sustainability:

Natural capital and human capital are **NOT** exchangeable - there is a qualitative difference between them

Main differences between weak and strong sustainability		
	Strong sustainability	Weak sustainability
Key idea	The substitutability of natural capital by other types of capital is severely limited	Natural capital and other types of capitals (manufactured etc.) are perfectly substitutable
Consequences	Certain human actions can entail irreversible consequences	Technological innovation and monetary compensation for environmental degradation
Sustainability issue	Conserving the irreplaceable « stocks » of critical natural capital for the sake of future generation	The total value of the aggregate stock of capital should be at least maintained or ideally increased for future generation
Key concept	Critical natural capital	Optimal allocation of scarce resources
Definition of thresholds and environmental norms	Scientific knowledge as input for public deliberation (procedural rationality)	Technic/scientific approach for determining thresholds and norms (instrumental rationality)

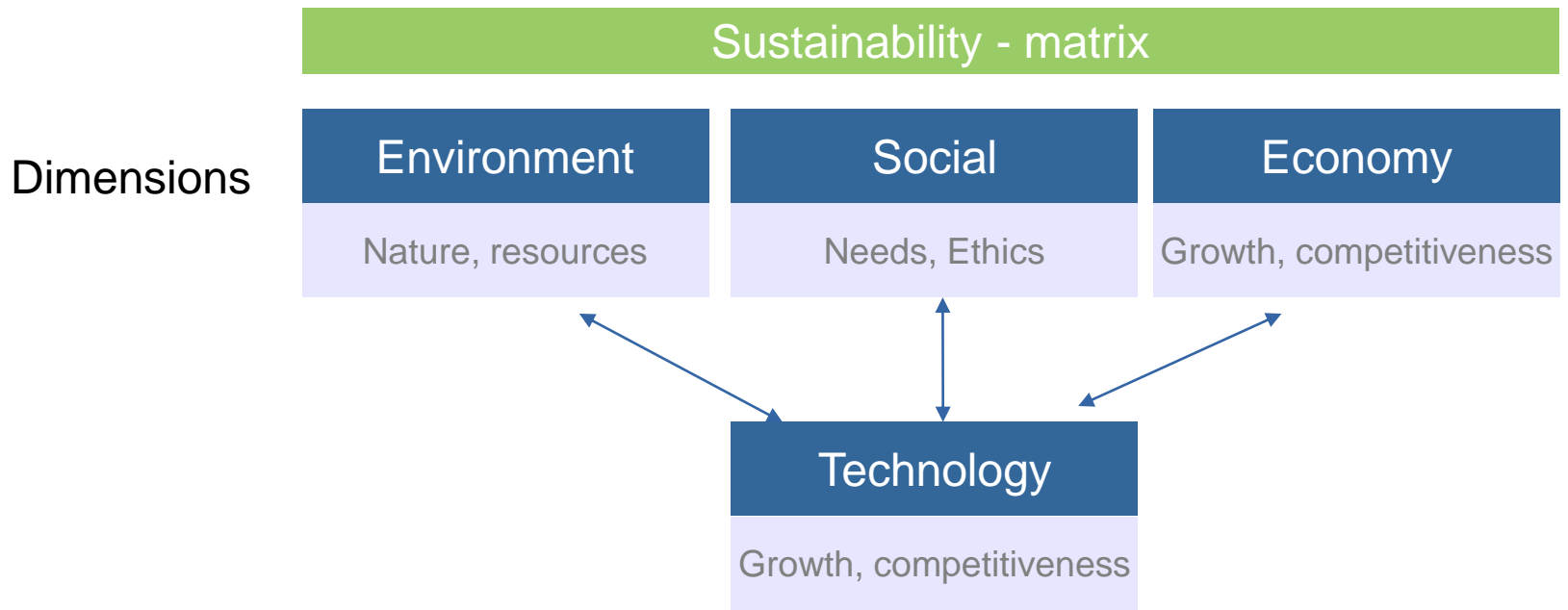
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Strategies, **Dimensions** and Side-effects

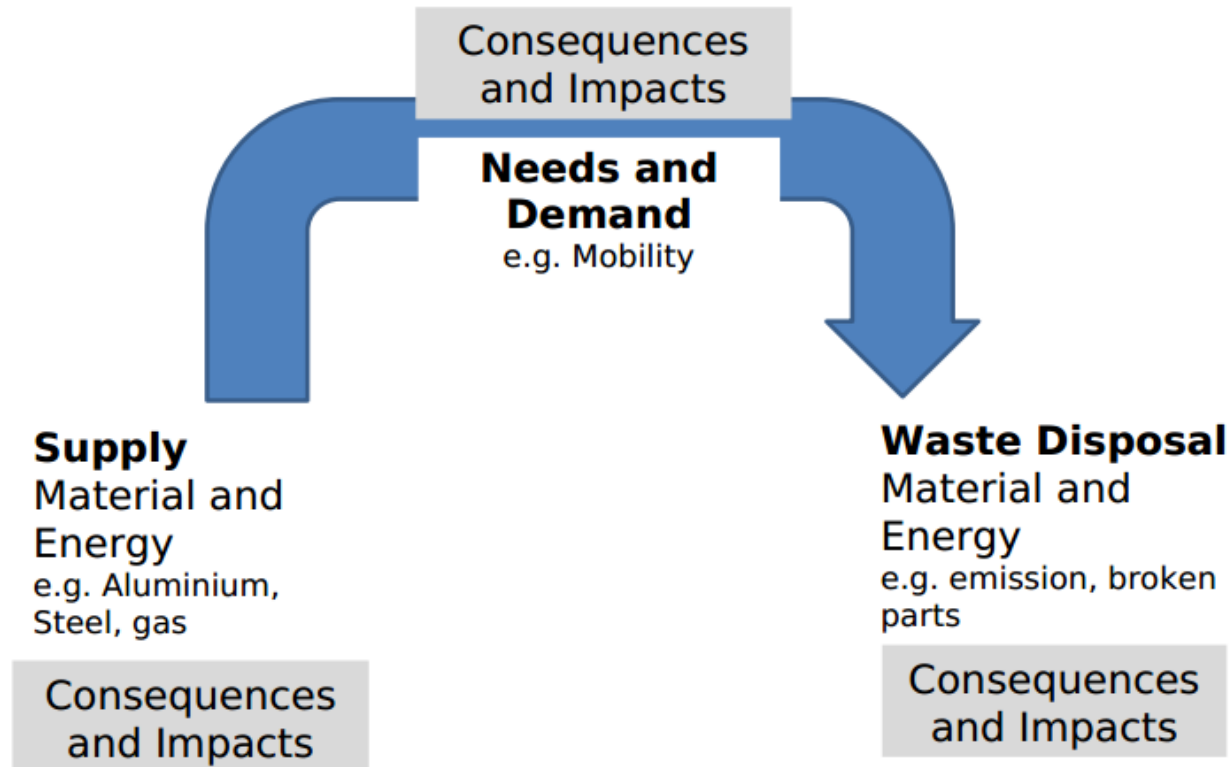
Sustainability - matrix			
Dimensions	Environment	Social	Economy
	Nature, resources	Needs, Ethics	Growth, competitiveness

Strategies, **Dimensions** and Side-effects



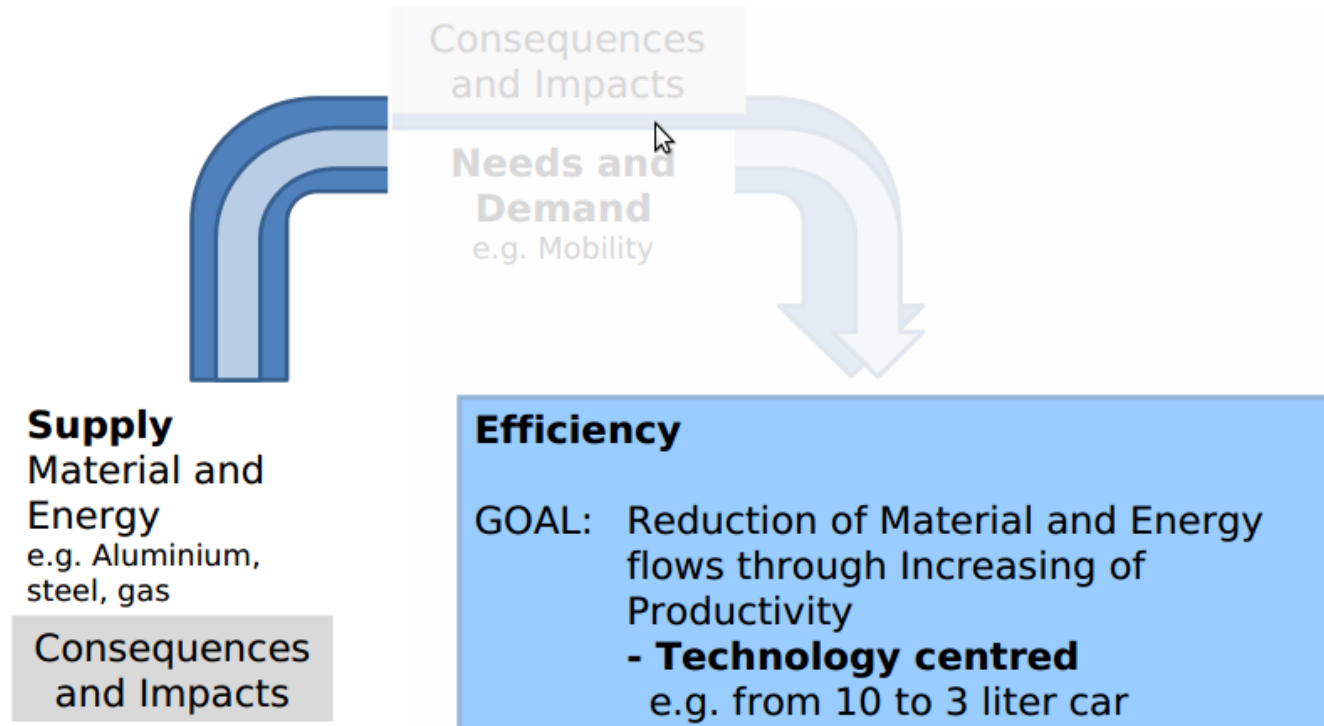
Strategies, Dimensions and Side-effects

Structure for human technology utilization



Strategies, Dimensions and Side-effects

Structure for human technology utilization



Strategies, Dimensions and Side-effects

Efficiency

- „Famous scientific institutions (IPCC, IEA) assume in their scenarios, that **most of the necessary reduction of GHG** emission can be accomplished by means of **efficiency measures.**“ (see Santarius 2012)
- Individual change of behaviour is neither required nor will it be supported: Daily life practices stay in place (will not be questioned)
- **Dematerialisation achieved:** Input decreasing (per unit)
 - > necessary to implement environmental friendly behaviour
 - > *„nature will still be damaged, but on a slower pace“*
(Stengel 2012 p. 131)
- Positive effects diminished through increasing consumption per capita -> **REBOUND-Effect**

Strategies, Dimensions and Side-effects

Efficiency

-Efficiency - Rebound-Effect

...or undesired side-effects of (intended) energy efficiency measures

(Santarius 2012)

... Increase in productivity -> Increase of demand -> Reduction potential will be decreased, often overcompensated

- **Financial Rebound-Effects:** efficiency -> income increase -> additional consumption: e.g. 6-liter to 3-liter cars -> additional financial resources for driving longer distances, or other goods
- **Material Rebound-Effects:** Production and consumption of more efficient goods -> increase in energy input: e.g. infrastructure for electro cars, insulation material etc.

Strategies, Dimensions and Side-effects

Efficiency

Efficiency - Rebound-Effect

...or the undesired consequences of intended energy efficiency measures

(Santarius 2012)

Increase in productivity -> Increase of demand -> Reduction potential will be decreased, often overcompensated

- **Psychological Rebound-Effects:** energy efficiency goods/technologies -> boost symbolic meaning of the commodities or services: e.g. use your 'ecological car' more often
- **Cross-factor Rebound-Effects:** Increase of labour and capital intensity -> Increase in energy demand: e.g. Automatisations and mechanisation, 'electrification' of daily life

Strategies, Dimensions and Side-effects

Efficiency

Efficiency strategies - Rebound-Effect

„Increases in energy and resource efficiency, together with cleaner technologies have resulted in **reduced energy and resource consumption and pollution *per unit*** of production and consumption. However, the increased efficiency has generally been offset by even greater **increases in *the total*** consumption of energy and natural resources. The increase is largely due to economic growth and population growth, but also with a „Bumerang-effect“ in which **increased efficiency of resource use has reduced demand and prices of energy and raw materials encouraging increased consumption“.**

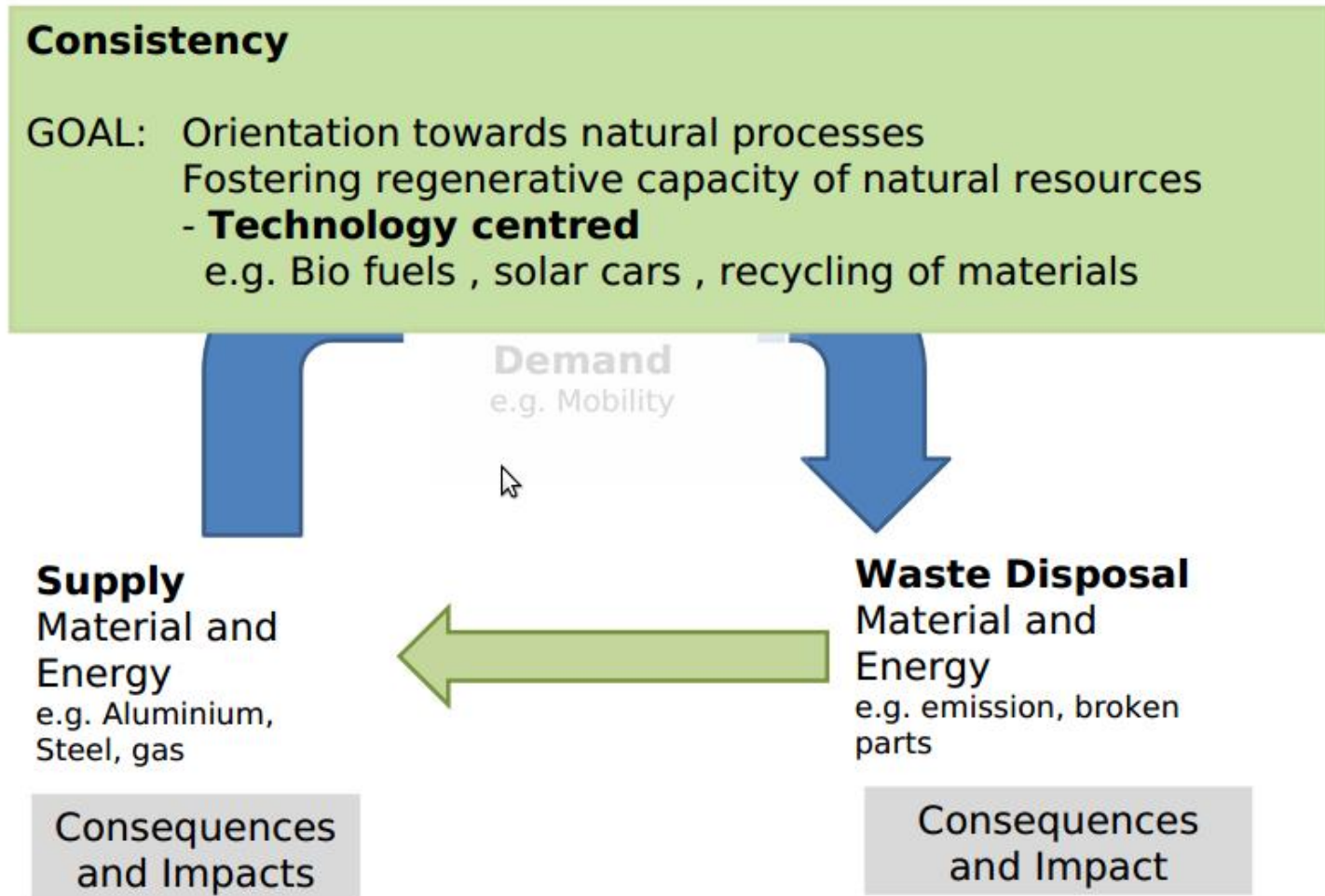
(United Nations 2005)

„Energy efficiency measures will only achieve up to 50% of their theoretical potential.“ (see Santarius 2012)

Strategies, Dimensions and Side-effects

If not efficiency alone,....what else??

Strategies, Dimensions and Side-effects

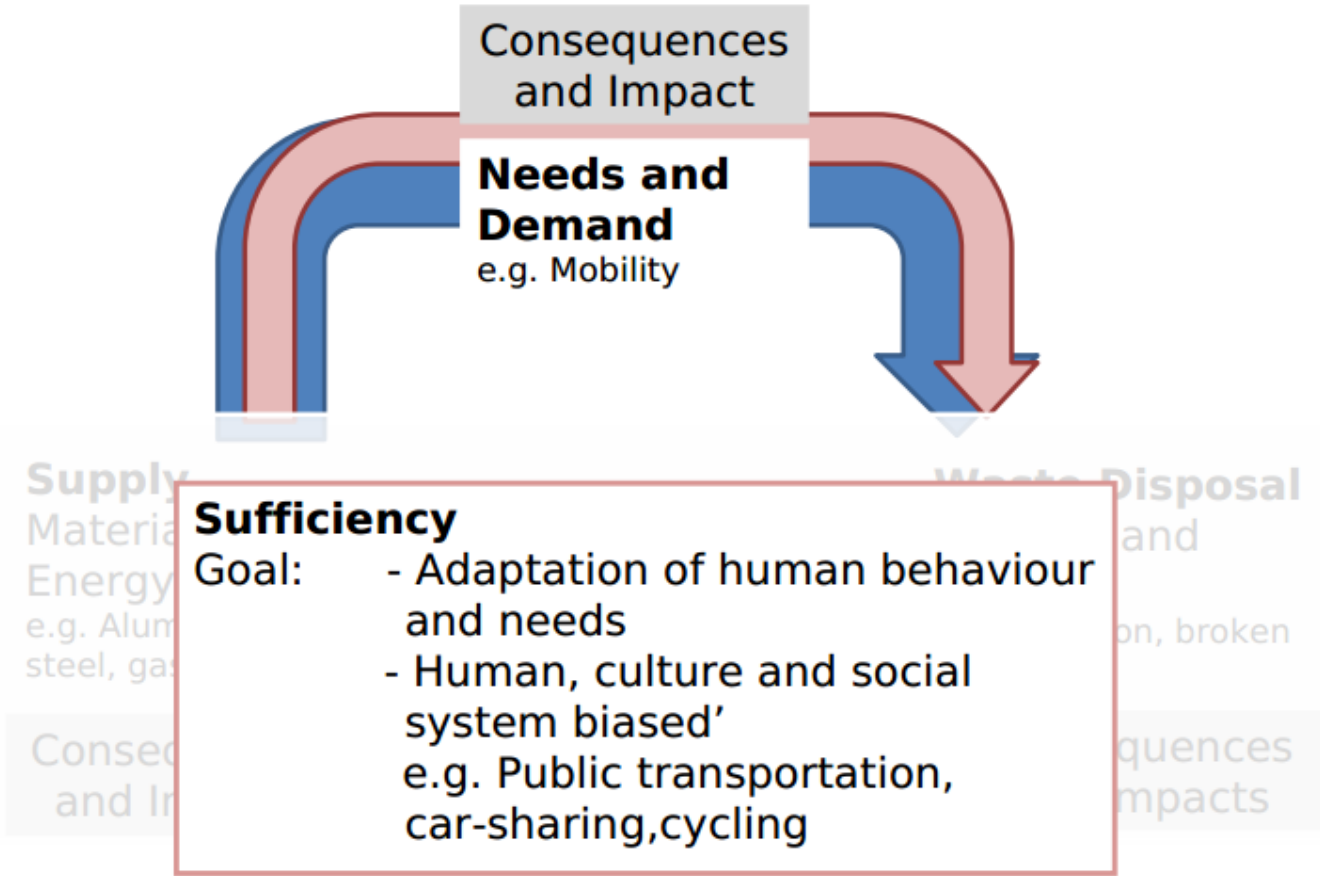


Strategies, Dimensions and Side-effects

Consistency

- Individual change of behaviour is neither required nor will it be supported: Daily life practices stay in place (will not be questioned)
- **No dematerialization achieved!**: Waste as such does not exist!! -> Danger: „green consumption“
- Currently only **partially applicable**:
 - Today max. 30% of the „technically moved mass“ can be recycled!!!
 - Recycling of Aluminium: possible up to 90% ...
 - ... BUT Energy-, machinery- and transport-intensive!!!
 - ... AND latest after 15 cycles only 20% of the original mass available!!!

Strategies, Dimensions and Side-effects



Strategies, Dimensions and Side-effects

Sufficiency

- **Voluntarily** change in behaviour (no force):
„Reduction of the necessary material and energy flows through change of life and consumption style“ (Stengel, 2012 p. 140)
 - Consumption ‚beyond sufficiency‘ in the European Union equals **75%**
e.g. ca. 50% of the fuel in the transportation sector is spent in cities with trips smaller than 5 km
 - **Potential:** in industrialised countries private consumption is responsible for 60-70% of the total consumption
 - **Dematerialisation:** Outputs reduction
- **„No technical requirements, no changes in political framework required“ - overnight change** (Stengel, 2012 p. 146)

Strategies, Dimensions and Side-effects

Sufficiency

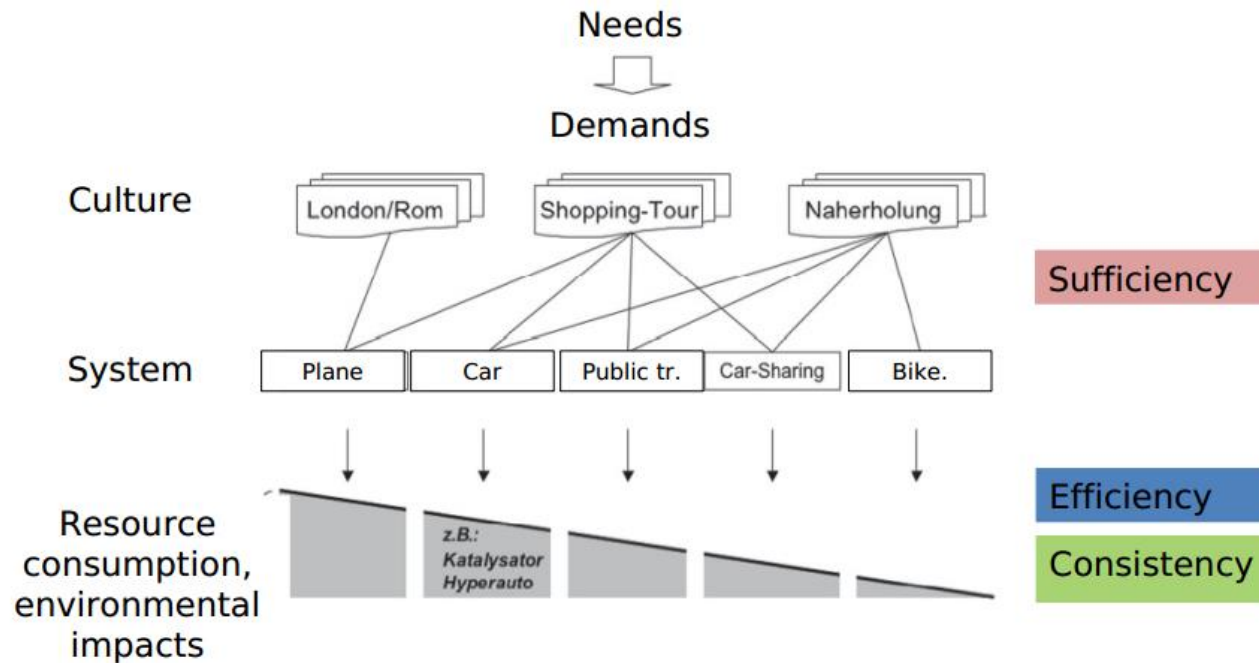
...an old friend:

“If we are concerned about our great appetite for materials, it is plausible to seek to increase the supply, to decrease waste, to make better use of the stocks that are available, and to develop substitutes. **But, what of the appetite itself?** Surely it is the ultimate source of the problem. If it continues its geometric course, will it not one day have to be restrained? Yet in the literature of the resource problem this is **the forbidden question**”.

John Kenneth Galbraith, US economist, **1958** (from Stengel 2012 p. 145)

Strategies, Dimensions and Side-effects

Influence level of the different strategies



Source: Paech 2005 S.62 (modified)

Strategies, **Dimensions** and Side-effects

Sustainability - matrix			
Dimensions	Environment	Social	Economy
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Strategies	Efficiency	Consistency	Sufficiency
	Resource use, input per output	Circular thinking, regeneration time	Reduction, substitution revision of habits

Strategies, **Dimensions** and Side-effects

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Criteria	Conservation	Acceptance	Solidarity	Participation	Justice ...

Strategies, **Dimensions** and Side-effects

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Criteria	Conservation	Acceptance	Solidarity	Participation	Justice ...
Indicators	Resource use	Fatalities	Access	Costs	...

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“Renewables don't lose an ecological problem,
only transform them into another physical,
spatial, temporal or systemic dimension”

Niko Paech

2012. Auf dem Weg in die Postwachstumsökonomie. In: Orientierungen zur

Wirtschafts und Gesellschaftspolitik. Nr. 134, pp. 61-67

<http://www.postwachstumsoekonomie.de/wp-content/uploads/Paech-2012-Orientierungen-134.pdf>