



A world tour of swine welfare: What's driving change in the major pork producing countries

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Overview

	North America		European Union		Asia		Latin America
	Canada	USA	Germany	Spain	China	Japan	Brazil
National herd (million head)	14.03	75.4	25.4	32.3	406.5	9.1	37.35
Pork produced (million tonnes)	2.2	12.8	5.1	5.1	27.15	1.3	4.44

Source: Statistica, Europarl.Europa.eu; figures 2019-2020.

World tour of Welfare: Focus areas



Sows: Gestation & farrowing



Painful procedures



Space & flooring



Enrichment

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Animal Protection & Welfare

- Canada & USA: Animal protection legislation
 - Farm Animal Care – Codes or industry guidelines
- European Union: EC Council Directive (2008/120/EC) – minimum standards for the protection of pigs.
- China: Animal Husbandry Law of People's Republic of China (2015)
 - Guidelines for Animal Welfare – in progress, Chinese Vet. Medical Association.
- Japan: Act on Welfare and Management of Animals (1973)
 - Standards relating to Care and Keeping of Industrialised Animals (1987)

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Sows: Basic requirements

	North America		European Union		Asia	
	Canada	USA	Germany	Spain	China	Japan
Breeding	Up to 35 days	Stalls*	Stalls*	Stalls	No requirements	
Gestation	Groups	Stalls/Groups	Groups	Groups	No requirements	
Gest. Space	Recommendations*		Requirements		No requirements	
Farrowing	Crates		Crates*		No requirements	
Farrow: Space	Quantitative requirements not set: Varying					

North America: Gestating sows

Canada: Code requirements

- Requirement for group housing
 - New builds, barns brought back into use
 - Breeding stalls permitted up to 35 days

USA: Legislated

- 'Group-housing' legislated requirement in 10 states
 - Largely: A greater freedom of movement required
 - Breeding stalls permitted – minimal limits

Gestating sows: North America

Space allowance: Recommendations

Group Description	Partially Slatted floors		Solid Bedded Floors	
	m ²	ft ²	m ²	ft ²
Gilts	1.4-1.7	15-18	1.5-1.9	16-20
Sows	1.8-2.2	19-24	2.0-2.4	21-26
Mixed (Gilts & Sows)	1.7-2.1	18-23	1.9-2.3	20-25

USA: No* space requirements

- Industry guidelines – National Pork Board
- Pork Quality Assurance
- *California: Proposition 12, in force Jan . 2022 – legislates space

Proposition 12: California

Farm Animal Confinement Initiative:

- 1) Establish minimum space requirements based on square feet
- 2) Ban sale of products from animals kept below the minimum space requirements
 - 'Groundbreaking' characteristic

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Proposition 12: Space requirements

Minimum space requirements for breeding animals:

- 24sqft/2.23sqm per animal in gestation & breeding
- Breeding: Temporary confinement must not exceed
 - 6 hours in 24 hours
 - 24 hours in a 30 day period

Less than 1% of production meets requirements (National Pork Producers Council, 2021)



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North America: Farrowing

Canada: Code of Practice

Crated sows

- Code – requirement for sow to have freedom of movement within crate
- Stand up, lie down, move forward /backward unhindered
- Not touch sides of crate
- Not be housed in crate for more than 6 weeks.

Piglets?

- An area to retreat to when the sow moves



North America: Sows - Flooring

Flooring must minimize slipping, not cause injury or suffering

- Open to interpretation for gap/slat width
- Fully or partially slatted

Science:

- Slatted floors create more injury (Pluym et al. ref)
- Pigs show preference for floor types
 - Solid – choice and shaping lying
 - Temperature and hygiene interactions



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European Union: Gestating sows

Breeding sows and gilts: Since 2013 requirement

- Group housed following four weeks post-breeding until one week before farrowing
- Housing in breeding stalls permitted up to four weeks

Germany 2021: New countrywide regulations in force February

- Sows must not be confined to breeding stalls
- Breeding area space allowance: 5m²/animal
- Eight year transition period: required 2029.

European Union: Gestating sows

Space allowance

Gilts: 1.64m²

Sows: 2.25m²

Group size interaction:

<6 animals: increase space allowance by 10%

>40 animals: decrease space allowance by 10%

- Interaction between use of space & social behaviour
- Minimum pen wall length: 2.8m
 - <6 individuals in group: minimum wall length of 2.4m

European Union: Gestating sows

Space allowance

Gilts: 1.64m²

Sows: 2.25m²

Solid flooring must be given to gilts & sows

Gilts: 0.95m²

Sows: 1.3m²

- Continuous solid flooring – maximum 15% drainage holes
 - Gap/slat measurements set: Max width 20mm;
 - minimum gap: 80mm

European Union: Farrowing sows

- Farrowing crates- standard indoor housing system
 - Piglets must have:
 - Space to lie as a group at one time
 - suckle
 - protection from the sow
 - a solid or bedded lying area
 - water provision



European Union: Farrowing sows

A move to free-farrowing of loose lactation systems expected

- Demand: Not able to fulfil the current demand for loose sows
- Environmental requirements
 - Limitations to growth in outdoor production of piglets
- Science is delivering answers – how to make this work



Free farrowing



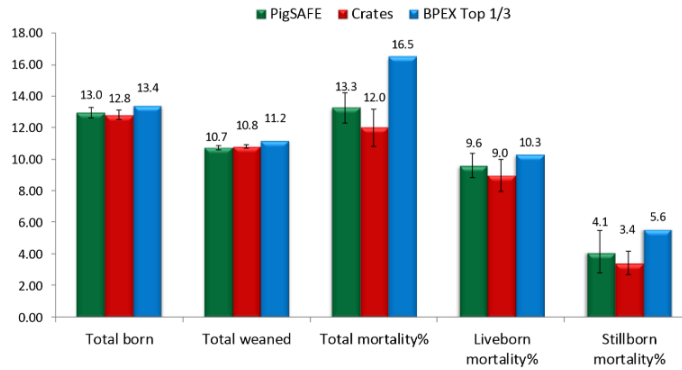
Loose lactation/Temporary crating



Group lactation

PigSAFE free farrowing pens vs conventional crates: Performance under commercial conditions

PigSAFE = 140 litters ~10% gilts
Crates = 164 litters

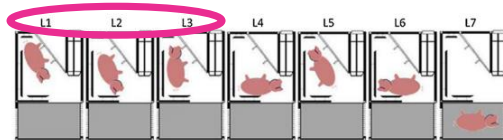
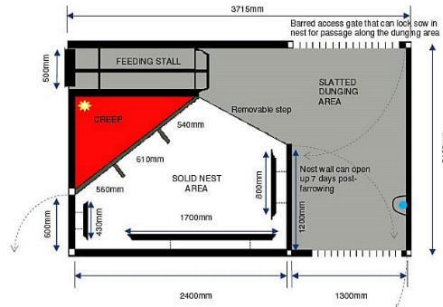


No significance differences in piglet survival

Baxter & Edwards, (2016) Free farrowing workshop, Belfast

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European Union: Farrowing sows



Baxter et al. (2015) *Appl. Ani. Behav. Sci.* 169, 9-16.

Germany:

- Loose lactation for sows by 2036
- Minimum pen: 6.5m²
- Temporary confinement permitted

Confinement of sows for four days after farrowing reduced mortality

Table 2
Effect of confinement before and after farrowing on piglet mortality to day 7. Values are presented as estimates \pm SE.

Day 114 of gestation to end of farrowing (day 0)	Confined		Loose		P-value
	Confined (CC)	Loose (CL)	Confined (LC)	Loose (LL)	
Day 0 to day 4					
Sows, n	30	32	28	30	
Parity (no.)	3.4 \pm 0.36	3.5 \pm 0.35	3.5 \pm 0.37	3.5 \pm 0.36	0.99
Live born (no./l)	17.1 \pm 0.48	16.6 \pm 0.46	16.8 \pm 0.50	17.1 \pm 0.48	0.83
Mortality before litter equalization (%)	5.0 ^a \pm 0.92	6.6 ^a \pm 1.06	5.7 ^a \pm 1.03	11.3 ^b \pm 1.44	< 0.001
Equalized litter size (no./l)	13.3 \pm 0.28	13.5 \pm 0.27	13.3 \pm 0.29	13.6 \pm 0.29	0.84
Mortality from litter equalization to day 4 (%)	5.0 ^{ac} \pm 1.07	9.0 ^b \pm 1.39	3.2 ^c \pm 0.87	7.5 ^{ab} \pm 1.31	< 0.001
Mortality day 4 to day 7 (%)	4.9 \pm 1.09	2.7 \pm 0.77	3.8 \pm 0.99	2.1 \pm 0.69	0.10

^{a-c} Values within a row with different superscripts differ significantly at $P < 0.05$.

Liveborn mortality in four days following farrowing:

Loose: 7.5%

Confined for four days post farrowing: 3.5%



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Hales et al. (2015) *Livestock Science*, **171**, 64-72.

Painful Procedures: Tail docking & Castration

Canada:

- Analgesics must be provided for both procedures

USA: No pain control required

- No pain control available
- Industry body: encouragement for prescription use

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Painful Procedures: Tail docking & Castration

European Union:

Council direction (2008/120/EC)

- Analgesics must be provided for pigs >7 days of age
 - Tail docking
 - Castration
- EU members voluntarily agreed to end castration in 2018
 - Not prepared or possible
 - Available alternatives not being addressed

Germany: January 2021

Male piglets castrated under general anesthesia

- Imported male piglets: Must be provided with pain control
- Cost: 1.9 – 4 euro/piglet: surcharge awarded to cover
- Tail docking performed without pain control

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Castration

	Male pigs not castrated (%)	Immunocastrated (%)	Surgical castrated (%)
Germany	5	5	90
Spain	80	5	15
Canada	<1	13	86
USA	<1	5	94
Brazil	<1	89	10
China	0	0	100
Japan	0	0	100

Source: De Bryn et al. (2016), Porcine Health Management, 2: 29; Zoetis, 2021.

Environmental Enrichment

“An improvement in the biological functioning of captive animals resulting from modifications to their environment,” (Newberry, 1995)

Changing the environment must benefit the animal



Newberry (1995) *Appl. Ani. Behav. Sci.* 44, (2-4), 229-243.

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European Union: Enrichment

- Sows and gilts: Permeant access to manipulable material
- Requirement for fibre: Reducing sow hunger
 - Loose – hay racks
 - In feed – increases bulk
- Farrowing sows: access to nesting material
- Compliance and value to the pigs:
 - Not just does the pig have enrichment
 - Is the pig using and benefitting from the enrichment



North America: Enrichment

Canada: Requirement for enrichment

- Multiple forms
 - Social
 - Occupational
 - Physical
 - Sensory
 - Nutritional

USA: No requirement for enrichment

- Less consideration of behavioural needs in pig care

Verification & Added value: Quality Assurance Schemes

Animal welfare standards embedded in QA schemes



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Germany: Consumer requests

Industry initiative: increased animal welfare for farmed animals.



70% of consumers have heard or read about

93% of consumers agree initiative Tierwohl is:

“Good” to “very good” (German survey, 2018, Initiative-tierwohl.de/2021)

25% of German fattening pigs produced within the scheme

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Compensation



Mandatory: Basic Criteria must be met:

- Implementation compensation: \$3,000/farm*
- 6.25 cents/kg of fresh pork
- Fattening pigs: 6.25 cents/kg fresh pork
 - 6.28 euro/slaughtered pig
- Piglets: 4.07 euro/piglet raised
 - Divided between sow and piglet farm



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Above mandatory criteria: 20% extra space – additional compensation

Germany: State welfare labelling

- 81% of German consumers want a state animal welfare label (Federal Ministry Food & Agriculture, 2019)

Label covers:

- Space
- Provision of organic enrichment material for all life stages
- Tail docking
- Wean age
- Castration
- Welfare monitoring – via animal-based indicators
- Training in animal welfare
- Checks and monitoring of housing
- Transport
- Slaughter



Bundesministerium
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Spain

Interporc Animal Welfare Certification Scheme

- Tier 1 – EU regulations
- Tier 2 & Tier 3: Increases in space, enrichment, no painful procedures



- Independent welfare certification
 - Animal-based indicators
 - Not system based
 - >50 companies enrolled



	PRODUCTION SYSTEM	TYPE 1	TYPE 2	TYPE 3
Minimum surface area	Sows	2.25 m ² (+/- 10%)*	2.5 m ²	2.5 m ² + 1.9 m ²
	Young sows	1.64 m ² (+/- 10%)*	1.81 m ²	1.81 m ² + 1.9 m ²
	Farrowing crates	3.5 m ²	5.5 m ²	> 5.5 m ²
	Piglets < 20 kg	0.2 m ²	0.4 m ²	0.6 m ² + 0.4 m ²
	Fattening 85 - 110 kg	0.65 m ²	1 m ²	1.3 m ² + 1 m ²
	Fattening > 110 kg	1 m ²	1.5 m ²	2 m ² + 1.6 m ²
Pregnant sows in groups	Before 28 days of post-service	Obligatory after service	Obligatory after service	
Free roaming farrowing sows	Non-obligatory	After the 5 th day	After the 1 st day	
Access to the outside for sows	Non-obligatory	Non-obligatory	Obligatory	
Access to the outside for fattening	Non-obligatory	Non-obligatory	Obligatory	
Fattening bedding	Non-obligatory	Straw	Straw	
Lactation	> 21 days	At least 28 days	At least 42 days	
Enrichment materials	Wood, natural ropes, and the like	Straw	Straw	
Castration	Non-obligatory (≤7 days with analgesic; >7 days con anaesthesia + analgesic)	Non-obligatory (≤7 days with analgesic; >7 days con anaesthesia + analgesic)	Non-obligatory (≤7 days with analgesic; >7 days con anaesthesia + analgesic)	
Tail docking	Non-obligatory	Not allowed	Not allowed	
Teeth clipping	Non-obligatory	Not allowed	Not allowed	
Transport of piglets	At most 18 hours	At most 12 hours	At most 6 hours	
Transport of pigs	At most 18 hours	At most 12 hours	At most 6 hours	



IAWS: Technical regulation, 2020.

Welfare Programs: USA & Canada



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Comparison of schemes

	Certified Humane	Global Animal Partnership	Animal Welfare Approved
Sow housing	Groups	Groups	Groups
Flooring and space	2.25 - 3.5m ² /gilt/sow	No greater than 25% slatted floors. Space: 2.24 - 3.70m ² .	Bedding available at all times, 6 sq. m.
Enrichment	Access to manipulable substrate required at all times. Hanging objects also permitted in addition.	Bedding requirements	Outdoor access, ranging foraging areas required,
Tail docking	Permitted if needed.	Not permitted	Prohibited.
Castration	Permitted. No pain control required when performed under 7 days of age.	Permitted before 10 days of age. Pain control encouraged.	Permitted. No pain control required. Immunocastration prohibited.

Asia: Evolution of practices

- Consumers little consideration towards farm animal welfare
 - Religious beliefs– incompatible to killing: *Aigo* ethics
- Nature to be managed by humans
 - Preference for advanced farming – controlled environment & animals with enriched housing
 - Food safety
- Technology & Innovation:
 - Labour shortages
 - Aging population
 - Production costs
 - Environmental requirements



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Sato, (2016); Bao & Li, (2016)

Asia: Sow housing, pain control, space

- Modernization of production practices
 - Western approaches
- Specialisation: Efforts to increasing production
- Little consideration for animal welfare
- Recognition: Difficult to accommodate normal behaviour (Care and Handling Guideline for Animal Welfare, 2011, Japan)

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Oh and Whitley, (2011), Asia-Aust.J. Ani. Sci., 24, 1629-1636

Contributing factors to change: Asia

- Improving production: Looking to animal needs
- Food safety – connection to good animal care and well-being
- World Trade Organisation:
 - Opens questions on animal welfare & practices
- International Organization for Standardization: Animal Welfare management
 - Terrestrial Animal Health Code (OIE)
- Humane Society activity – informing consumers



Bao and Li, 2016

Asia: Environmental Enrichment

No requirements

Differing practices: some do provide more diverse & enriched environments



- Bedded pens:
 - Sand, rice hulls
 - Wallowing pits

Image: Kyodo Farm co. Ltd

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Asia: Value added products

Animal welfare links to product quality

- Advancement of production practices
- Enhanced food safety
- Consideration of animals needs

Zhejiang Qinglian Food Company Ltd. Committed to:

- Converting all sows to group-housing 2025
- Increasing space allowance/pig
- Providing environmental enrichment

Branded pork: higher quality product

8 RMB/kg pork higher than other pork products

“Higher welfare farming...promotes the quality and safety of our products,”

Mr. Jin, vice president, Qinglian Food Co.

(World Animal Protection case study report, 2021).



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Humane Societies: Actively informing

Survey: Chinese consumers

- 81% stated they want sows to be given freedom to move
 - Prefer groups over sow stalls
- 75% stated they would be willing to pay more for sows to be given space (WAP Asia survey, 2016).



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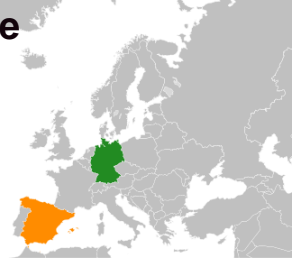
What drives change?

- Consumer questions on production practices
 - Humane society exposes
 - Food safety events: BSE
- Consumer surveys – stall housing never accepted
- Scientific advancements: understanding of animals
 - Ethics over livestock production
- Structures in place to review and adopt improvements
 - Shaped by consumer pressures

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Germany vs Spain: Managing change

- Spain now largest pig producer in EU
 - Strong, integrated systems
- Germany: Evidence of shrinking
- Advanced Welfare legislation – right to produce
- No evidence pace of change being managed in Germany:
 - Political will for change
 - African Swine Fever
 - Pig prices
- Cost coverage: still challenging
- Spain: Observes EU changes – minimum levels



Brazil: Pig welfare standards for market access

- Fourth largest exporter of pork
- Interest to adopt welfare standards – harmonise to international markets
- Uptake and adoption ‘unofficially’
- New pig welfare legislation incoming: ‘Establish good animal management & welfare practices on commercially raised swine farms.’
- Brazil looking to raise animal welfare in all areas (Dias et al. 2015, Animal Production).
- Carrefour Brazil, committing to pig welfare improvements
 - World Animal Protection – communicating demand.



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Market Drive: Industry advancement

- Market demand
 - Consumer choice and spending
- Added value products
- Niche market
- Profitable production
 - Away from lowest cost of production
- Leadership industry representation & added value



Trust: Industry vs Government led

- Industry initiatives prevalent
 - Are they accepted?
- Third party verification – required?
- Government oversight – inevitable?
 - Bring increased requests
 - Harder to manage
 - Presents challenges for market driven development.

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What can be learnt?

- Obligation/expectation: provide appropriate production practices & care
- Safe, trust, transparency
 - Consumers to know how their food is produced
 - Welfare – part of product quality, part of trust
 - Welfare is here to stay – in this capacity
- Industry initiatives: Valid approach to delivering animal welfare certification
 - Third party verification – a good idea
 - Process for gradual, continual improvement
 - Government oversight – if change is not satisfactory?
 - Delivering appropriate change?
 - Right to produce – will play a strong role in some countries.



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What can be learnt?

Welfare costs:

- Building infrastructure changes
 - Operating costs
- Changes must be managed to prevent contraction.

Canada?

- Baseline level of animal welfare will raise to acceptable standards to global competitors.
- Given pork markets: Likely greater development of domestic niche markets for specific consumer wants in welfare.
 - Baseline level may be influenced by animal care and product quality perceptions in global markets, and right to produce.

Swine Welfare Research Chair



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Swine Welfare Research Chair

- Four research pillars:
 - Methods to improve welfare in current systems
 - Methods to monitor progress



- Not system comparisons
- Understand how to optimise welfare in existing systems

Specific program objectives

- 1) **Goal 1:** To understand how early life management contributes to pig robustness, sociability and welfare outcomes in the growing pig
- 2) **Goal 2:** Identify if promotion of play, can increase physiological and psychological robustness
- 3) **Goal 3:** Identify and validate biological markers indicative of welfare states in swine
- 4) **Goal 4:** Understand the value of animal-based post-mortem indicators of welfare

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