

Analysis of the net food production of different livestock categories in Austria



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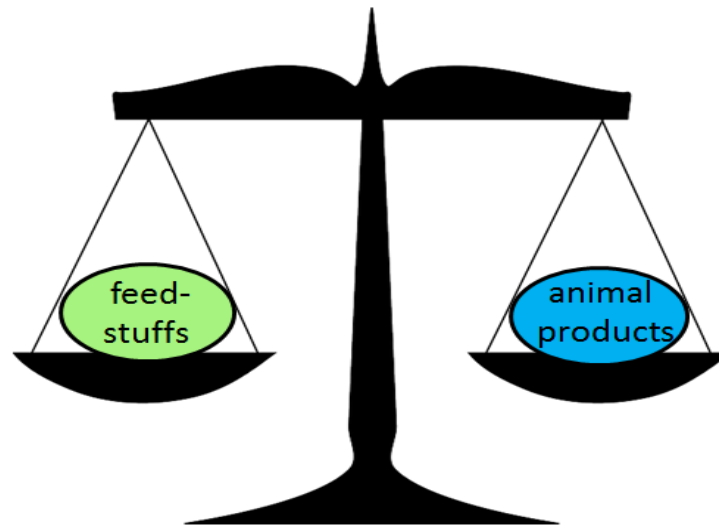
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Background

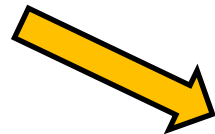
- Worldwide **trends**:
 - Population growth
 - Consumption of animal source foods ↑
 - => **Crop demands** nearly **double** (2005–2050)
- **Conversion efficiency of livestock** systems ~10:1
- Need to increase **net food production**

Measuring net food production

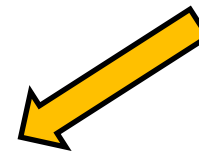


Animal production system

Quantity
changes?



One parameter



Quality
changes?

Materials and Methods (I)

- **Quantity** changes:

Human-edible feed conversion efficiency (**heFCE**)

$$= \frac{\text{human-edible output (animal products)}}{\text{human-edible input (feeds)}} \text{ (for GE and CP)}$$

- **Quality** changes (for protein):

Protein quality ratio (**PQR**)

$$= \frac{\text{Protein quality score of human-edible output}}{\text{Protein quality score of human-edible input}}$$

Materials and Methods (II)

- Data **Source**:
 - National data from 2011–2013
 - Human-edible **output**:
 - Livestock **production data** (Statistics Austria)
 - Human-edible **input**:
 - National **feed balance** (Statistics Austria)
 - Estimated **human-edible fractions of feeds**

Materials and Methods (III)

- Protein **quality**:
 - Digestibility
 - (Indispensable) amino acid composition
- => Digestible Indispensable Amino Acid Score (**DIAAS**)

Results - Energy

	Human-edible fraction (% of feed)	FCR	heFCE
Dairy cows	10.3		1.44
Growing-fattening bulls	17.4	11.5	0.26
Swine	51.3	3.7	0.35
Laying hens	51.0		0.31
Broiler	48.5	2.2	0.30
Sheep	10.3		0.31

$$\text{FCR} = \frac{\text{kg feed dry matter}}{\text{kg bone-in carcass}}$$

$$\text{heFCE} = \frac{\text{human-edible energy in the animal product}}{\text{human-edible energy in feeds}}$$

Results - Protein

	heFCE	PQR
Dairy cows	1.98	1.9
Growing-fattening bulls	0.45	1.7
Swine	0.36	1.7
Laying hens	0.63	1.6
Broiler	0.52	1.4
Sheep	0.54	1.9

$$\text{heFCE} = \frac{\text{human-edible protein in the animal product}}{\text{human-edible protein in feeds}}$$

$$\text{PQR} = \frac{\text{Protein quality score output}}{\text{Protein quality score input}}$$

Take home messages

- Only about 10–20% of diets of ruminants is potentially human-edible
- Cattle in total contribute to human energy as well as protein supply
- When protein quality changes are included, not only cattle but also laying hens and sheep are net contributors to human food supply

A **comprehensive version of this study** can be found in the research paper „Net food production of different livestock: A national analysis for Austria including relative occupation of different land categories” published in *Die Bodenkultur – Journal of Land Management, Food and Environment* 2016/2.

Further information will be presented at the **poster** „Land occupation for livestock feed production in Austria”

Thank you for your attention

