



Assessment of animal welfare and environmental impact

C. Leeb

Scientific Workshop on Organic Pig Production

Hovborg

June 12th-13th 2013

Organic pigs outdoors



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Organic pigs indoors with concrete outside run



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Overview

- Introduction to ProPIG
- How to assess animal welfare and environmental impact?
 - Examples
- How to/how do they relate to each other?
- Conclusions



ERA-net CORE Organic II **ProPIG** (2011-2014)

Farm specific strategies to reduce environmental impact by improving health, welfare and nutrition of organic pigs



Aim of this project,

- to investigate the **interaction of animal health and welfare**, with nutrition and environmental impact
- to create and disseminate a **tool to improve both aspects** of organic pig production.

Partners



- 9 Partners in 8 Countries (AT, CH, CZ, DE, DK, FR, IT, UK)
- Coordination: C. Leeb , Austria

Austria: **C. Winckler**, G. Rudolph and **C. Leeb** (BOKU)

Czechia: **J. Urban (Bio-I)**, G. Illman (IAS, Prague)

Denmark: **T. Rousing**, **J.T. Soerensen** (Aarhus Univ.)

France: **A. Prunier**, **J.Y. Dourmand**, **F. Vertes** (INRA)

Germany: **S. Dippel** (FLI) and C. Simatke (BAT)

Italy: **D. Bochicchio** (CRA-SUI)

Switzerland: **B. Früh**, **M. Meier**, **A. Berner** (FIBL)

UK: **S. Edwards**, **G. Butler** (Univ. Newcastle)

(Sweden: **E. Salomon**, **K. Lindgren**, A.K. Lind (JTI))



ProPIG „Three Systems“



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75 farms in 8 countries

To identify

- animal - environment interactions
- in three systems:



Indoor with concrete
outside run

=?



Partly outdoor

=?



Outdoor

Hypothesis

All systems are able to ensure good welfare and low environmental impact
when well managed

ProPIG

Farm specific strategies for improvement

To develop and implement

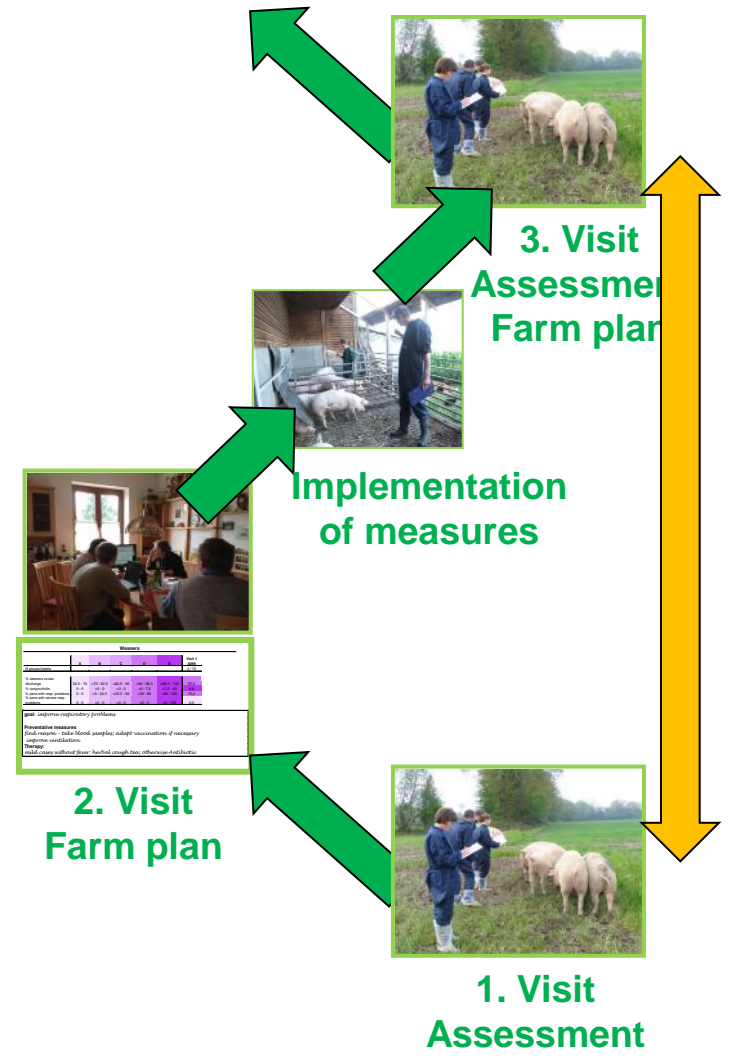
- **Farm specific strategies to:**

- reduce environmental impacts
- by improving health, welfare, nutrition and management

- To **disseminate knowledge** to national advisory bodies and farmers



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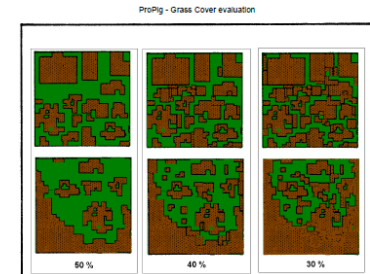
WP1: Definition of systems and development of assessment protocols of animal health, welfare and environmental impacts

WP leader: UK, Sandra Edwards/Gillian Butler)

- Definition of **Systems** (indoor/partly indoor/outdoor)
- **Development of Assessment protocols**
 - **Animal health and Welfare:** e.g. Clinical scoring, medicine records
 - **Environmental impact:** LCA, nutrient balances
 - **Farmer:** qualitative interviews, basic economical data
- **Automatic** recording and feedback: **PigSURfer**
- „**Decision Support Tool**“ for environmental impact



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Introduction

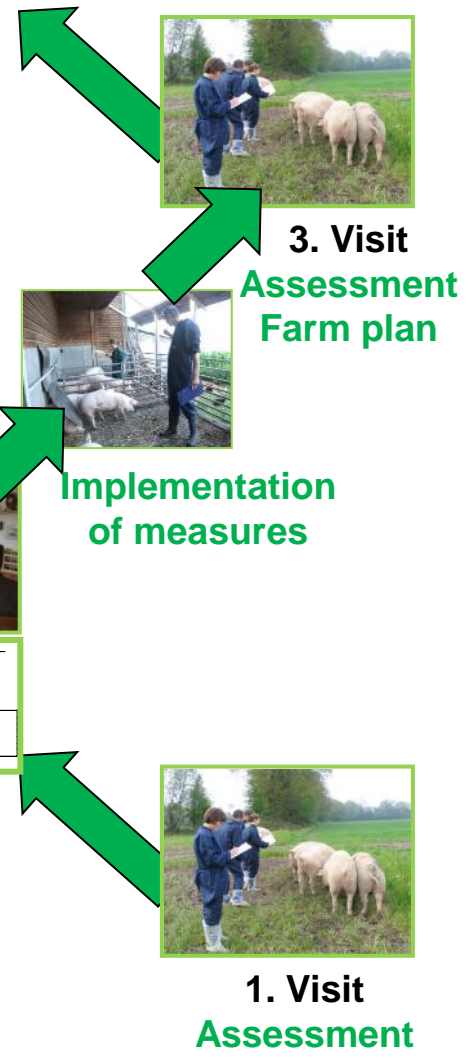
WP 2: On-farm assessment and application of improvement strategies of animal health, welfare and environmental impacts

WP leader: Denmark, Tine Rousing

Prospective cohort observational study
 75 farms (3 systems of 25 farms each)
 Training and Interobserver Repeatability
 3 Farm visits



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1. pregnant sows: investigating enrichment:

20% best farms				20% worst farms	Your farm on 02.05.2012 (mean based on 4 value(s))
52.5 - 41.5 %	41.5 - 38.5 %	38.5 - 34.2 %	34.2 - 27.8 %	27.8 - 11.6 %	31.2 %

Enrichment		01	02	03	04
Enrichment	01	02	03	04	05
Enrichment	01	02	03	04	05
Enrichment	01	02	03	04	05
Enrichment	01	02	03	04	05

pre-emptive respiratory problems

Preventative measures
 (and measure - risk-based program; adapt vaccination if necessary; improve ventilation)
 Therapy
 (and care without fear; handle coughs etc; otherwise details)



WP 3: Analysis, evaluation and dissemination

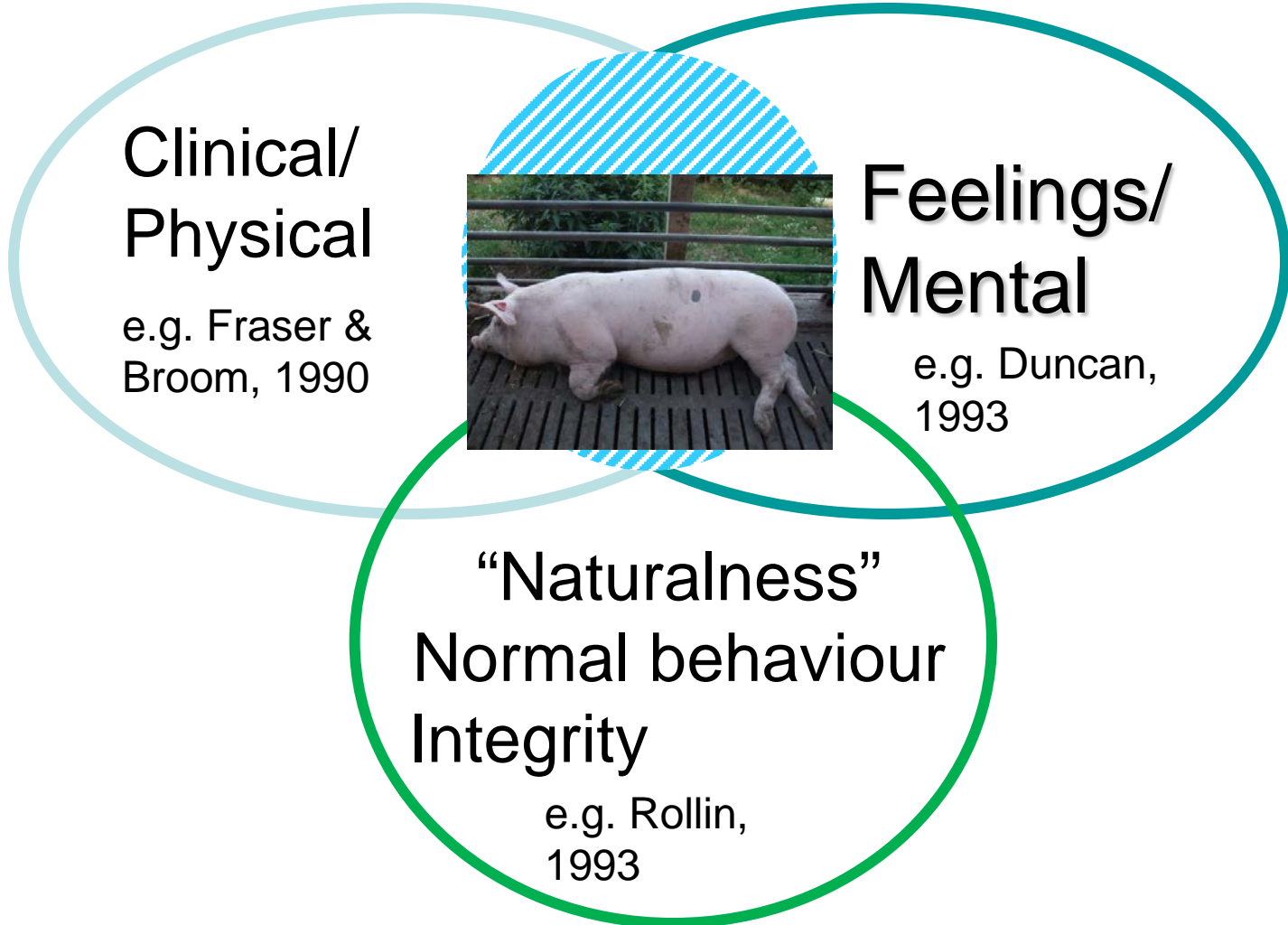
WP leader: Germany, Sabine Dippel

- 1. Comparison of three systems** regarding animal health, welfare and environmental impact
- 2. Detailed analysis of effect of farming type** on health and welfare and productivity
- 3. Evaluation of improvement strategies**
- 4. Dissemination:**
 - Website, articles (farmer journals/scientific)
 - Handbooks and training material for advisors
 - National and international stakeholder meetings

Welfare



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Assess

Relationship

Housing

Nutrition

Breeding



e.g. training



e.g. space, bedding



e.g. system, ration



e.g. breeding goals

INPUTS

How to measure?

WELFARE



Pathology/physiology



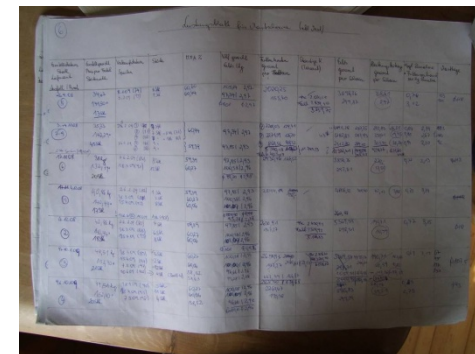
e.g. lesions, BCS

Behaviour



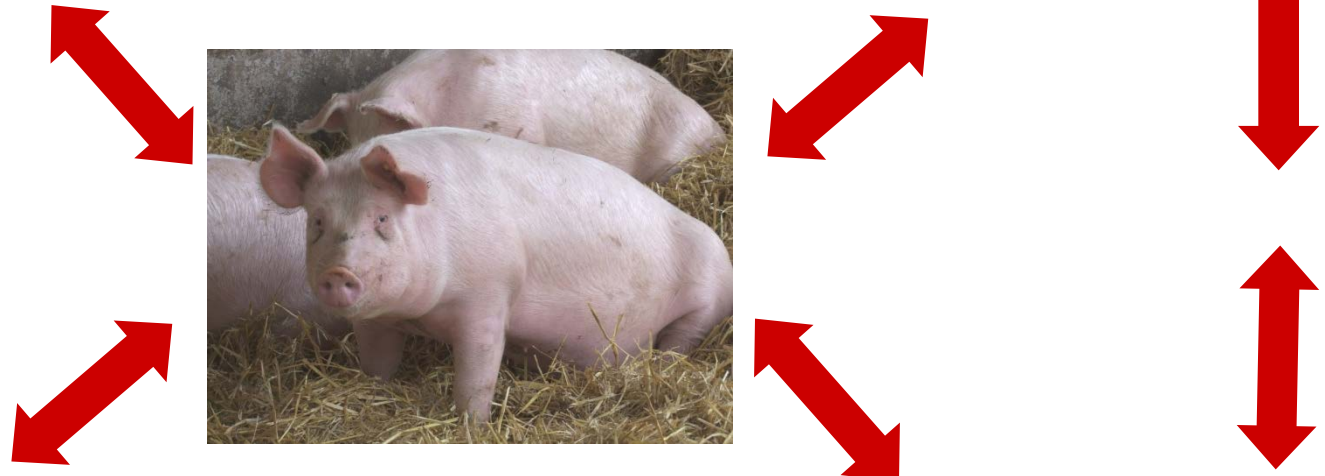
e.g. social behaviour

Records



e.g. treatments, mortality

OUTCOME



First results- Two Austrian farms



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farrow to finish farms,
approx. 25 sows, F1 (LRxES), mainly home grown feeds

Indoor



Partly outdoor



First results- Animal welfare



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Thin sows

20% best farms				20% worst farms	Ihr Betrieb am 18.07.2012 (Mittelwert basiert auf: 19 Werte)
0.0 - 5.3 %	5.3 - 10.5 %	10.5 - 14.3 %	14.3 - 22.2 %	22.2 - 54.5 %	5.3 %

 <p>Condition Score 1: The sow is visually thin, with hips and backbone very prominent and no fat cover over hips and backbone.</p>	 <p>Condition Score 2: The hip bones and backbone are easily felt without any pressure on the palms.</p>	 <p>Condition Score 3: It takes firm pressure with the palm to feel the hip bones and backbone.</p>	 <p>Condition Score 4: It is impossible to feel the bones at all even with pressure on the palm of the hands.</p>	 <p>Condition Score 5: The sow is carrying so much fat that it is impossible to feel the hip bones and backbone even by pushing down with a single finger.</p>
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First results- Animal welfare



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Skin lesions

20% best farms				20% worst farms	Ihr Betrieb am 18.07.2012 (Mittelwert basiert auf: 19 Werte)
0.0 - 0.0 %	0.0 - 11.1 %	11.1 - 19.0 %	19.0 - 27.3 %	27.3 - 51.4 %	47.4 %



Environmental impact



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Global warming Potential

e.g. Basset-Mens & van der Werf, 2005; Olea et al., 2009; Halberg et al, 2010, Rigolot et al, 2010



Nutrient flow (N and P)

e.g. Schröder et al., 2003

Soil characteristics

e.g. Gee and Bauer, 1986

Assess

Welfare

Housing/Outdoors

Nutrition

Manure management



e.g. training



e.g. space, bedding



e.g. system, ration



e.g. cleaning frequency

INPUTS

How to measure?

Environmental impact

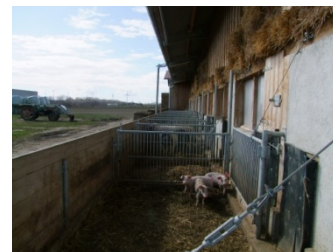


Soil characteristics

Vegetation cover

Nutrient balances (N, P)

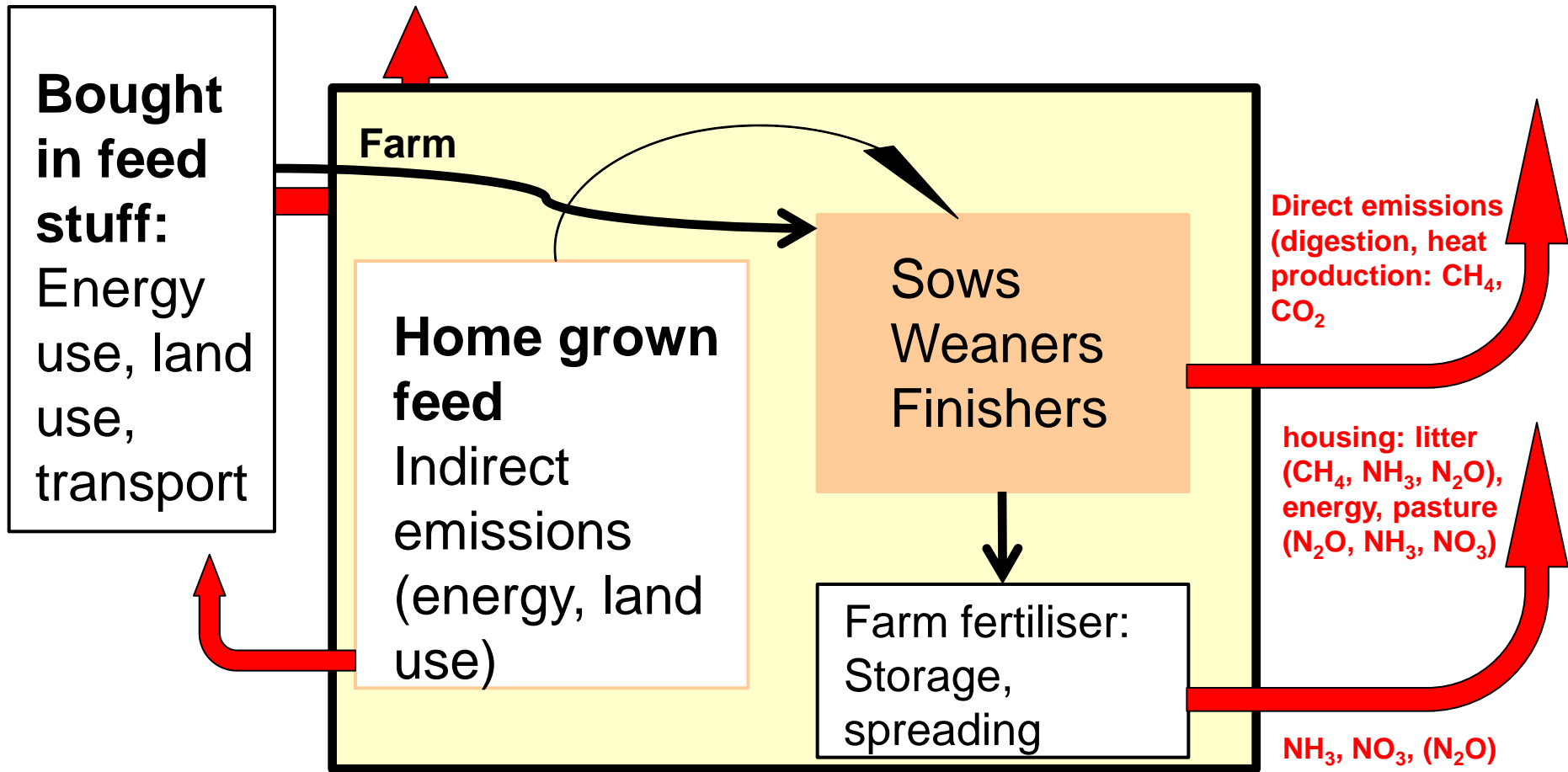
Global warming potential



OUTCOME



Global warming potential Modell (Rigolot et al., 2010)

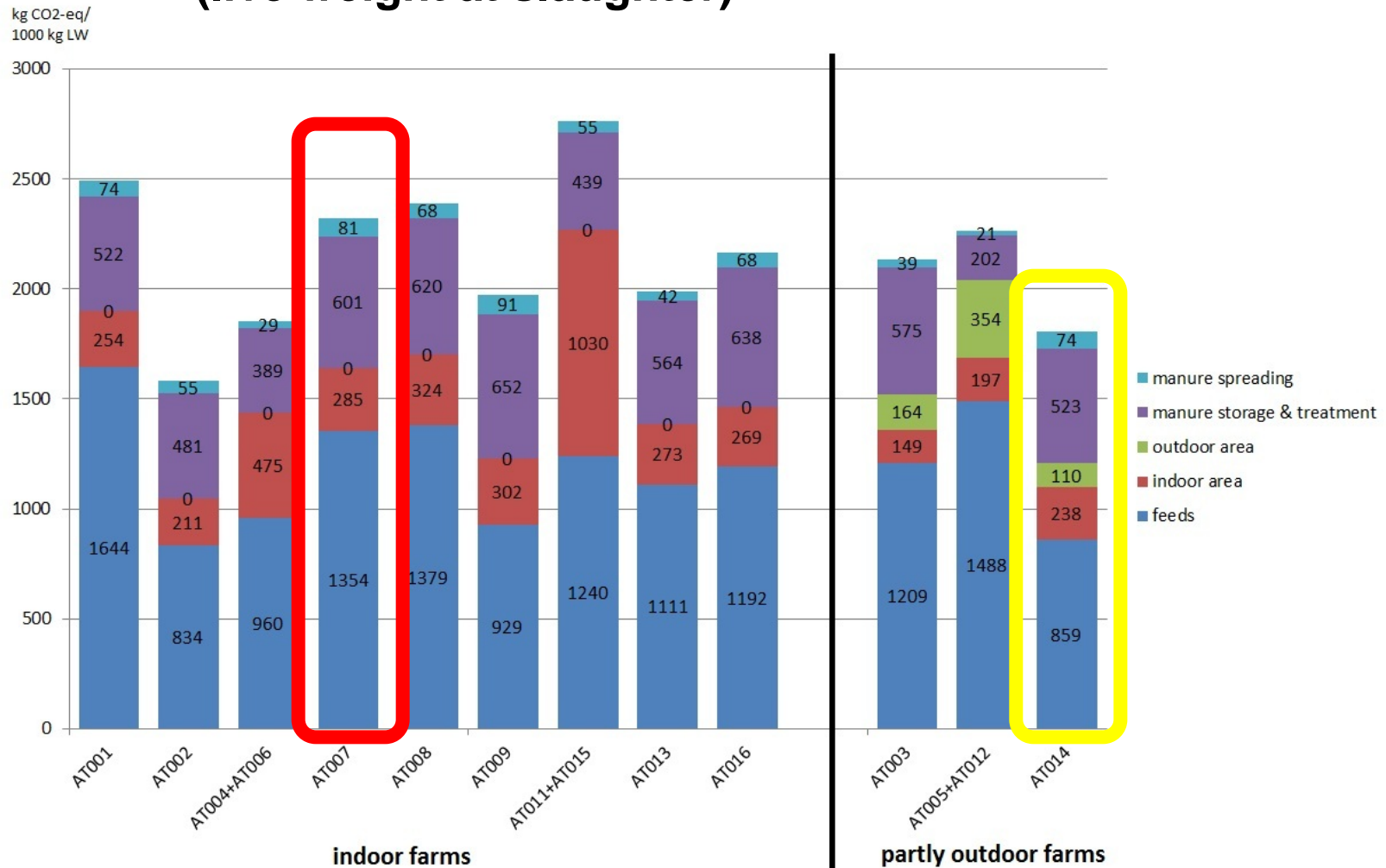


First results-



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CO₂-eq Emissions of Austrian organic pig farms in kg CO₂-eq/1000kg finishing pig (live weight at slaughter)





First results- N and P

balances of Austrian organic pig farms

Betrieb	N-Bilanz (kg N/ha/a)	P-Bilanz (kg P/ha/a)
AT001	17	-6
AT002	-30	-6
AT004+AT006	-10	-3
AT007	7	-4*
AT008	-10	-7*
AT009	3	1*
AT011+AT015	15	-3
AT013	12	4
AT016	5	-2*
AT003	-12	3
AT005+AT012	-11	2*
AT014	42	28*
Durchschnitt indoor	1,0	-2,9
Durchschnitt partly outdoor	6,3	11,0

Brandhofer, 2013



How to relate?

1. Individual parameters?

– Mange eradication:

- prevalence of ectoparasites vs. Treatment incidence



– Outdoor areas:

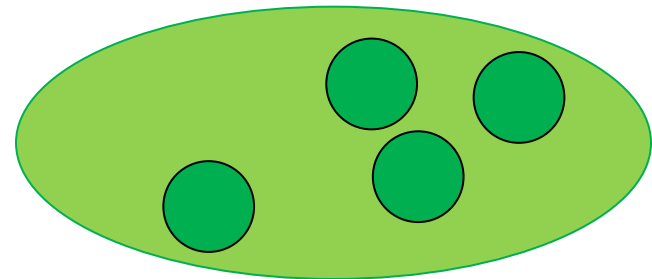
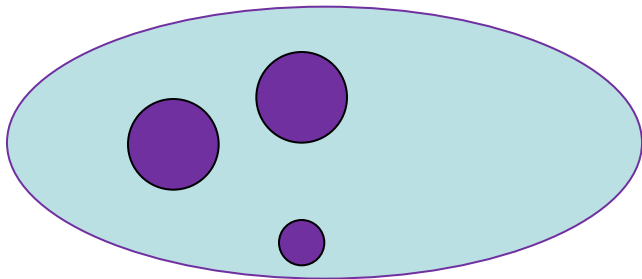
- rooting behaviour vs. vegetation cover





How to relate?

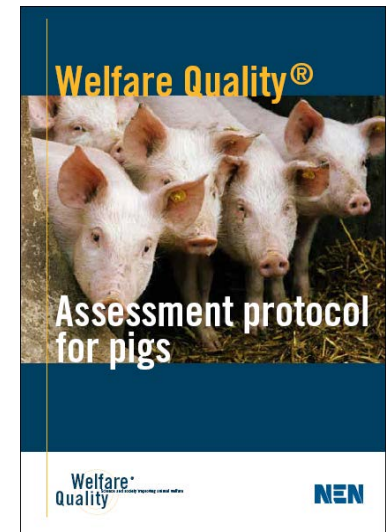
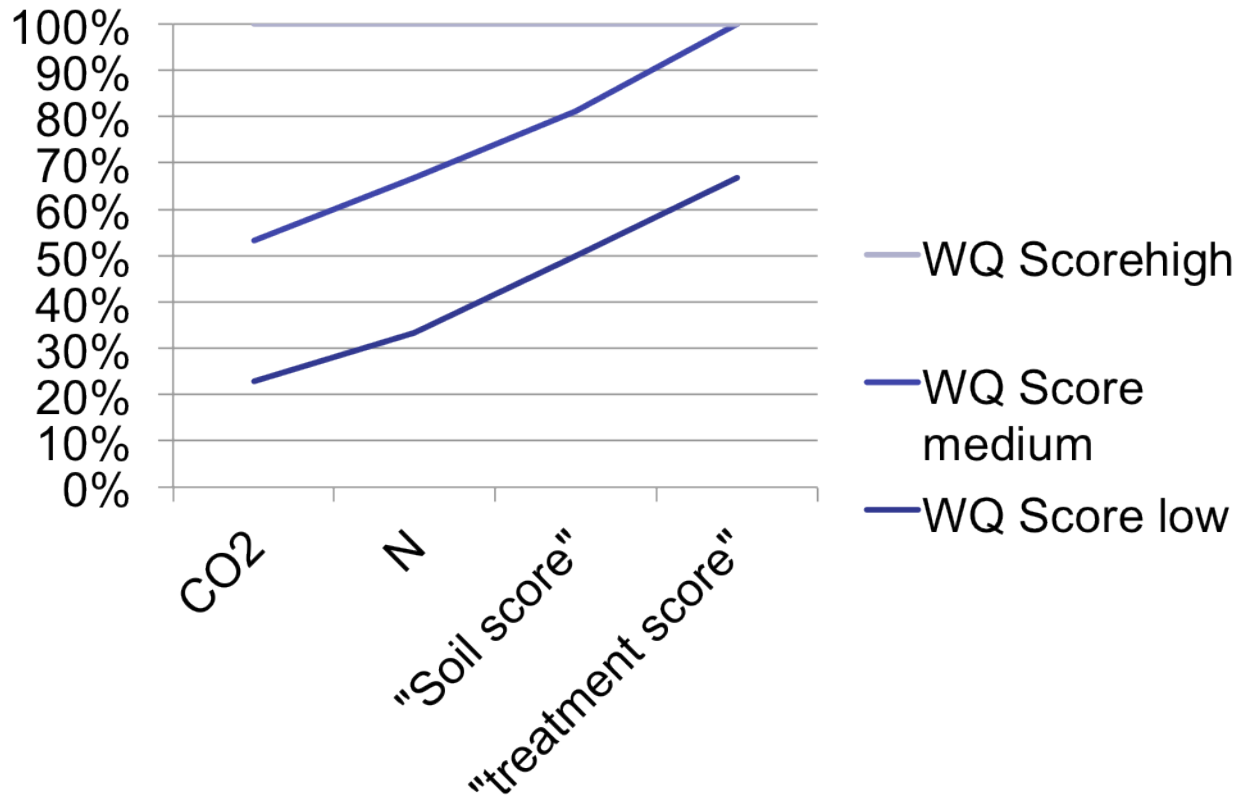
2. Combination of few, selected parameters
„Cluster“?
 - E.g. **Physical welfare**: treatment incidences plus lesions, lameness
 - **E.g. Direct animal impact on environment**: Medicinal input, Vegetation cover,





How to relate?

3. Compare e.g. WQ[®] Score of farm with e.g. CO₂-eq Emissions?



How do they relate?



	Environment +	Environment 0	Environment -
Animal health, welfare & nutrition +	Mange eradication Optimised ration Regular removal of manure in outside run Health management	Adequate amount of bedding	Access to forest Access to natural water sources
Animal health, welfare & nutrition 0	Origin of food stuff Manure storage Food conversion rate		Protein surplus in Ration Feed losses High spacial variability in N and P load
Animal health, welfare & nutrition -	Nose rings of sows	Respiratory problems	High density of pigs outdoors Rotation interval inadequate

First results- Ectoparasites



Treatment incidence Parasites sows

20% best farms				20% worst farms	Ihr Betrieb am 18.07.2012 (Mittelwert basiert auf: 20 Werte)
0.0 - 0.0 %	0.0 - 100.0 %	100.0 - 100.0 %	100.0 - 187.5 %	187.5 - 200.0 %	190.0 %

Treatment incidence Parasites weaners

33% best farms		33% worst farms	Ihr Betrieb am 18.07.2012 (Mittelwert basiert auf: 262 Werte)
0.0 - 0.0 %	0.0 - 0.0 %	0.0 - 100.0 %	87.4 %



First results-

Ectoparasites- Mange eradication



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Treatment incidence Parasites sows

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0.0 - 0.0 %	0.0 - 100.0 %	100.0 - 100.0 %	100.0 - 187.5 %	187.5 - 200.0 %	190.0 %

Treatment incidence Parasites weaners

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0.0 - 0.0 %	0.0 - 0.0 %	0.0 - 100.0 %	87.4 %

When well managed!

Conclusions



- **Selected aspects** of animal welfare and environmental impact can be assessed on farm
- Still to be discussed **how to relate** them to each other
 - Concrete hypothesis
 - Specific – measureable - outcomes
- High influence of **management** - variation within systems larger than across systems
- Allowing to identify solutions





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Thank you!
Questions?

Further information: <http://www.coreorganic2.org/propig>

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