

Bioeconomy - an Austrian Organic Agriculture Perspective



University of Natural Resources and
Life Sciences (BOKU)
Department of Sustainable Agricultural
Systems

*Opportunities for agriculture and agro-industry and
smallholder farmers*

International Conference – Latin America and the Caribbean Bioeconomy
2015

08.-09.october 2015, Santiago de Chile

Univ. Prof. Bernhard Freyer (University of Natural
Resources and Life Sciences (BOKU), Vienna, Austria)

(Deputy of the Centre of Social Innovation, Vienna, Austria)

Overview

Introduction (I)

Bioeconomy position paper ÖVAF-BIOS SCIENCE Austria

- Bioeconomy Austria (A)
- Challenges and needs in agriculture (A)
- Bioeconomy and other targets (EU / A)
- Programatic activities (A)
- Thematical fields of Bioeconomy Research (A)
- The innovation potential of bioeconomy (A / I)

Elements from an organic agriculture perspective

- Systemic leverage points for change...how systems could fit together? (I)
 - ...landuse systems (I)
 - ...food nutrition systems (I)
 - ...energy systems (I)
 - ...

Conclusions (I)

How we define Bioeconomy?

- The bio-economy can be defined as an (**economy**) **holistic societal approach** in which production and consumption of goods and services are based on the direct use and sustainable transformation of biological resources and the productive use of (**wastes**) **organic matter** generated in processes of production, transformation and consumption.
- The bioeconomy includes — **traditional**, convencionales and modern — technologies that are used to transform biological resources, especially those related to biotechnology **and locally adapted techniques**.

Source: conference introduction (in parenthesis: original; red and bold: new)

Bioeconomy position paper ÖVAF-BIOS SCIENCE Austria*

* both part of Bioeconomy-Austria

Bioeconomy-Austria – Who we are (A)

- Bioeconomy Austria aims at concentrating all Austrian efforts to **push** and **promote** the national bioeconomy development process.
- Furthermore, Bioeconomy Austria provides a **platform** for **coordination** and **capacity building** to all relevant players who together advocate a worthwhile, economically fruitful and highly innovative future.
- Research, agriculture, forestry, the economy and industry should be closely **interlinked** in order to exploit as many synergies as possible, to facilitate optimum coordination and to help bring **innovations** in research and the **lab to the market**.

JOIN US!

Source: <http://www.bioeconomy-austria.at/en/>

Bioeconomy-Austria – Aims (A)

- **Food security**
- Utilisation of the **domestic raw material potential**
- **Reduction** in the heavy **dependency on imports of fossil resources**
- Reduction in **greenhouse gas** emissions
- New **jobs** with long term perspectives
- **Sustainable raw materials basis** for the **re-industrialisation of Europe**
- **Cascading** and integrative use of raw materials
- **Preservation** of large parts of the value cycle in Austria
- **Export** of bio leading-edge technology and bio services

Source: <http://www.bioeconomy-austria.at/en/>

Bioeconomy Austria – Dimensions (A)

To practice bioeconomy asks for

- **technological** innovations,
- adapted **socioeconomic** and **eco-social** frameworks
- and **social** renewal

within the context of

- consumption **habits**
- mobility **behaviour**
- consumption **patterns**
- **knowledge**
- technology **transfer**

Source: Bioeconomy position paper ÖVAF-BIOS SCIENCE Austria

Challenges and needs in agriculture (A)

- **Enough** raw material for food security, material and energetic use

As a consequence there is need for e.g.:

- Modern (*and traditional!*) **breeding** methods
- Increase of **efficiency** in terms of **nutrient** uptake, **energy** and **fertilizer** need, and **optimized plant protection** methods
- **Landuse** and **landuse change** that should be cover all areas

...and continuously **monitored**

Source: Bioeconomy position paper ÖVAF-BIOS SCIENCE Austria

Bioeconomy and other targets (EU / A)

Action- and activity fields of raw / resource material:

▪ **Independency** from outside and **reduction** of resource use

Both targets are interwoven with the

- **Sustainability** strategy
- **Biodiversity** strategy
- **Climate** – and **Climate adaptation** strategy

Source: Bioeconomy position paper ÖVAF-BIOS SCIENCE Austria

Programatic activities (A)

- (1) **Government program** and strategies of the government (collaboration of several ministries)
- (2) FTI*-Strategies of ministries for **the bio-based industry**
- (3) Bioeconomy and **research funding**
- (4) **Universities****, research institutions and networks

* Research, technology development and innovation

** University of Natural Resources and Life Sciences (BOKU) with a leading role

Source: Bioeconomy position paper ÖVAF-BIOS SCIENCE Austria

Thematic fields of Bioeconomy research (A)



**But -
Is there really something
new?**



The innovation potential of bioeconomy (I)

Yes?

- Action plans – policies!
- Networks and research clusters!
- Inter- and transdisciplinary research!
- Innovations in the social, economic, techn. sectors!
- Awareness!
- New industries!
- New Labor opportunities
- ...

No

- Landuse challenges are well known and exist since decades...
- Barriers:...„Reduction“ in consumption is misunderstood or perceived as loss of life quality...
- External costs are ignored...
- Policies protecting tenure of smallholders are missing
- ...

Land surplus for Bioeconomy based products?

- Daily, mostly **irreversible** loss of agricultural land through **mis-management** and **non-agricultural use of soils**
 - **Intensification** of agriculture for **feed production**
 - **Salination through irrigation**
 - Extreme **weather** events damaging **non-protected land** (floods & droughts)
 - ... confronted with an increasing **world population**
 - ...
- ...not really!**
- **Nature cannot provide eco-systems services if humans ignore their need for recreation (30% rule!)**

Need for change ?



A solution?



Stone bunds...?



Accumulation of sediments in front (upslope) of the stone bund

From master thesis of Roman SCHIFFER / Jakob Rieder (BOKU)

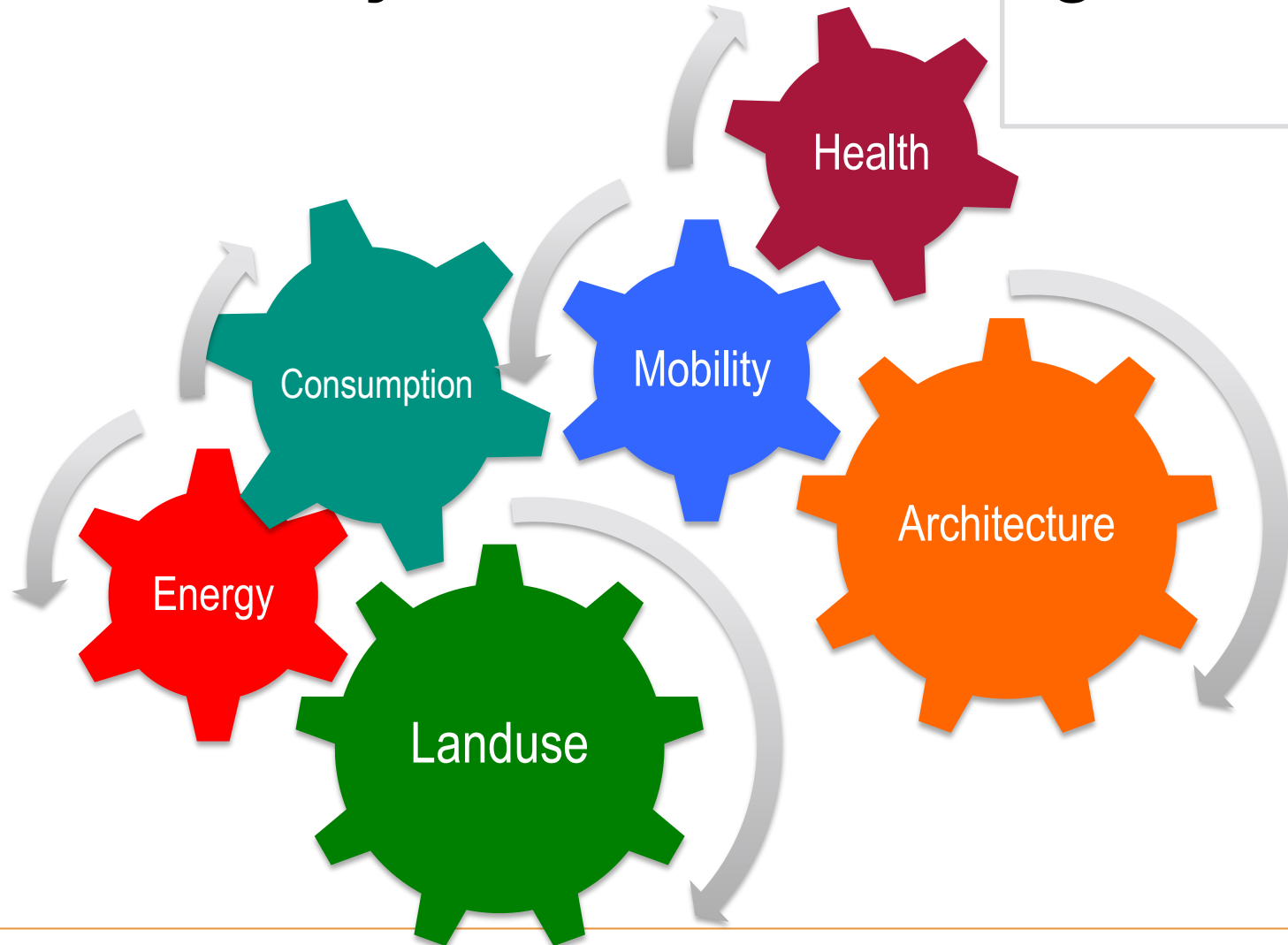


Elements from an organic agriculture understanding of Bioeconomy in selected sectors

Based on the ethical principles of the International Federation of Organic Agriculture Movements (IFOAM)



Systemic leverage points for change ...how systems could fit together? (I)



When systems do not fit together...

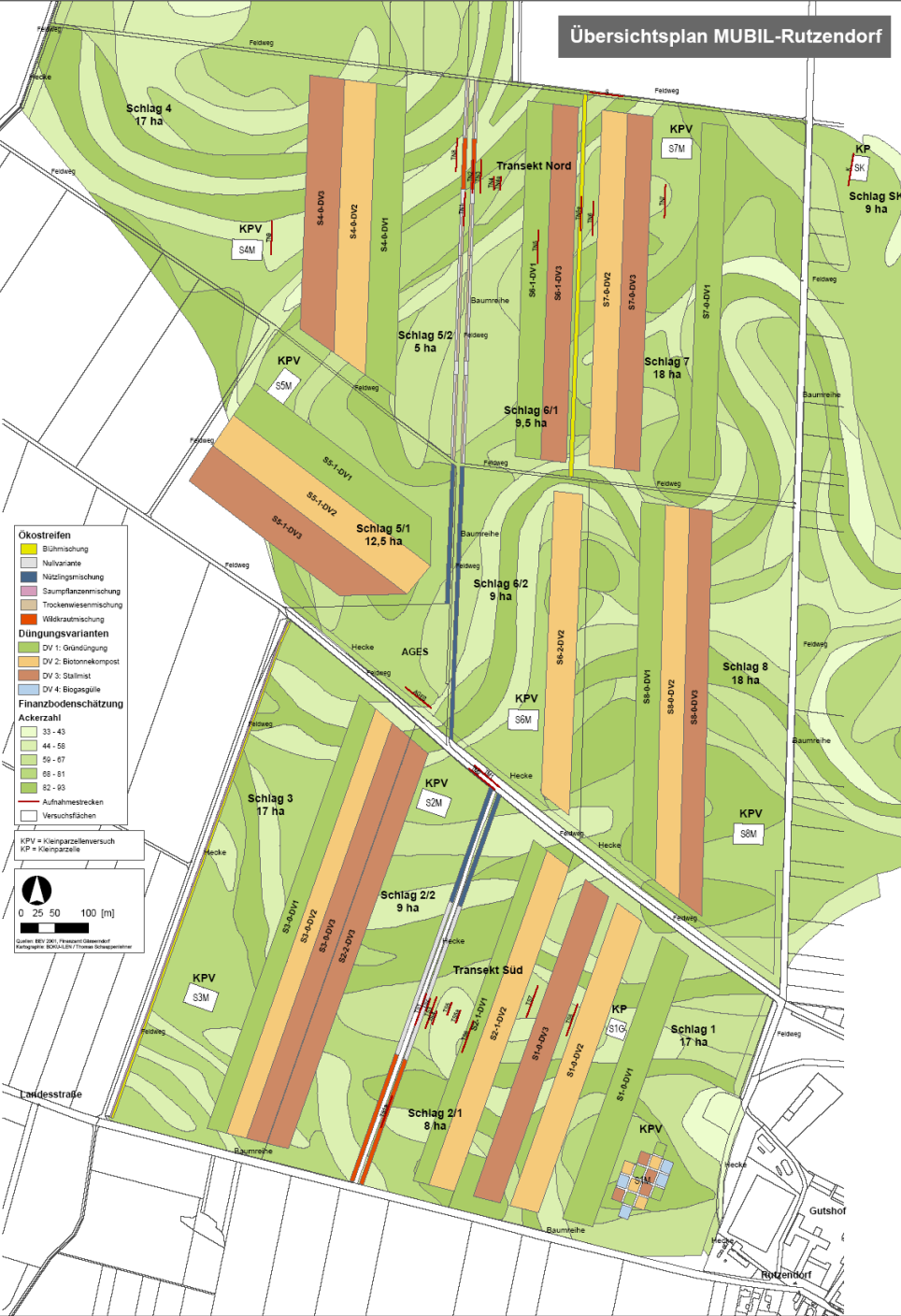


Leverage points of landuse systems (I)

- **Landuse management:**
 - Root biomass producing plants
 - Nitrogen fixing plants
 - Diversification of cropping systems – species and varieties
 - Alley farming and agroforestry
 - Nutrient cycling
- **Organic matter management (re-circulation, re-use):**
 - Covering the soils with organic matter
 - Compost, farm yard manure and slurry (biogas production)
 - Community, household compost and biogas production
- **Water management:**
 - Water harvesting
 - Water storage
 - Reduction of water use intensity
- **Animal husbandry management:**
 - Livestock density adapted to natural grassland
 - Reduction of feed concentrates
 - Total reduction of livestock density and intensity

Really sorry, but organic matter is a must!





- **Cash crop farm**
- **Organic since 2001**

- Source: Freyer et al. 2015

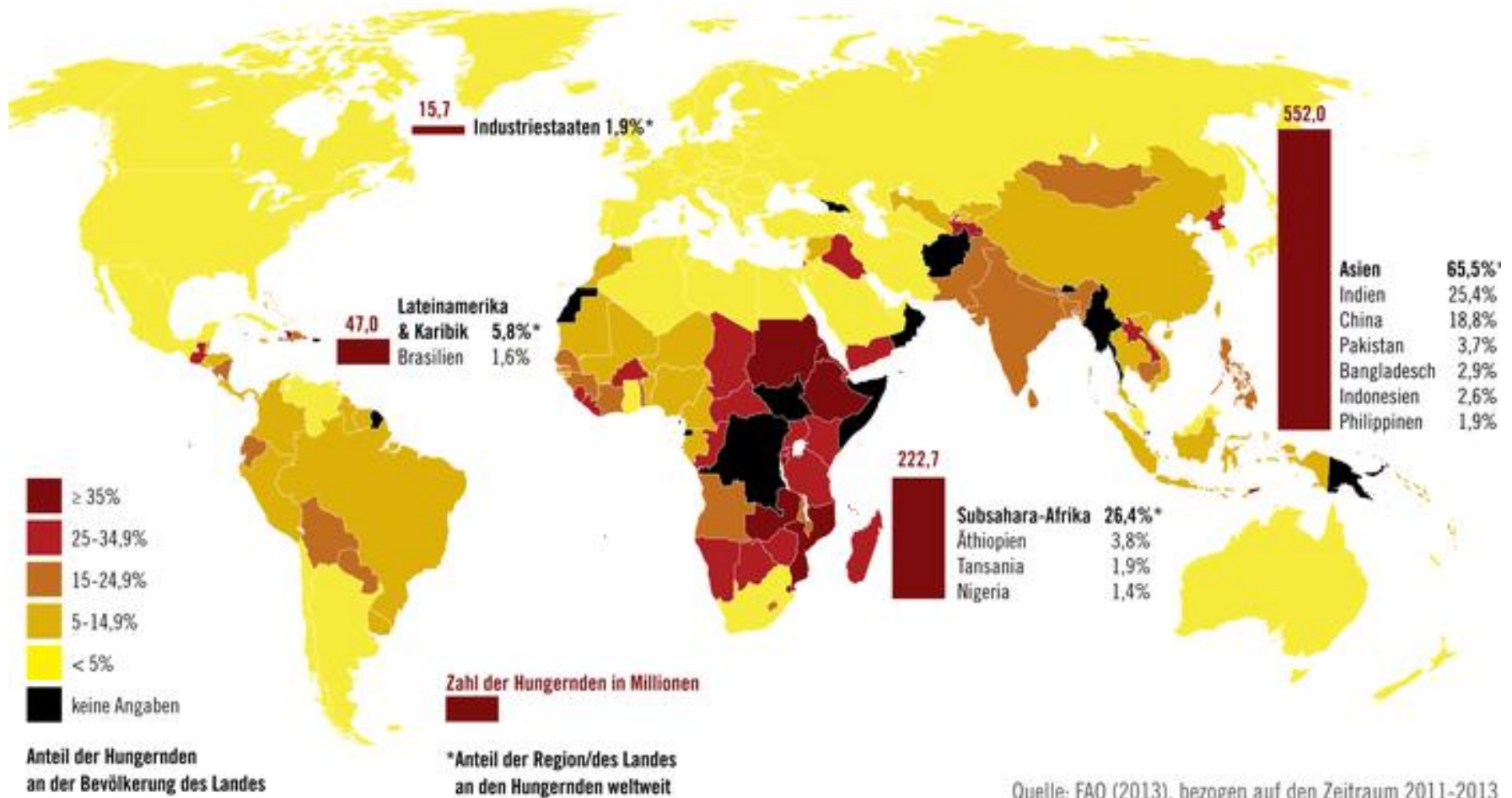
Leverage points in food nutrition systems (I)

- Reduction of **meat** consumption towards diversified vegetarian (low meat) consumption
- Reduction of **sugar** consumption
- Reduction of **storage** loss, **processing** loss, food **waste** loss
- ...

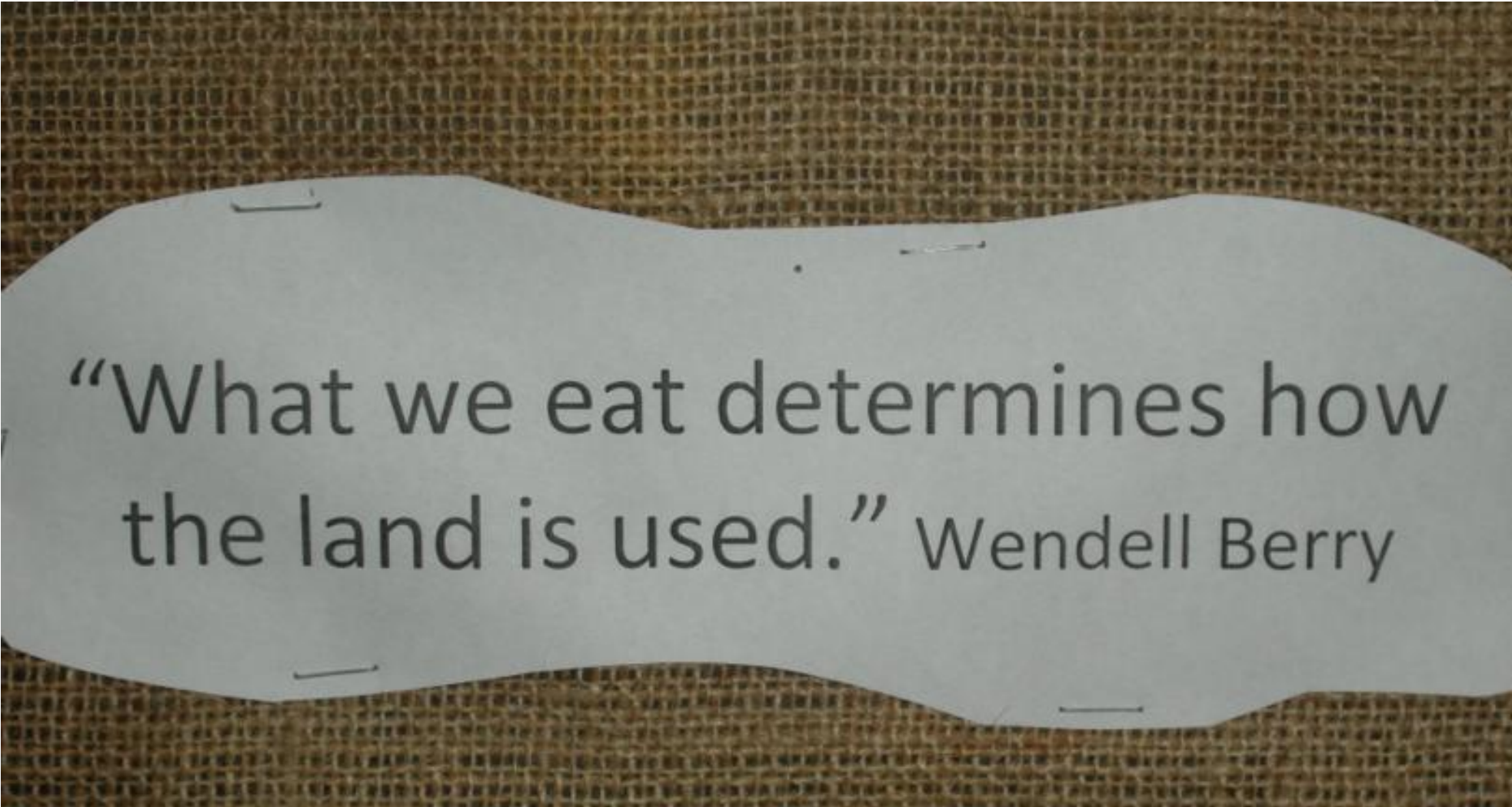
**Is such a reduction and adaptation
for Western societies**

**a loss of life quality
?**

Hunger in the world – an underestimation – to adress within the Bioeconomy context!



Don't forget while dinner!



“What we eat determines how
the land is used.” Wendell Berry

Or in other words: Eating is an agricultural act!

Leverage points in energy systems (I)

There is consensus that an increase of efficiency and reduction of energy use in all sectors is needed!

However, the well known future energy sources are “waiting”...:

- Fuel energy from **alleys** and **agroforestry**
- Fuel energy from **forests** – *!Humus content limitation of forest soils! Don't heat soil fertility of the forests!!!*
- **Earth** and **water** energy
- **Solar** and **wind** energy
- **Biogas** energy



Farm energy autarky!

Conclusions (I)

- (1) Current „systems“ are far away from what we name **efficiency and thrifty** in using bio-resources
- (2) This is specifically the case in terms of **landuse** and therefore there is need for **fundamental change of landuse** to fulfil targets of Bioeconomy
- (3) „**Organic**“ **strategies** take over a key role giving impulses specifically for fundamental **change of landuse** and **food consumption**
- (4) **Clusters** between ministries, universities, research institutions and industries for successful Bioeconomy development should be business as usual, but a stronger integration of **civil society** makes the difference
- (5) **Bioeconomy-Austria** offers programmatic approaches that might serve as **interfaces** and **impulses** for a
Latin American / Caribbean Bioeconomy strategy

Thank you for your attention

Bernhard.Freyer@boku.ac.at

www.nas.boku.ac.at

<http://www.bioeconomy-austria.at/en/>