

From Policy to Practice: Global Strategies for Improving Farm Animal Welfare

Animal Health Canada Forum,
Ottawa, Canada

22 September 2026

Robert Hoste, senior pig production economist



Wageningen University & Research



Photo credits: Rob Goossens

What I will share with you

1. What then is animal welfare?
2. Regulatory framework and situation in Europe
3. Animal welfare outside Europe
4. Economics of animal welfare
5. Take-home messages





<https://www.nytimes.com/2023/02/08/business/china-pork-farms.html>



Screenshot from the Weibo network



WAGENINGEN
UNIVERSITY & RESEARCH

A photograph of a group of piglets in a farm setting. The piglets are mostly white, with one prominent brown and white spotted piglet in the foreground. They are standing on a grey concrete floor. A semi-transparent white rectangular box is overlaid on the middle of the image, containing the text "What then is animal welfare?".

What then is animal welfare?

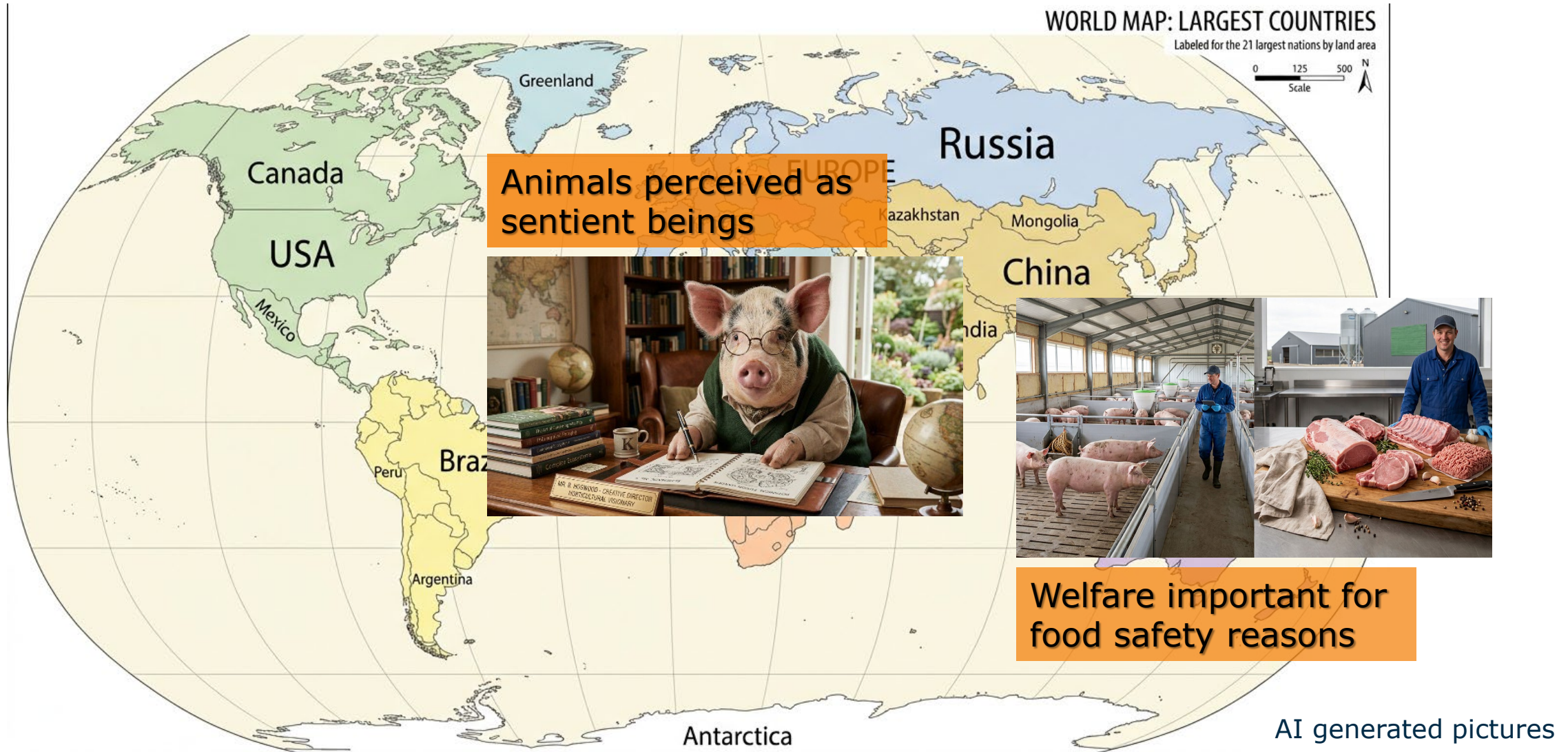
What then is animal welfare? (not exhaustive)

5 freedoms: 1) freedom from hunger and thirst, 2) freedom from discomfort, 3) freedom from pain, injury or disease, 4) freedom to express normal behavior, and 5) freedom from fear and distress (Brambell, 1965)

Animal welfare is the **quality of life** as perceived by the animal itself (Bracke, 1999)

Critical animal welfare issues: a) related to **animal discomfort** (Boredom, Mutual lesions, Foot and leg quality; Lighting schedules and intensity); and b) secondarily, related to **mutilations** (Hoste and Oosterkamp, 2015)

Perception of animal welfare differs

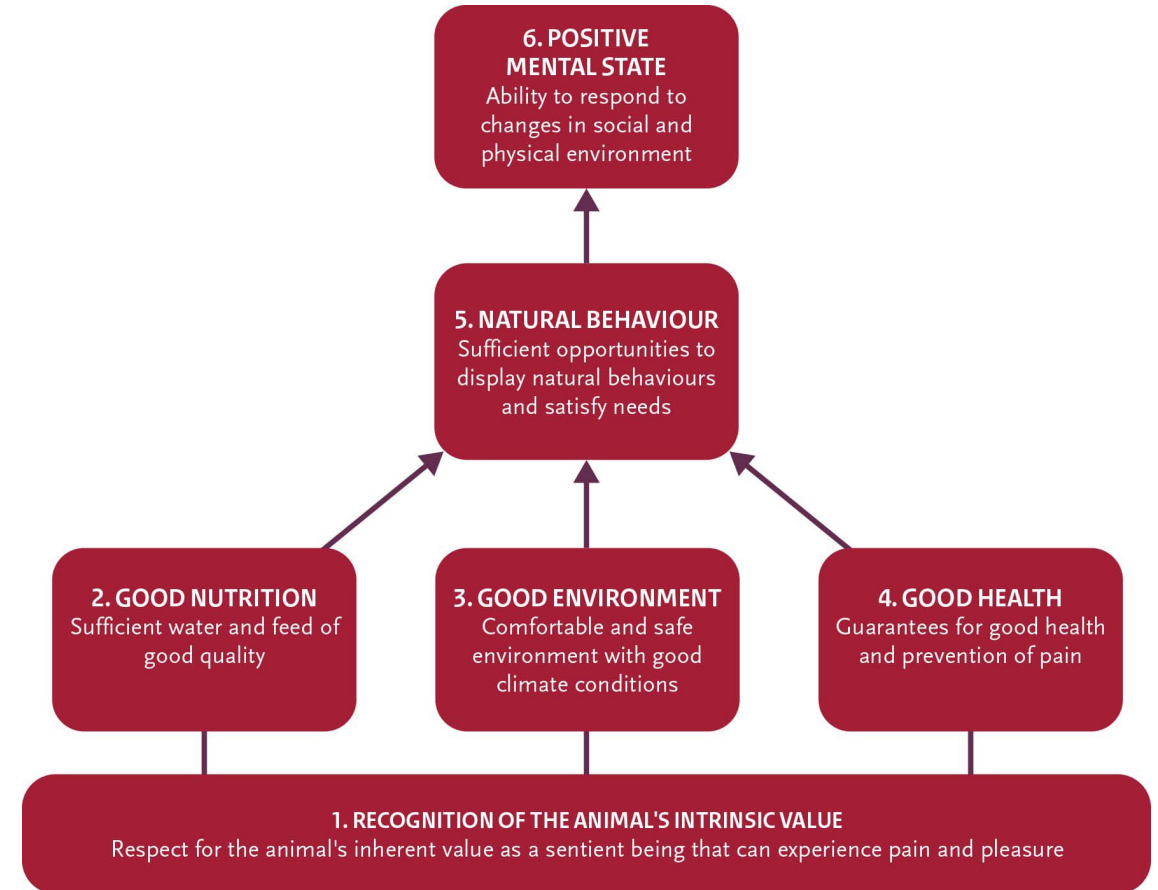


Guiding principles

Opinion of RDA, advisory committee to Dutch government

Six principles, including respecting the animals as sentient beings

1. Intrinsic value
2. Good nutrition
3. Good environment
4. Good health
5. Natural behaviour
6. Positive mental state



Source: RDA, 2021

<https://english.rda.nl/latest/news/2022/6/29/six-guiding-principles-to-ensure-humane-livestock-farming>

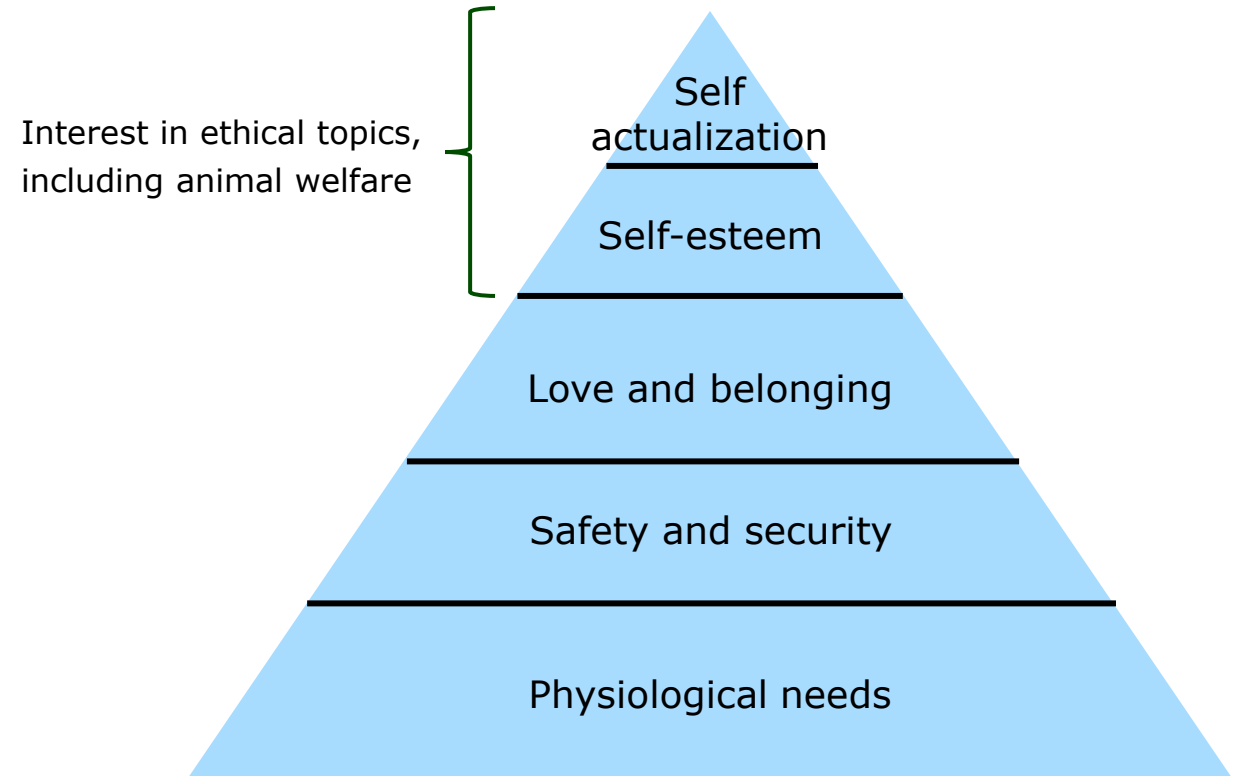
Interest in animal welfare relates to personal status

Awareness especially in developed countries

Ethical topics play a role mainly in developed countries, and for people with sufficient income

E.g., animal welfare, meat replacers, organic, vegetarian, environmental protection, climate

Maslow's hierarchy of needs



Source: Maslow, 1943

A close-up photograph of four piglets standing on a bed of straw. The piglets are white with some pinkish skin visible on their ears and legs. They are positioned in a row, with their hindquarters and legs visible. The straw is dry and yellowish-brown. A semi-transparent grey rectangular box is overlaid on the middle of the image, containing the text 'Regulatory framework and situation in Europe' in bold red font.

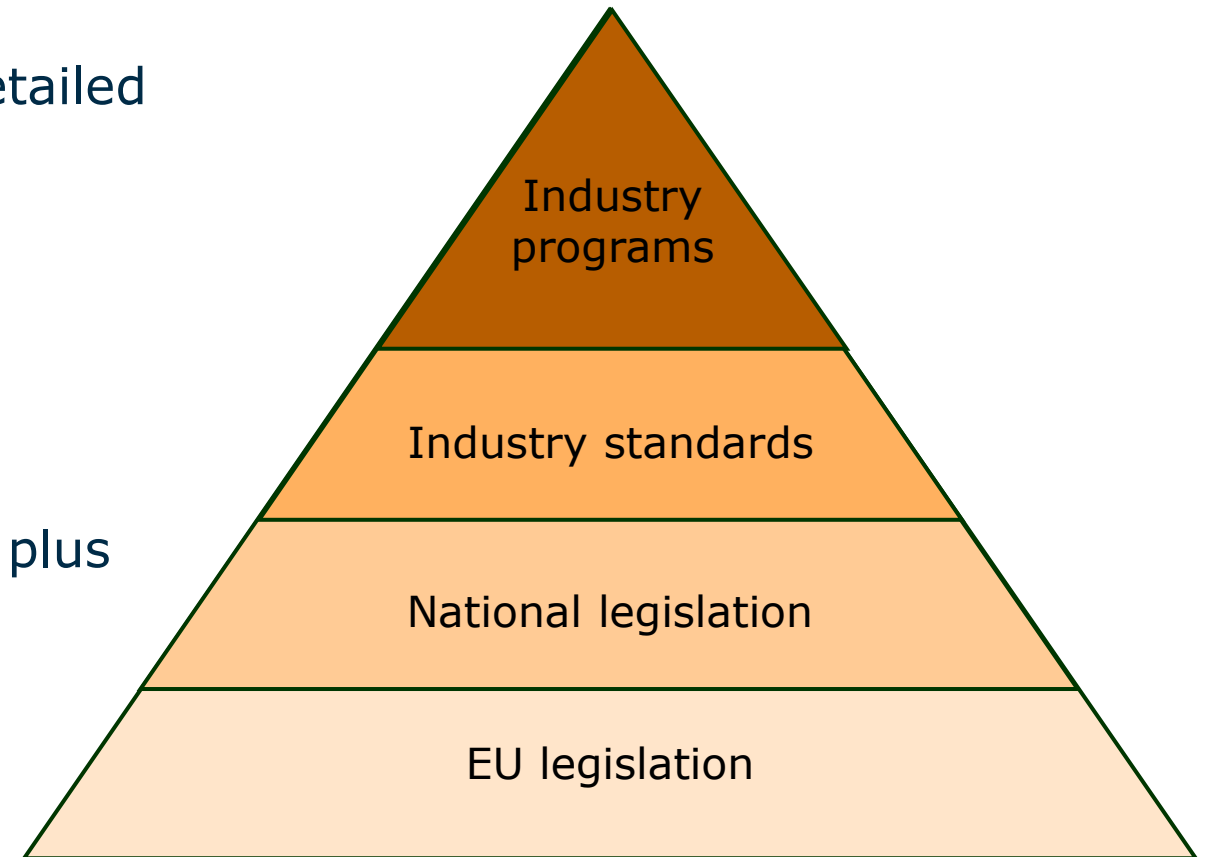
Regulatory framework and situation in Europe

Regulatory framework: public & private

EU's first Directive in 1978, stepwise more detailed and stricter

EU Directives require legislation by Member States: top-ups possible ('gold-plating')

Private: sector-wide quality schemes and standards (umbrella organisations + NGO's), plus industry market programs



Source: Hoste, 2016

EU Legislation on pig welfare

Pig husbandry:

- Space allowances
- Group housing of pregnant sows
- Isolation of sick animals
- Mutilations (tail, teeth, castration) not allowed routinely
- Feeding, watering, light availability and noise avoidance
- Trained staff, etc.

Council Directive 98/58/EC; Council Directive 2008/120/EC

Transport: *Council Regulation (EC) No 1/2005*

- Loading density, Journey times, Feeding and watering, Truck equipment, Fitness for transport, Drivers' competency

Slaughtering: *Council Regulation EC 1099/2009*

- Trained staff, Stunning methods, Construction, layout and equipment of slaughterhouses, Appointment of an animal welfare officer, Drawing up of standard operating procedures

National top-ups ('gold-plating')

Some examples

-  UK: Group housing of sows immediately after weaning (1999)
 -  Germany: living area in service area (2029); free farrowing (2035)
 -  Sweden: intact tails (1988)
 -  Finland: intact tails (2003); castration (2034)
 -  Netherlands: living area (1994, 2013); intact tails (2030)
 -  Austria: free farrowing (2033)
 -  Denmark: transition path to free farrowing (2021 10%); intact tails (2028 $\pm$ 10%)
- Etc.

→ Consequence: competitive distortion

Comparison of national top-ups

													
Requirement	EU	AT	BE	DK	FR	FI	DE	HU	IE	NL	ES	UK	
Area fatteners (m2)	0.65	0.70					0.75			0.80			
Area weaners (m2)	0.30						0.35						
Area 1 st parity sows (m2)	1.64									2.25			
Slat width suckl.piglets (mm)	11	10											
Slat width weaners (mm)	14	13											
Group housing (days PI)	28	5		3						4			
Width of sow stalls	Suffic.												
Solid floor - weaners	-			0.5									
Solid floor - fatteners	-			0.33						0.4			
Day light access	-		3%										
Light provision	Suffic.						80 lux						
Painkillers for castration	Allowed	Priv.	Priv.	Legal	Priv.	Priv.				Priv.			
Tail docking	Allowed			half tail		No							
Hospital pens	Suffic.			2*area									
Enrichment material	required			natural									
Castration									Not done	transition to ban		priv. forb.	

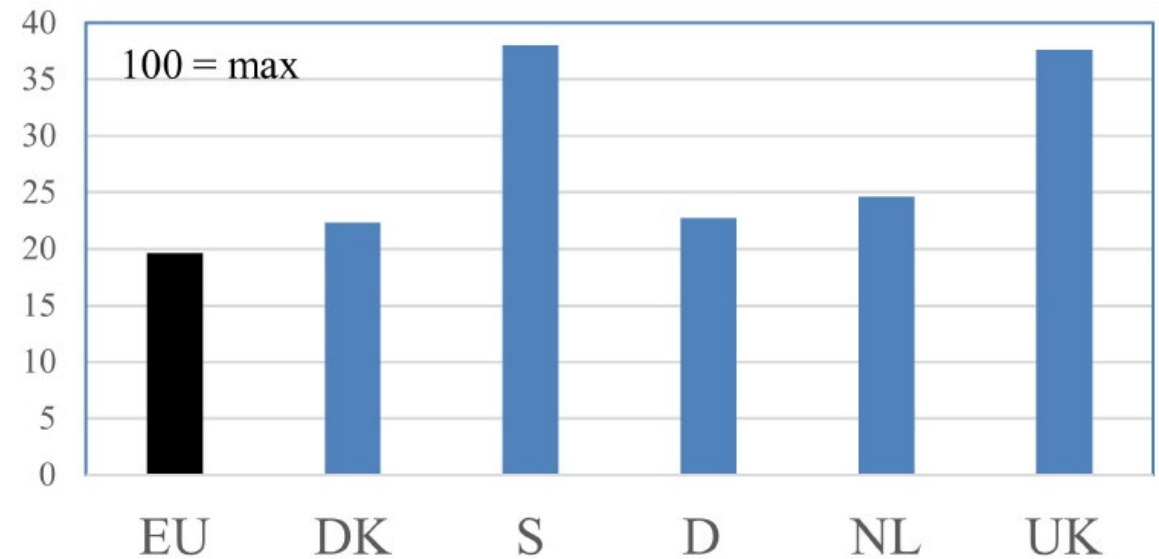
Source: own compilation/InterPIG (2015)

Benchmarking EU countries on welfare demands

National top-ups on EU legislation

Sweden and UK highest – not competitive

Netherlands mixed



Aggregated Benchmark scores (scale 0 to 100) for animal welfare in pig production in 5 countries vs. EU

Source: Sandøe et al., 2020

Lack of Level-playing field among competitors

Different requirements among countries in the same market distorts competition

Importing countries have less trouble than exporting

Solution: private standards (with additional payment), rather than legal requirements



AI generated picture



Outdoor access (market program); Austria

Upcoming NGO's: discursive power



Increasingly active, esp. since a few decades

Netherlands: >200 animal welfare-related NGO's + political party

Scale local - national; often single-issue; activism <-> cooperative approach

Discursive power – naming/shaming

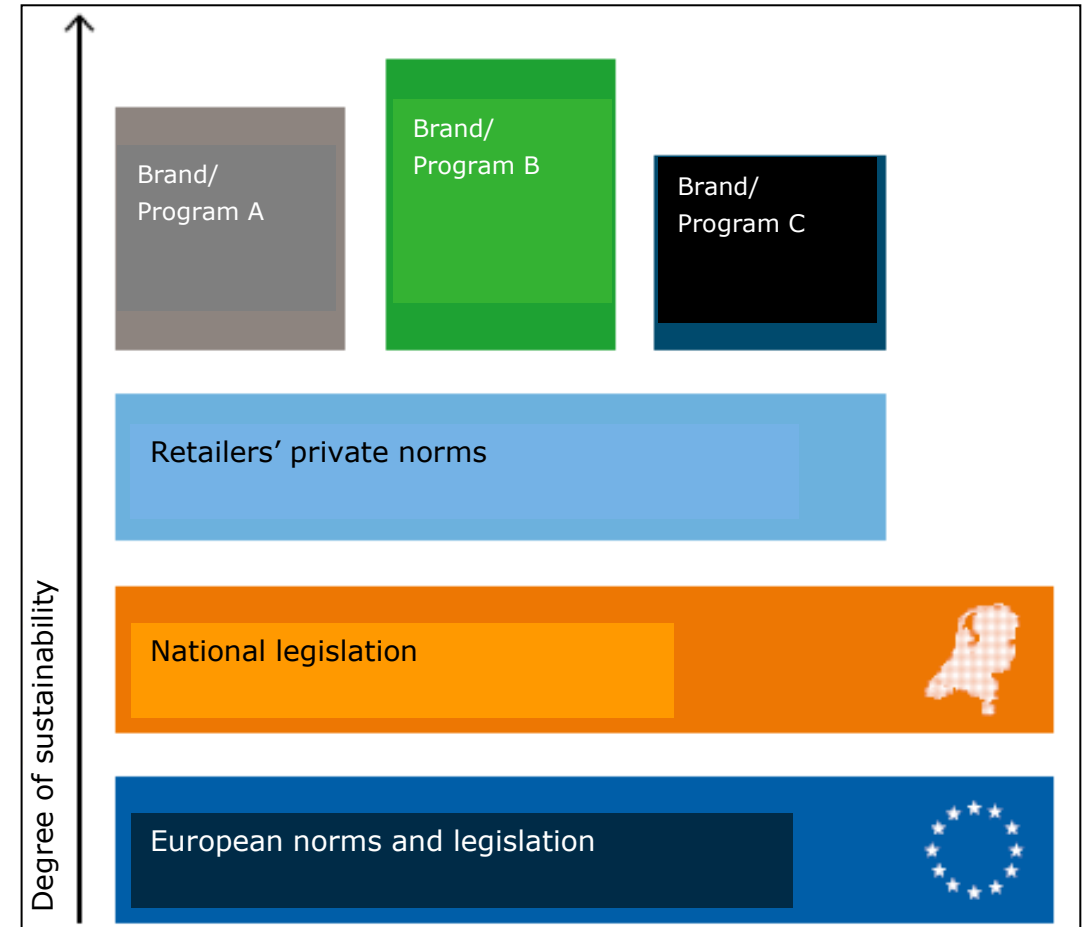
Dierenbescherming is largest organization

cooperative approach with farmers

initiated Beter Leven Keurmerk (Better Life Hallmark) -> national benchmark

Private arrangements for value added production

Examples of private programs



Source: Reinders et al., 2013

Beter Leven keurmerk (Better Life hallmark)

Developed by NGO Dierenbescherming



- Developed by NGO Dierenbescherming, now legally independent
- Cooperative program development with farmers, industry, retail, and government
- Three levels
- Demands in living area, daylight, non-castration, weaning age, group size, mortality, antibiotics' use, soy sourcing, feed and water quality, feed ingredients selection, enrichment material, troughs and nipples, transport time, farm size, supply chain governance
- Annual check and re-certification
- Covers entire supply chain
- **Embraced by all retailers** for fresh pig meat!
- Basis for all other market programs, building on top of it

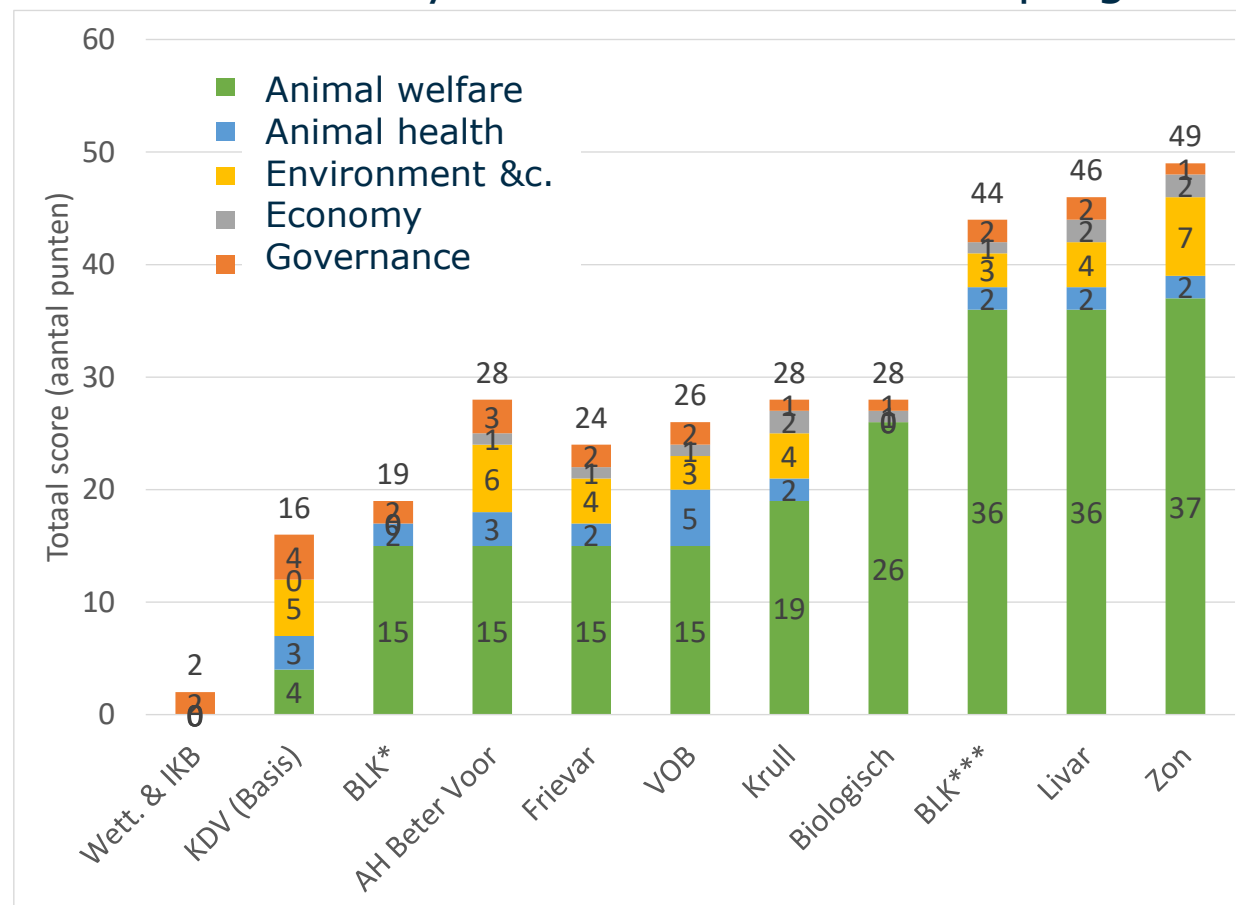


Market programs in the Netherlands assessed

Legal + IKB
KDV (Basis)
Beter Leven*
AH Beter Voor
Frievar
VOB
Krull
Biologisch
Beter Leven***
Livar
Zonvarken



Sustainability assessment of market programs



Source: Hoste and Benus, 2025

Intact tails as perfect welfare indicator

But it requires quite a bit from the farmers and supply chain partners

Conditions for intact tails:

Craftmanship & labour availability

Management

Space

Floor

Enrichment material

Air quality and speed

Health

Genetics

Feed composition

Etc.

→ Virtually everything must be perfect



Photo: WUR

Tail biting still happens: Finland 2% damaged; Switzerland lots

Covenant for Dierwaardige veehouderij 'humane animal handling'

Combination of legislation, covenant and specific Authority

A. Government: far-reaching goal on welfare, environment, nature

Goal-setting, funding; horizon 2040

Legislation: goal-oriented, transition time, enforcement option

Facilitating: research funding, subsidies, tax facilities, permission procedures

B. Covenant – government, farmers, industry, few NGO's

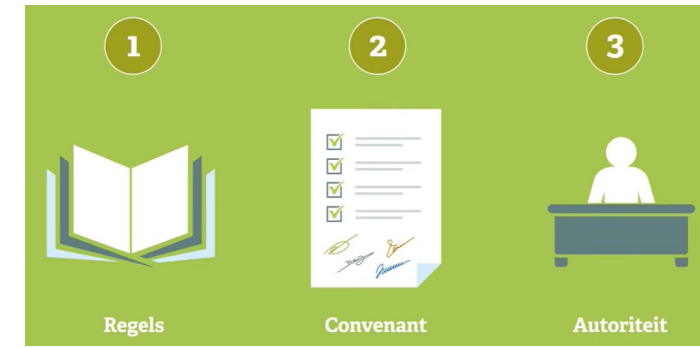
Exchange experiences, joint knowledge development, supporting pioneers

Room for implementation that suits the individual farmers

Aligning supply chain partners

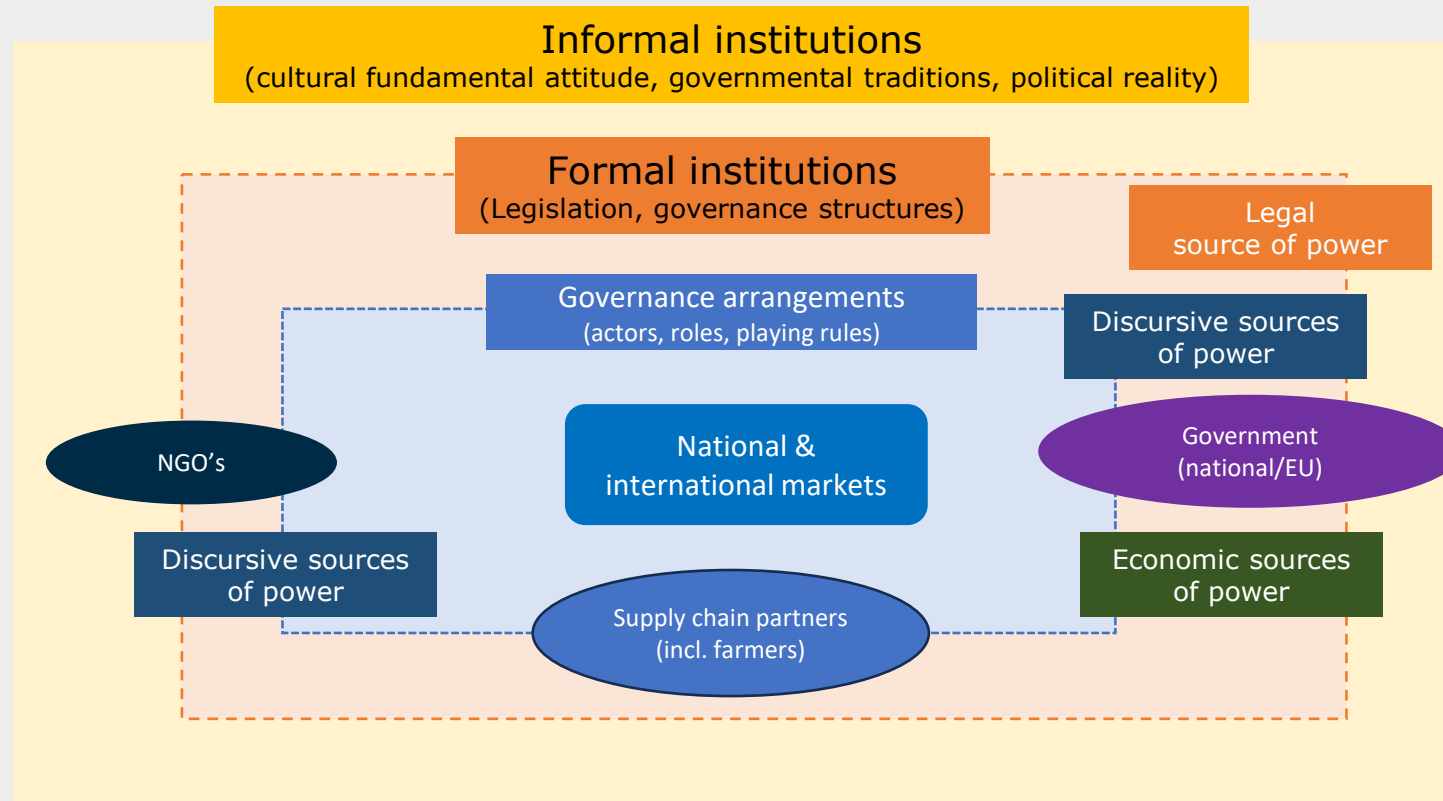
C. Authority – independent

Reality check, e.g., permission procedures, funding, consumer uptake



Conceptual framework

Institutional context in sustainability agreements



Source: Van Wassenhaer et al., 2025

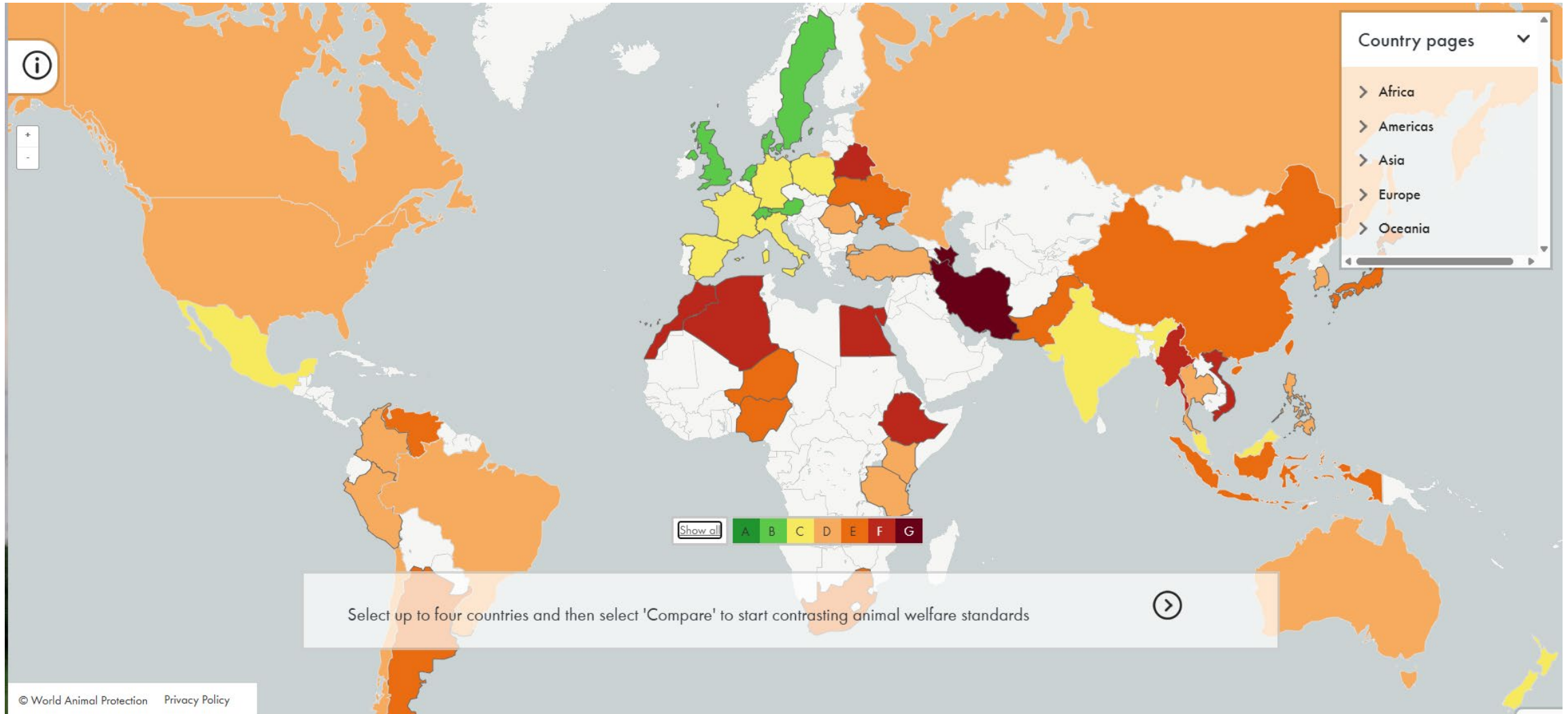
Animal welfare outside Europe

ESTABLECIMIENTO



THE GOOD PIG

Animal protection index 2020



<https://api.worldanimalprotection.org/>

Welfare standards in selected countries outside Europe

Compared to EU legislation (situation 2012!)

Brazil



Federal Decree No. 24,645 of 1934

- Due to the subtropical climate, basic welfare requirements are fulfilled on many farms even without legal standards
- Legislation provides basic welfare goals for farming, transport and slaughter
- Good Practice Recommendations have been or are being developed.
- Group housing for pregnant sows is not required

New Zealand



Animal Welfare Act 1999

- Based on legislation, codes of welfare have been developed for all species. These include farming, transport and slaughter. Codes contain mandatory minimum standards and recommended best practices.
 - Minimum standards are similar to EU standards, except for permitting tail docking in dairy cattle and sheep. Codes are enforced by government and ngos.
- Codes were developed jointly with ngo's

USA



Animal Welfare Act 1873 / 1994 – relates to zoo and circus animals, and pets; not to farm animals

- Very little federal relevant legislation on farm animal welfare exists
- Several States have developed their own regulations
- A number of voluntary industry-based animal welfare standards exist

Gaps between US PQA+ and EU legislation

4 areas where PQA+ is non-compliant with EU legislation:

- Living area
- Group housing of pregnant sows
- Enrichment material
- Pain killers at castration



Source: Hoste and Oosterkamp, 2015

Animal welfare in South Korea

Year	Certified farms	Certified farms with pigs	Number of Pigs
2012	21	0	0
2013	7	0	0
2014	9	0	0
2015	11	3	19,900
2016	27	1	2,400
2017	29	1	138
2018	51	1	2,000
2019	63	5	10,814
2020	52	4	9,140
2021	70	0	0
2022	78	2	5,808
2023	32	5	46,376
Total	450	22	96,576

Certification of welfare-friendly farms

In 2023, 22 pigs farms certified in total,
with 96,576 pigs (Source: animal.go.kr)

Est. output 100-150,000 slaughter pigs

Legislation + NGO's developed welfare program

Main topics:

- Group housing
- Lower density
- Enrichment



Comparing EU and non-EU approach

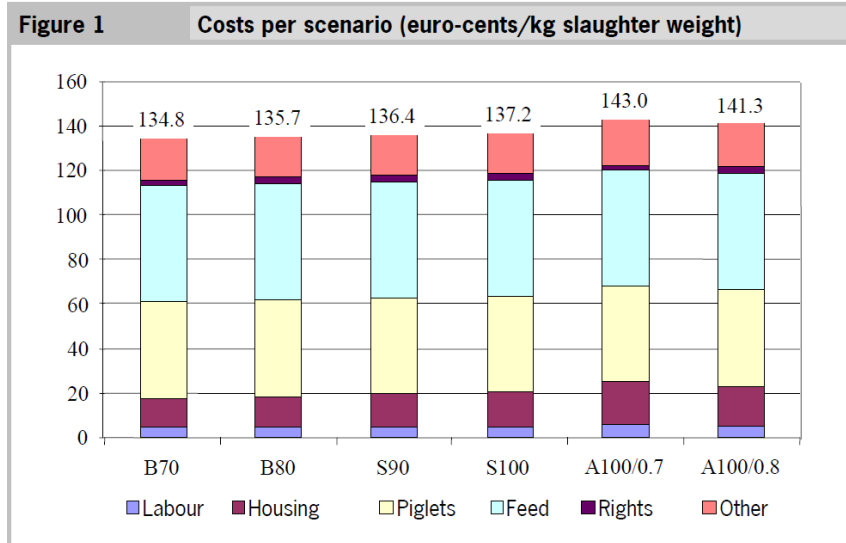
-  European Union: government-based, quite detailed legislation, Member States are gold-plating, at the cost of competitive power. Private standards increasingly important
-  Brazil: Legislation + recommendations
-  New Zealand: Codes of conduct, jointly developed with NGO's
-  USA: industry-led, science-based and retailer demands; legislation only in some states
-  South Korea: legislation + NGO's
-  China: legislation with animal handling only focused on food safety

Outside EU often oriented on cage ban, and on transport and slaughter

Economics of animal welfare



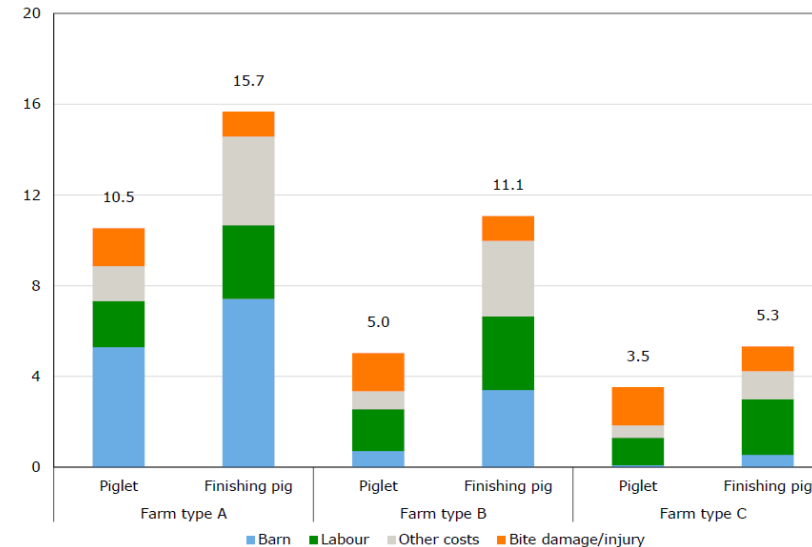
Few examples of economic assessments



Increased space in finishing: +1.5 – 9.2ct
Immediate change vs. only new buildings

Source: Hoste (2010)

Beter Leven (Better Life hallmark) 15 ct/kg
Dierwaardige veehouderij ±35ct/kg



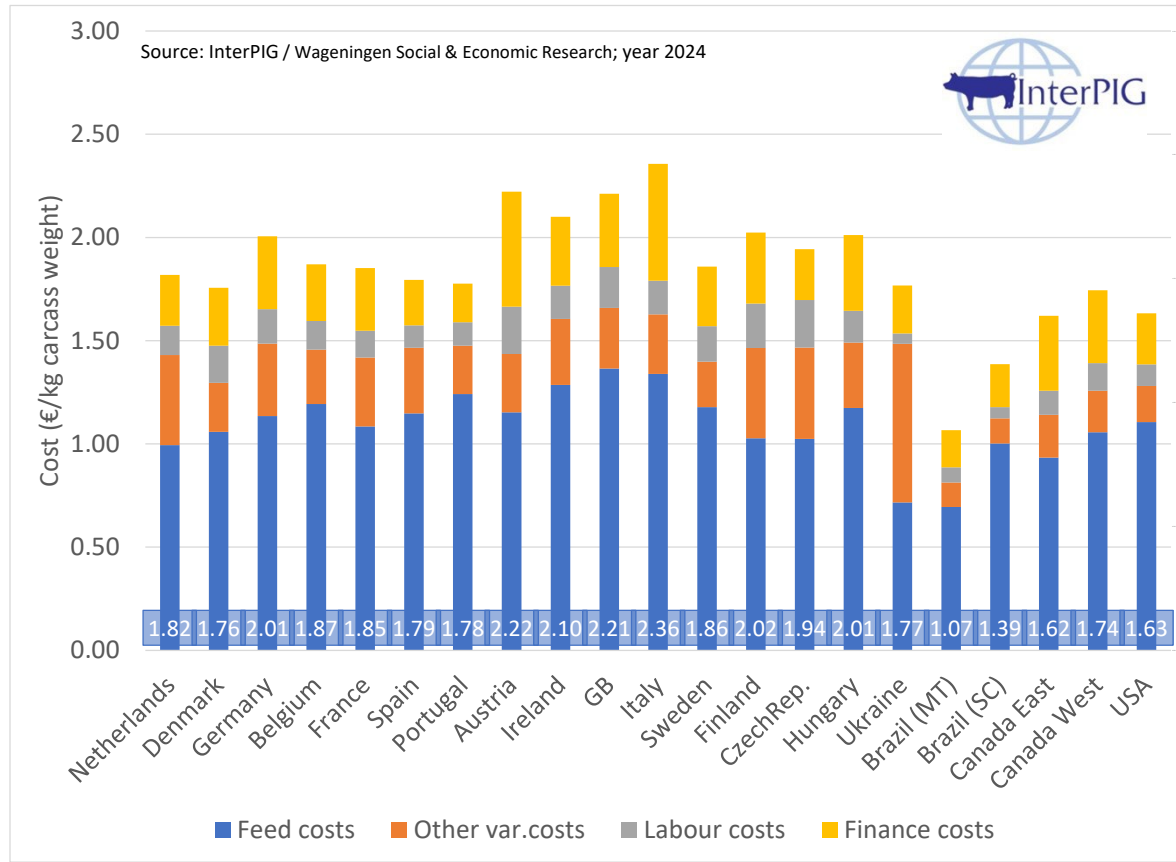
Intact tails: 9 – 26ct/kg (split nursery & finishing)
Housing circumstances deviate

Source: Hoste et al. (2023)

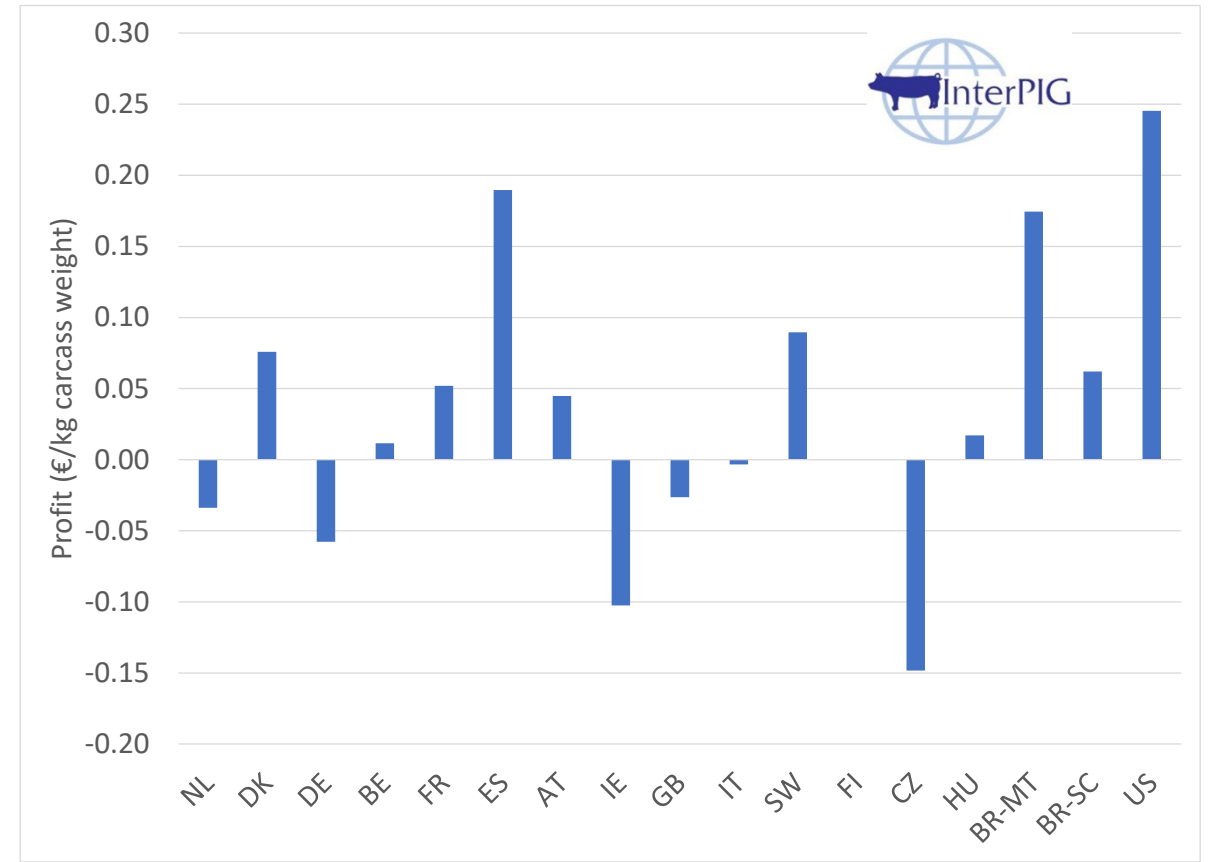
Production costs and margins compared

Little room for uncompensated cost increases for welfare measures

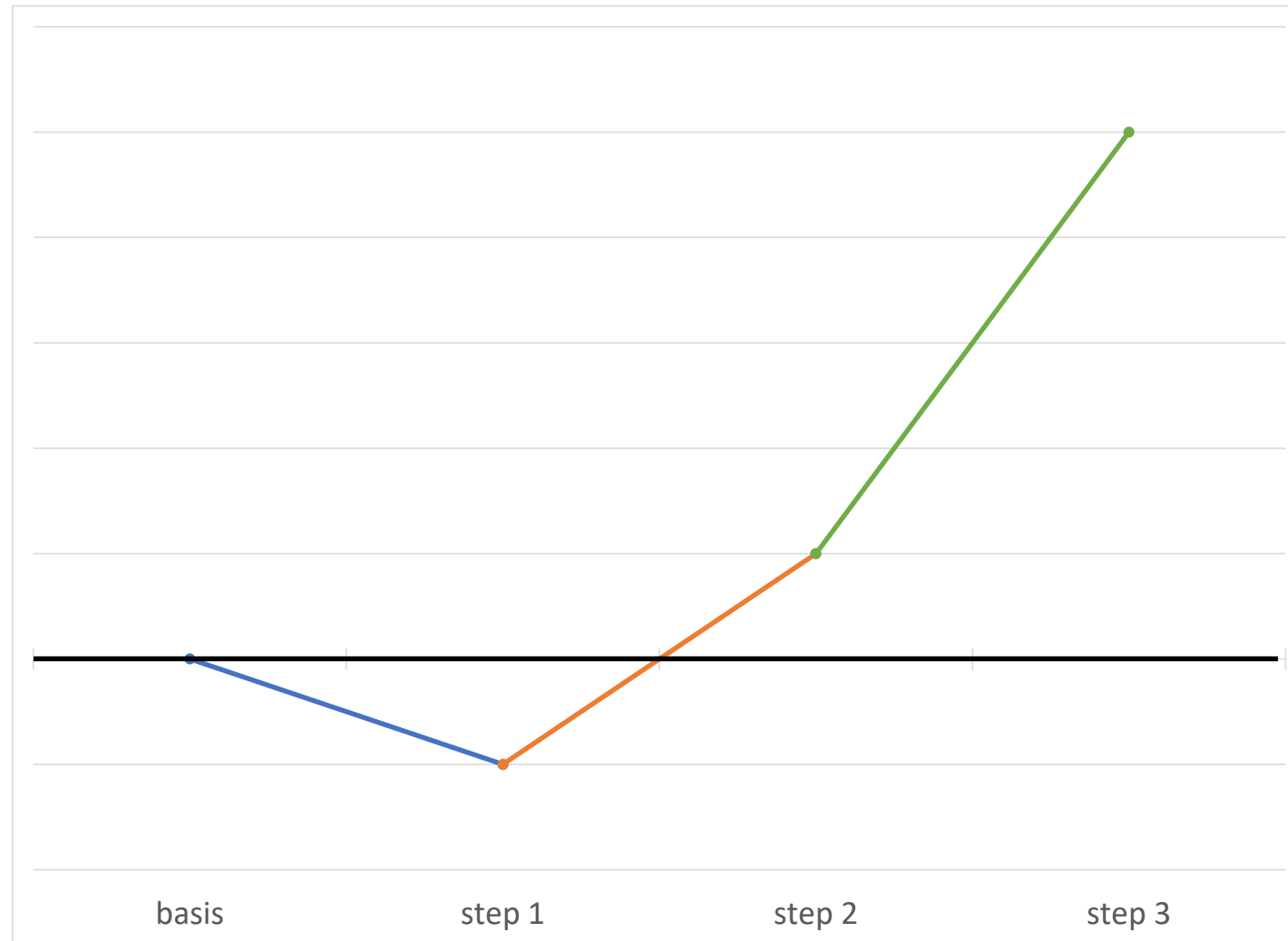
Production cost per kg



Indicative long-term average margin per kg



Cost effect of increasing welfare steps (*schematic*)



Steps towards improved animal welfare

Low-hanging fruit:

- Group housing pregnant sows
- Enrichment material
- Non-castration
- Partly solid floor
- Biosecurity measures

Middle-hanging fruit:

- Lower density
- Reduced NH_3 in air
- Free farrowing
- Daylight

High-hanging fruit:

- Intact tails
- Outdoor
- Less proliferative genetics
- Organic

Functioning of the Beter Leven supply chains

- Retailer -> processor -> farmers (sometimes in farmer organizations)
- Farmers & processor have annual contracts (tacitly extended per year): volumes, requirements, payment
- Processor is linking pin
- Payment: 50% conventional market price + compensation for additional costs, 50% full cost of production -> cushioning market fluctuations
- About half of the pig can be sold as Beter Leven certified products → valorization very important to prevent strong price increase for retailers



ELK VARKEN EEN STER



Vertrouwd van dichtbij, natuurlijk met minimaal
1 ster Beter Leven keurmerk.



How to adopt a higher welfare standard?

Some elements



A close-up photograph of several pink pigs in a metal cage. The pigs are looking out from behind the bars. One pig in the foreground has a dark eye and a dark patch on its face. The text "Take-home messages" is overlaid on the left side of the image.

Take-home messages

What did we present?

- Attention to animal welfare found in developed world
- Prefer private standards over public
- Level playing field against competitive distortion
- Demand-driven development of Welfare+ programs
- Valorization challenge
- Export destinations might demand sooner or later
- Start with low-hanging fruit

Typical stakeholder roles

- Government: vision, goal-setting and facilitating
- Retail and NGO's to encourage consumer demand
- Industry: pivotal role in implementation
- Farmers: consider it as an opportunity
- NGO's: push forward, but wisely
- And let it happen as CO-OPERATION



Thank you for your attention

Robert Hoste

Senior pig production economist

Wageningen University & Research, the Netherlands

Mail: robert.hoste@wur.nl

LinkedIn: www.linkedin.com/in/robert-hoste-0574a219

