Loose housing of lactating sows

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Danish Pig Levy Fund
SEGES INNOVATION

Hyper-prolific high performance sows

- Selection criteria for sows have not yet taken account TC/FF
- But we ‘want’ sows
  - Capable of nursing piglets
  - Low input – work
  - Low input medication
  - Long and large life performance
- We expect them
  - To have uncomplicated farrowing
    - But it is a marathon – a farrowing takes 4-8 hours
  - To produce significant amounts of milk continously
    - 16 kg/day on average -
  - To release many fertile eggs

I just gave birth to 25 liveborn piglets – took 8 hours

I’m producing 16 liter of milk every day

I’m carrying 18-32 fetuses

The future is not ‘only’ welfare
- it’s a more ***sustainable*** pork production

Environment / climate impact

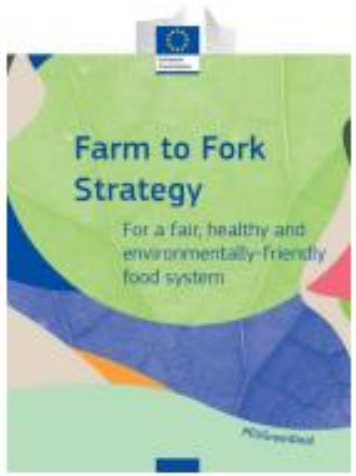
Social responsib

- Incl. animal welfare

Business earnings

Revision of EU animal welfare legislation.1

- Why do we revise the EU animal welfare legislation?
  - Science
  - Scope
  - Enforcement
  - Level of animal welfare
- Further objective: ECI ‘End the Cage Age’



European Commission

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Revision of EU animal welfare legislation.2

- Which are the pillars of the revision?

→ Scientific basis (EFSA)

→ Better Regulation (Commission)

evidence-based and transparent EU law-making, backed up by the comprehensive involvement of stakeholders

European Commission

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Revision of EU animal welfare legislation.3

- Which are the Better Regulation steps?

→ Fitness Check of current legislation

evaluation of the existing EU animal welfare legislation

→ Impact Assessment

economic, social and environmental impact of policy options

Inception Impact Assessment

provides Commission's understanding of the problem and possible solutions

European Commission

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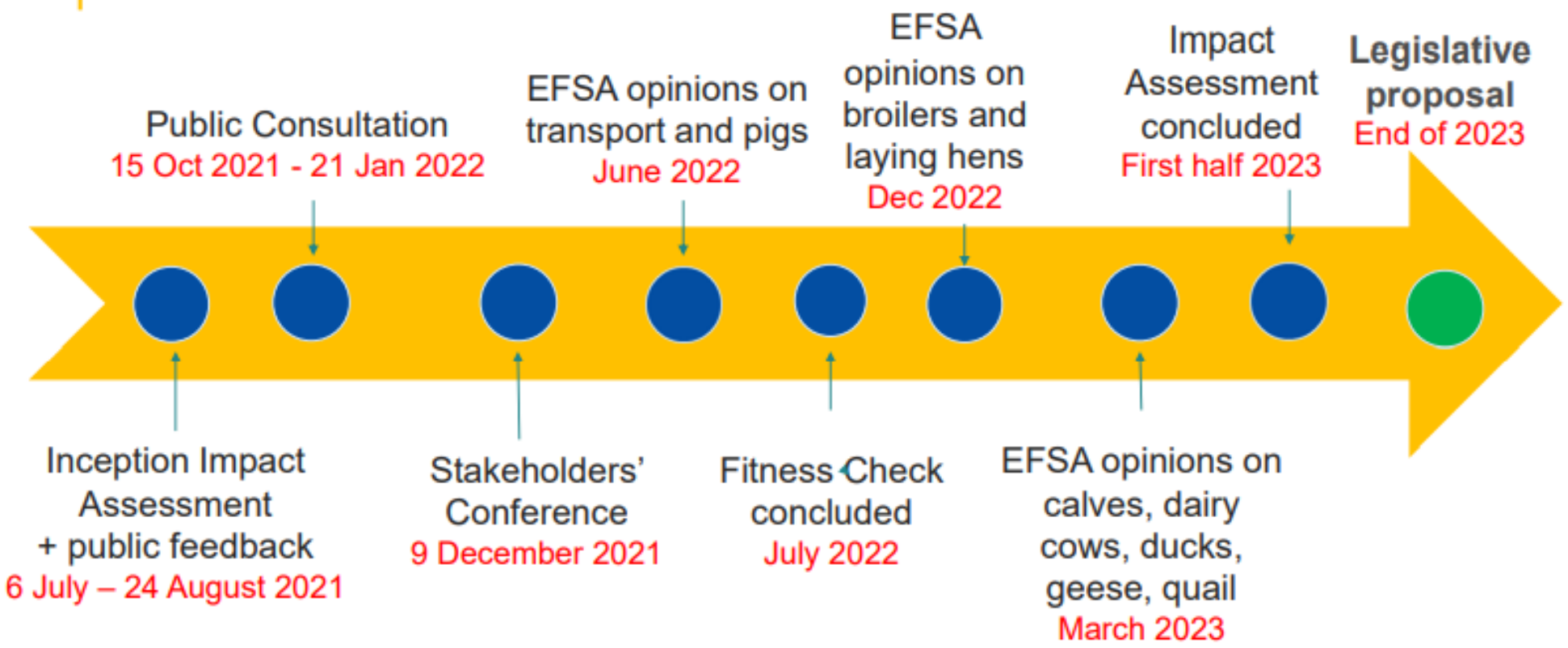
Timeline of the Revision



European Commission

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Mandate of the subgroup

- Which is the aim of the subgroup ?

→ to provide technical expertise and opinios to the Commission for the improvement of pig welfare at farm

international implications of opinions to be taken into account

- In which way will the subgroup function ?

→ examine the Inception Impact Assessment options

identify additional options, if any

discuss possible elements of future legislation

European Commission

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Inception impact assessment

According to the F2F Strategy, the EU animal welfare legislation should be revised in order to meet the following general objectives:

- Ensure a higher level of animal welfare;
- Align the EU animal welfare legislation with the latest scientific evidence;
- Broaden its scope and
- Make it easier to enforce

Questions to be answered by each topic

- What is the problem to be addressed by the option?
- What is the content of the options?
- Which alternatives have been implemented?
- What are the possible main impacts?
- How to mitigate negative impacts?
- Other options to address the problem?

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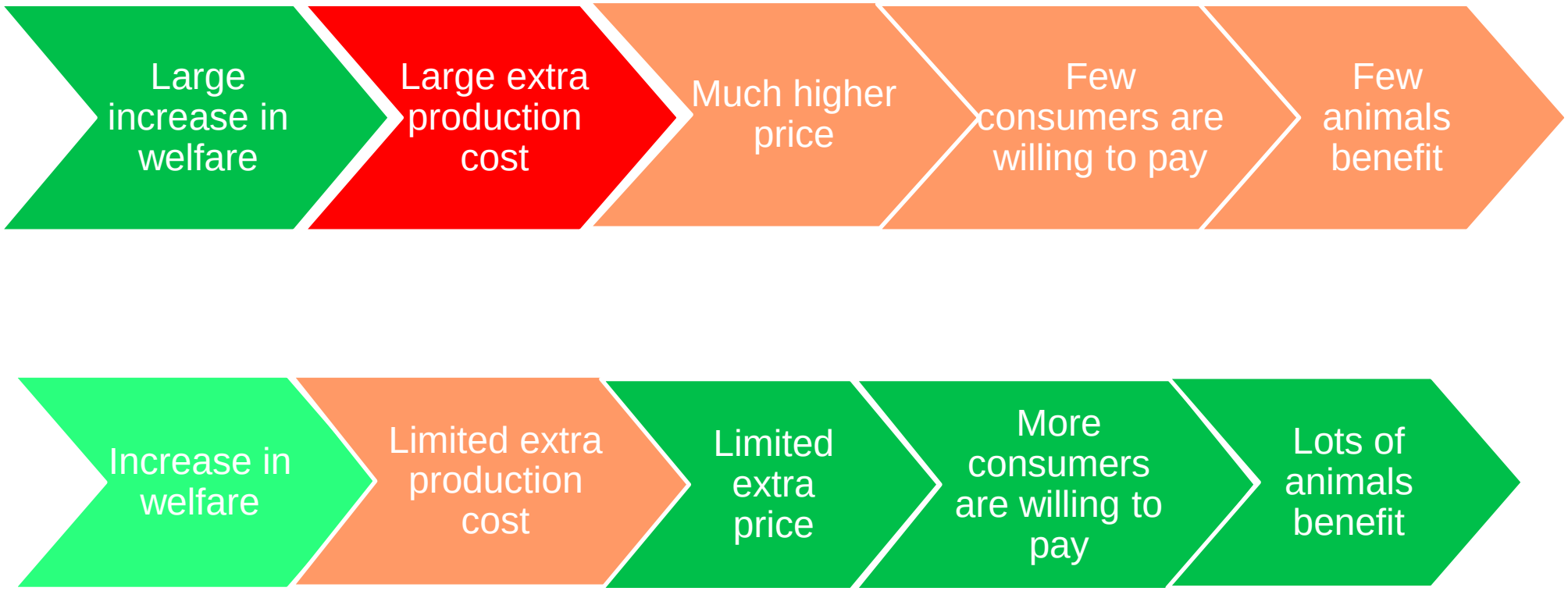
Significant investment - Market driven



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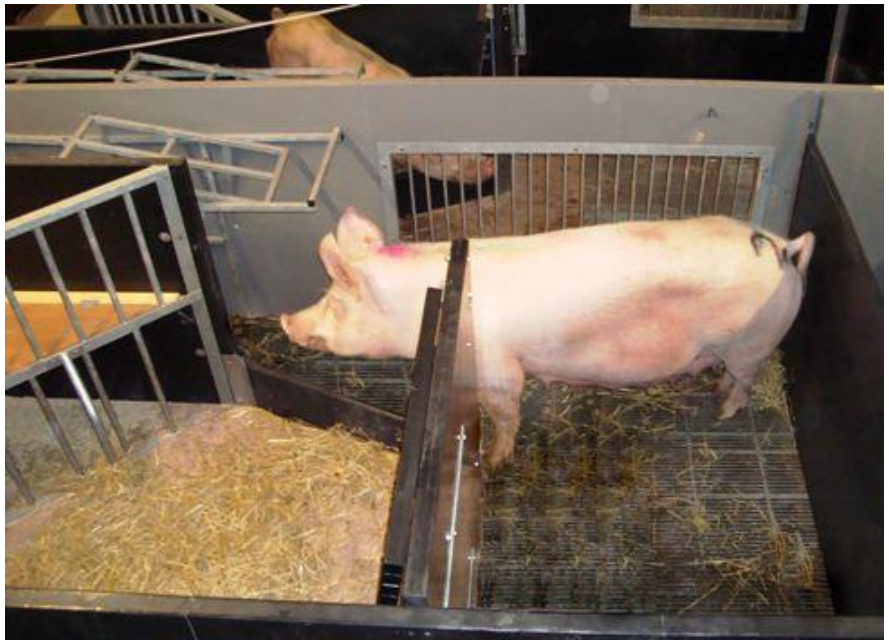
Challenge of change – housing of lactating sows from crates to loose

- From outdoor to loose indoor or from crate to loose?
- Solid floor vs. high level of hygiene – or both?
- Large pens – large investments - few farms?
- Smaller pens – fully slatted – cheap – many farms?
- Only building once! Need to consider long term political and market situation (eg caged layers)



Critical points

Before investment

- Decision making
- Key decisions

Daily management

- Calm handling of sows
- Use of confinement

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Loose housing of farrowing and lactating sows

Problem to be addressed:

- Loose housing has limited prevalence – except in countries with legislative enforcement
- Challenges
  - Increased risk of crushing of neonatal piglets
  - Increased cost
  - Increased emissions
  - Limited readiness to pay a premium
- Potential
  - Impoved ability to perform natural behaviours
  - Improved access to the udder
  - Improved acceptance of pig industry by society

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Options or alternatives

- Zero-confinement (free farrowing)
  - Common in countries with legislative enforcement
  - Used in research such as the UMB-pen and PigSAFE
- Temporary confinement (free lactation)
  - Accepted in countries with up-coming legislative enforcement
  - Two categories of pens
    - Designed for loose sows – with an option to confine
      - SWAP; ProDromi;
    - Farrowing crate that can be opened

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Why can’t we just….

- Why not just open up the crate?
  - The sows need more space – they cannot turn around unimpeded in an open crate
  - The sows turn away from feeder (and resting areas) when dunging

- Why not just copy pen designs from Norway, Sweden or Switzerland
  - They use zero-confinement – so ‘only’ need to design for loose sow
  - Increased litter-size leads to increased need for management in the first few days
    - Use confinement

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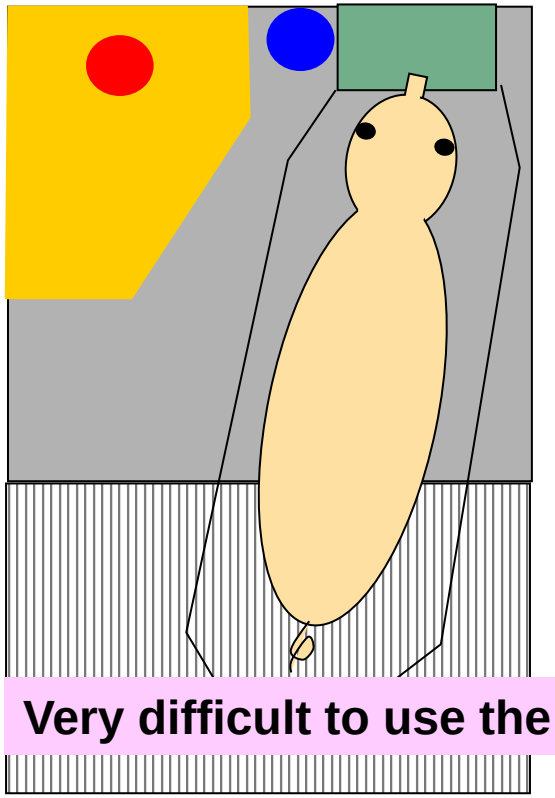
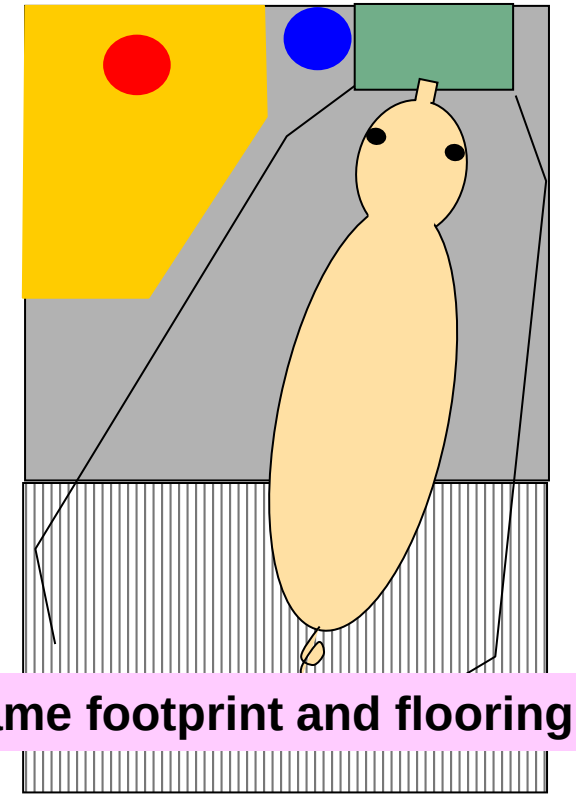
Can we prepare pens with crates?

The answer is ‘no’

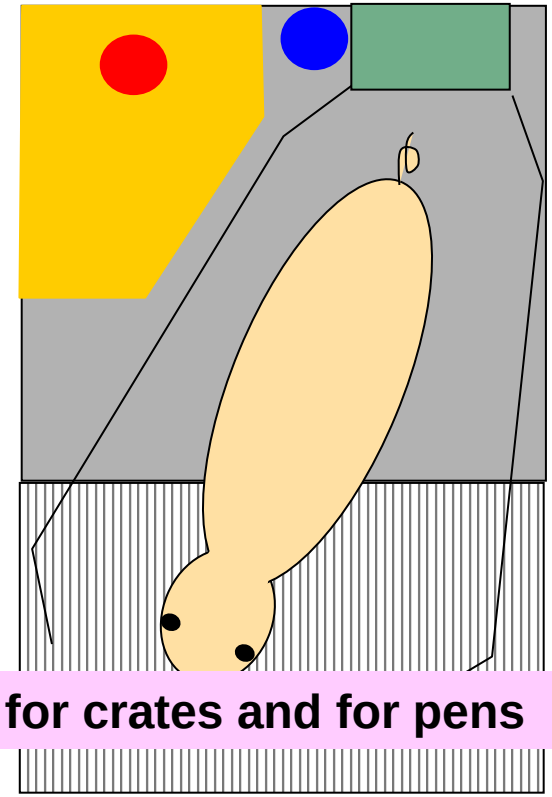
While the crate is **closed**, the sow eats and defaecates in the same position.



When the crates is **open**, the sow continues to eat at the trough.



But turns away from the trough when defaecating.



Very difficult to use the same footprint and flooring for crates and for pens

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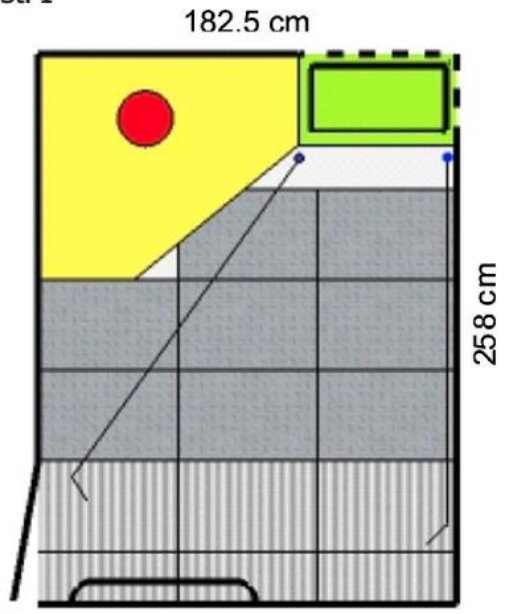
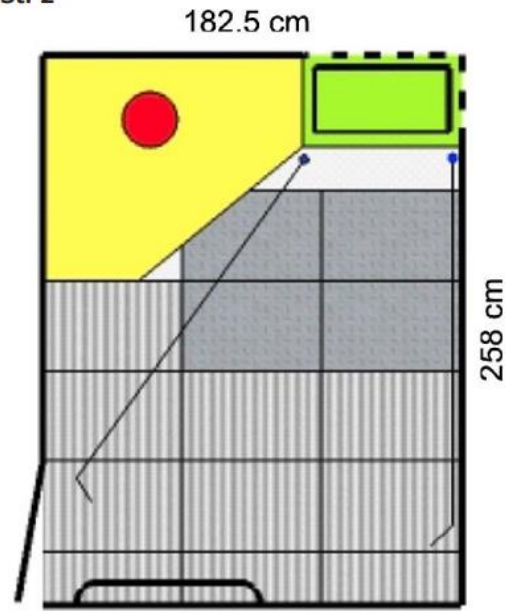
Hvad sker der, når vi åbner boksen?
Fire 'kombinationer'

Sti 1



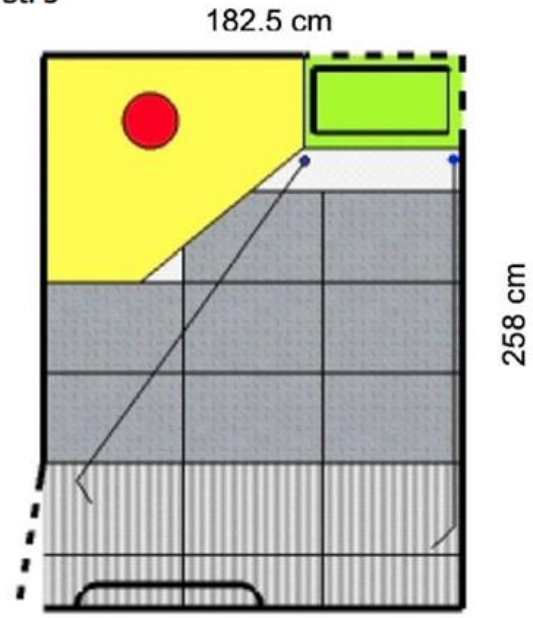
Figur 1.
2/3 drænet gulv (2 m^2) og lukket inventar i stilågen.
Billededatabase 2103

Sti 2



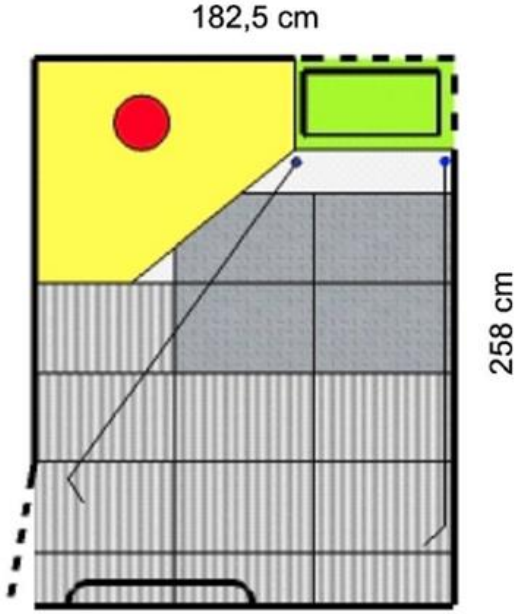
Figur 2.
1/3 drænet gulv (1 m^2) og lukket inventar i stilågen.
Billededatabase 2104

Sti 3



Figur 3.
2/3 drænet gulv (2 m^2) og åbent inventar i stilågen.
Billededatabase 2105

Sti 4

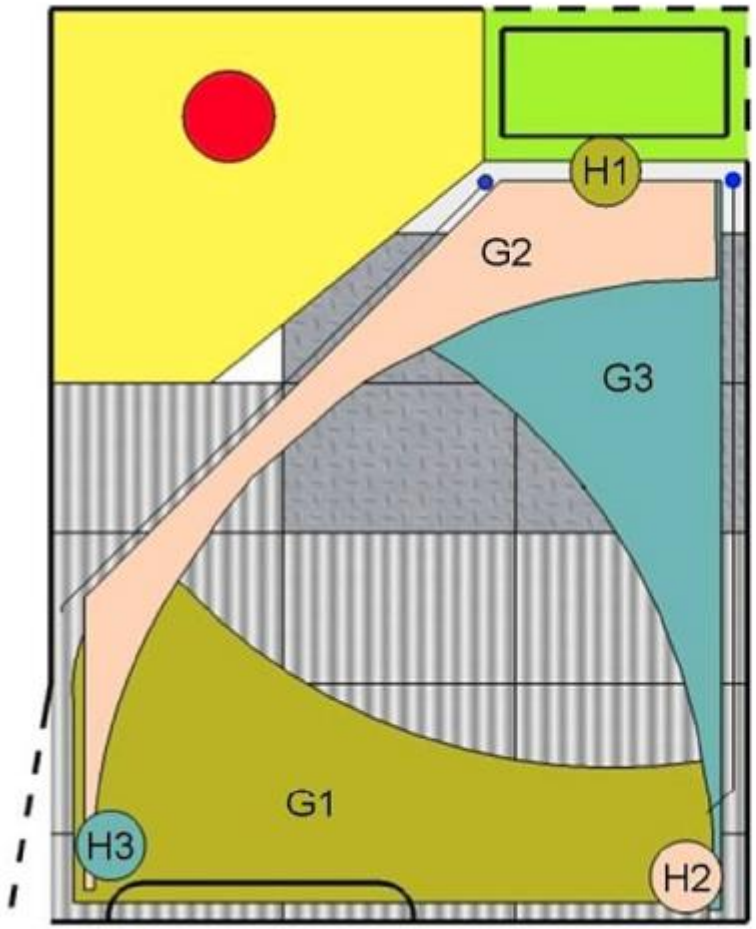


Figur 4.
1/3 drænet gulv (1 m^2) og åbent inventar i stilåge
Billededatabase 2106

SEGES INNOVATION

Medd. 849

Gødeadfærd



Figur 5.
Kombisti med angivelse af hovedets placering (H) ved gødeadfærd og det mulige område hvor gødningen kan afsættes (G).

H1/ G1: Hoved ved krybbe og muligt gødeområde (G1)
H2/ G2: Hoved ved endevæg modsat stilåge og muligt gødeområde (G2)
H3/ G3: Hoved ved stilåge og muligt gødeområde (G3)

Billededatabase 2107

SEGES INNOVATION

Medd. 849

Forsøg med betydning af krybbens placering

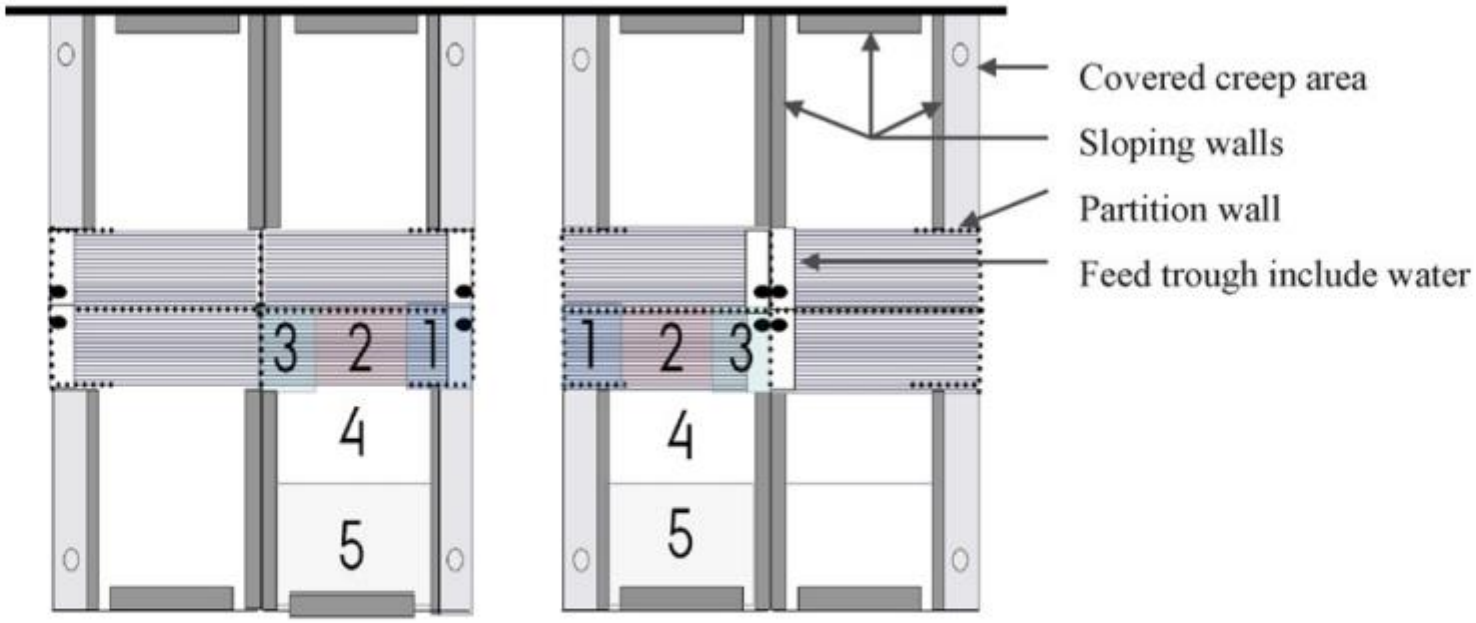


Fig. 1. The eight experimental farrowing pens with an illustration of the 5 observation areas for the sow's head position for each of the two feed trough position: Area 1: the first 0.5 m of the slatted area from the aisle. Area 2: the middle part of the slatted area (from 0.5 to 2.2 from the aisle). Area 3: the back area of the slatted floor (from 2.2 to 2.7 m from the aisle). Area 4: the first meter of the concrete. Area 5: the last meter of the concrete.

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Hoved-position ved afsætning af gødning

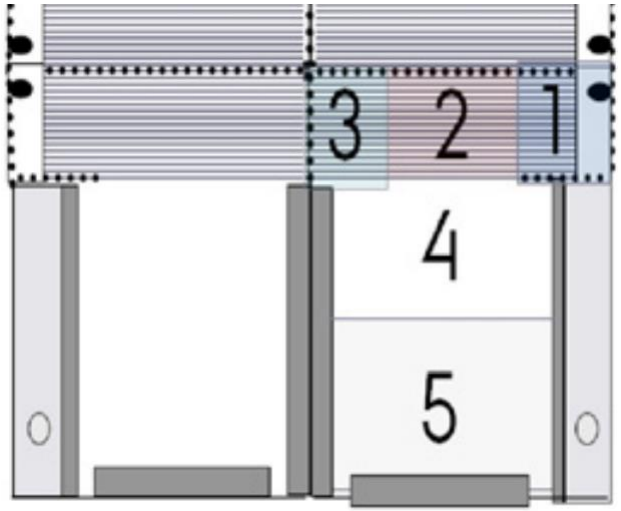

Table 1
The sow's head position when eliminating depending on the feed trough position (mean and confidence interval in percentage).

Head position	Feed trough position	
	3 Towards neighbouring pen	Towards aisle 1
Area 1	73.85 [68.48–76.35]a	10.30 [4.63–20.92] b
Area 2	6.39 [2.99–13.00]a	6.78 [3.19–13.78]a
Area 3	14.92 [12.42–20.30]a	79.15 [68.53–84.81]b
Area 4	1.89 [1.17–3.05]a	1.51 [0.93–2.44]a
Area 5	2.97 [1.52–5.71]a	2.27 [1.16–4.39]a

Different letters (a, b) in rows indicate significant differences ($P < 0.05$).

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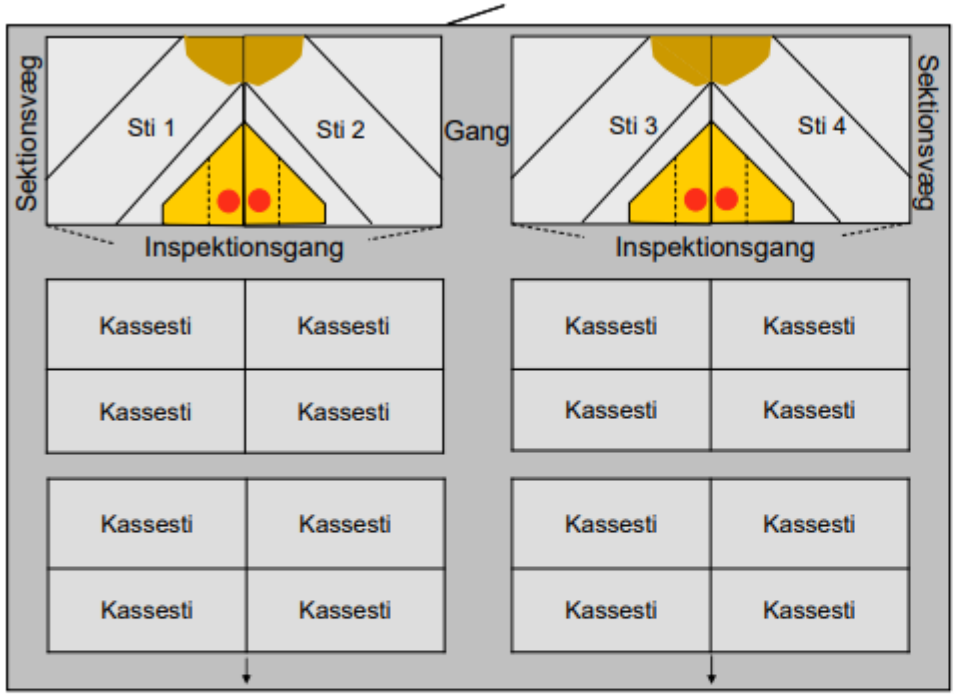
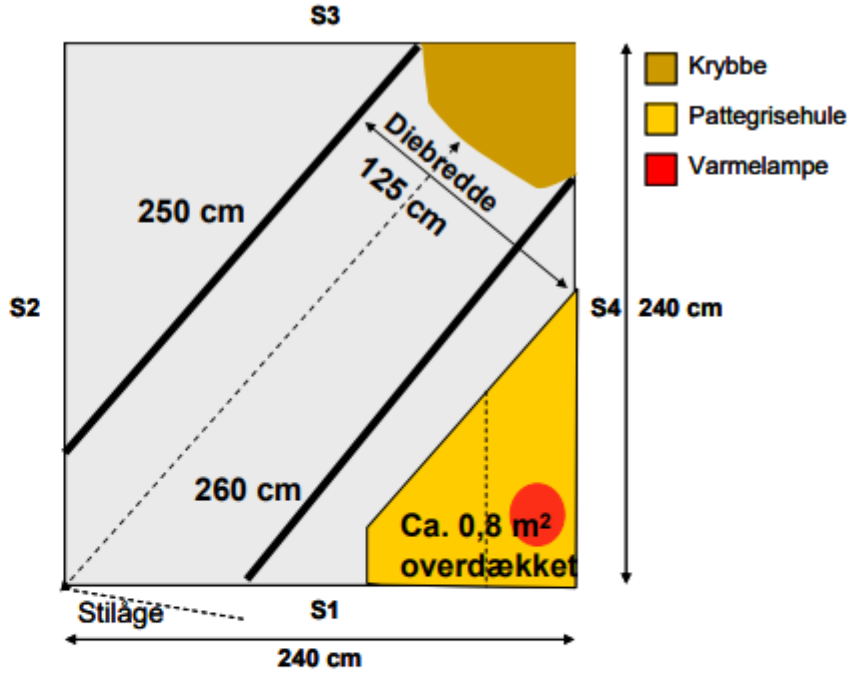
Kvadratiske stier



Figur 1. Principskitse af kombistiernes placering i sektionen.
Sti- og boksdimensioner fremgår af Figur 2.



Figur 2. Principskitse af kombisti.
S1: Stiside ved inspektionsgang,
S2: Stiside modsat pattegrisehule,
S3: Stiside modsat inspektionsgang,
S4: Stiside/inventar foran pattegrisehule.

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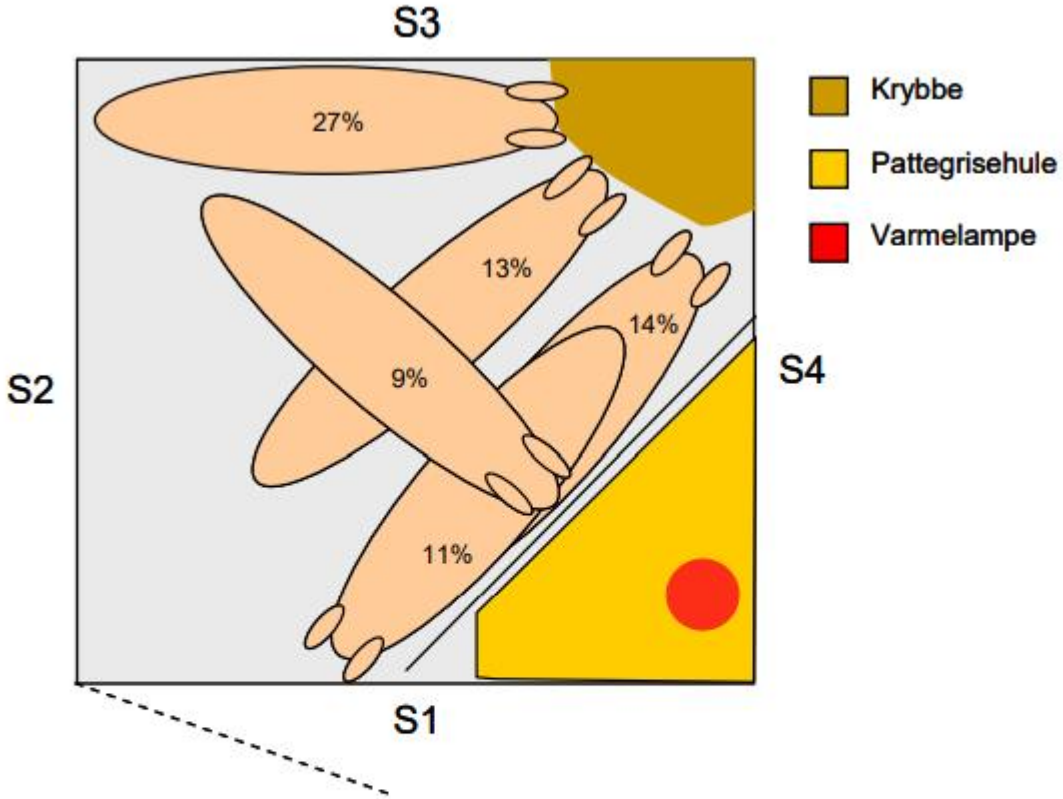
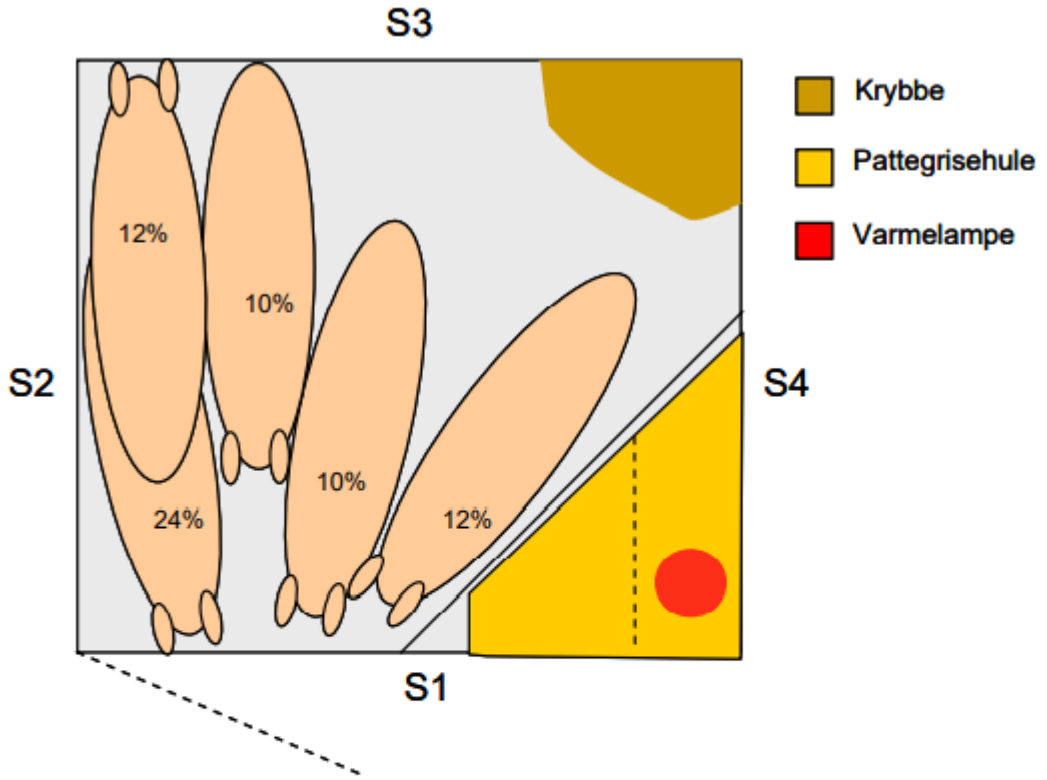
Resultater



Figur 5. De fem foretrukne liggepositioner.
S1: Stiside ved inspektionsgang,
S2: Stiside modsat pattegrisehule,
S3: Stiside modsat inspektionsgang,
S4: Stiside/inventar foran pattegrisehule.



Figur 6. De fem foretrukne gødepositioner.
S1: Stiside ved inspektionsgang,
S2: Stiside modsat pattegrisehule,
S3: Stiside modsat inspektionsgang,
S4: Stiside/inventar foran pattegrisehule.

SEGES INNOVATION

Tre forskellige stityper

Vissing Agro (Opti Farrow)

Gulvprofilen bestod af plastikspalter og støbejernselementer. Støbejernselementerne var placeret i midten af stien og med drænet gulv i området ved krybben. I huleområdet var spaltegulvet overdækket med en gummimåtte.

KU/VSP (SWAP version 2):

Gulvet var 120 cm fast betongulv, efterfulgt af 60 cm drænet støbejernsgulv og 120 cm med støbejernsspaltegulv.

STEWA (WING)

Gulvprofilen var en kombination af dels plastikspaltegulv i det meste af stien, drænede betonelementer under soen og et område med fast betongulv i pattegrisenes opholdszone.

Erfaring 1721

SEGES INNOVATION

Gødningsregistrering

Figur 1. Vejeceller i gyllekanal før montering af gødningsopsamlingsbakke.

Figur 2. Vejecelle.

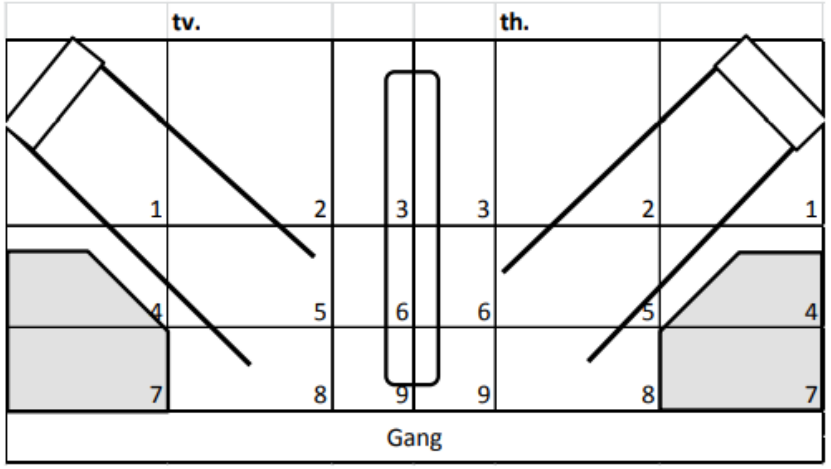
Figur 3. Gødningsopsamlingsbakke med gylleprop i hvert rum.

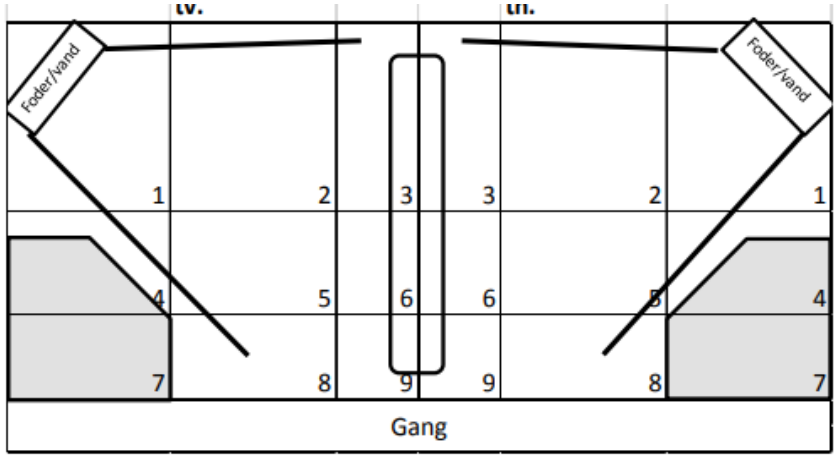
Figur 4. Gødningsopsamlingsbakke placeret under spaltegulvet.

Sti 1

Figur 6. So opbokset kortvarigt omkring faring.

Figur 7. Løsgående so.

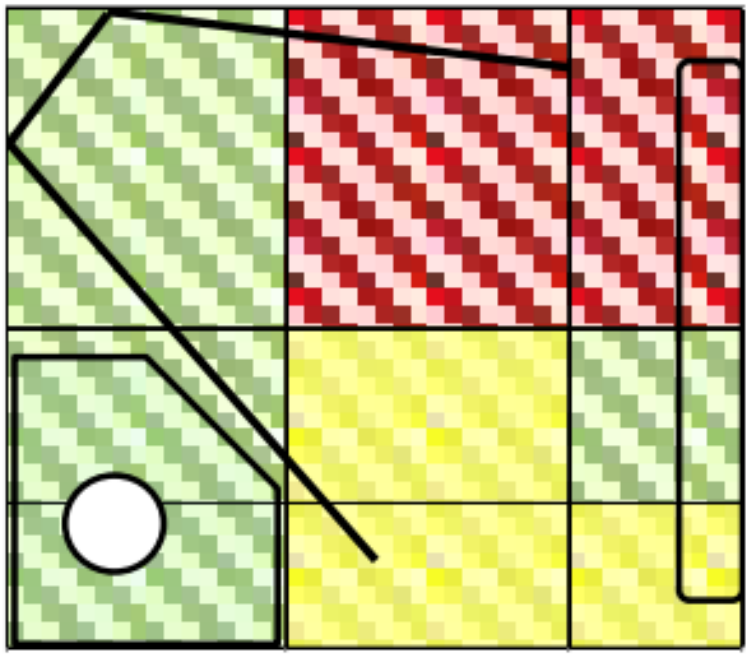




Erfaring 1721

SEGES INNOVATION

St1 1



Farvekode:			
Kg/m^2	0-50	51-100	>101

Figur 9. Gødningsopsamlingsniveau Vissing Agro (Opti Farrow)

Pens for loose lactating sows - 2022

- Danish pig producers
  - Ensure high level of productivity
    - Temporary use of confinement
    - High level of hygiene
    - Limited labour
- Square pens – equal-sided
  - Difficult for sows to part in different functional areas
    - Need fully slatted/drainde flooring
      - Increased emissions
      - Reduced opportunity to use straw etc
- Rectangular pens
  - More likely the sows will part in different functional areas
    - Design and dimensions are important
    - Not all sows read the manual
    - Can we guide them
      - Increase the attractiveness of resting area for rest
      - Increase the attractiveness of slatted area for dunging

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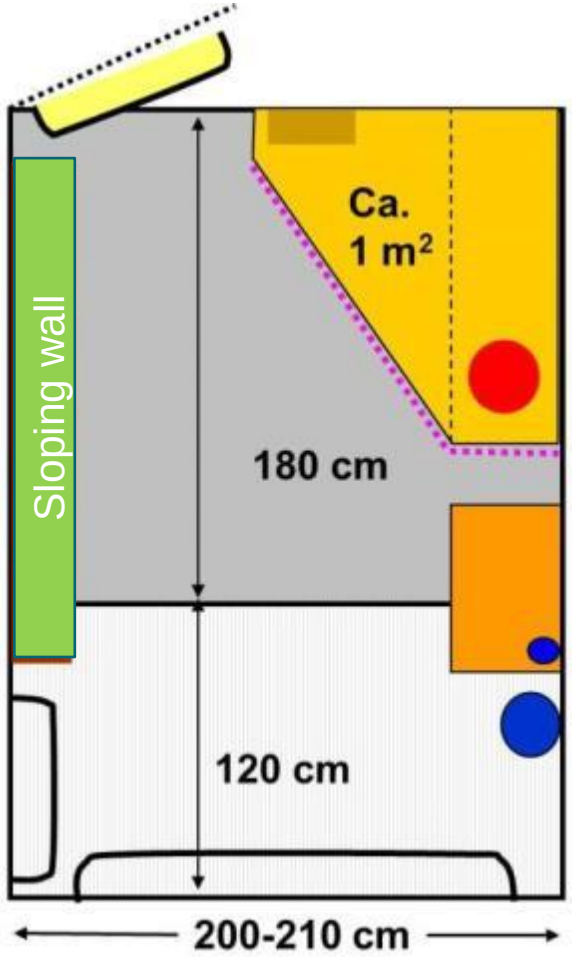
Free farrowing or option to confine temporarily?

- Initially - Pen meeting needs of sow, piglet, caretakers



1. Creep area adjacent to the pathway

- Piglets are checked everyday
  - Safety
  - Fast
  - Limit risk of disease transfer

2. Sow-resting area next to creep

- The sows choose to lie next to creep
  - Partly solid floor – at least in Denmark
    - Reduce environmental impact
      - Partly solid floor is cheaper than aircleaners etc
    - Warmth – dry floors before farrowing – and piglet survival
    - Keep nestbuilding- and rooting material in pen – not in slurry

3. The sow walks away (turns away) from feeding area, when defaecating

SEGES INNOVATION

Three commercial herds

- Ok small scale
- Three herds – results

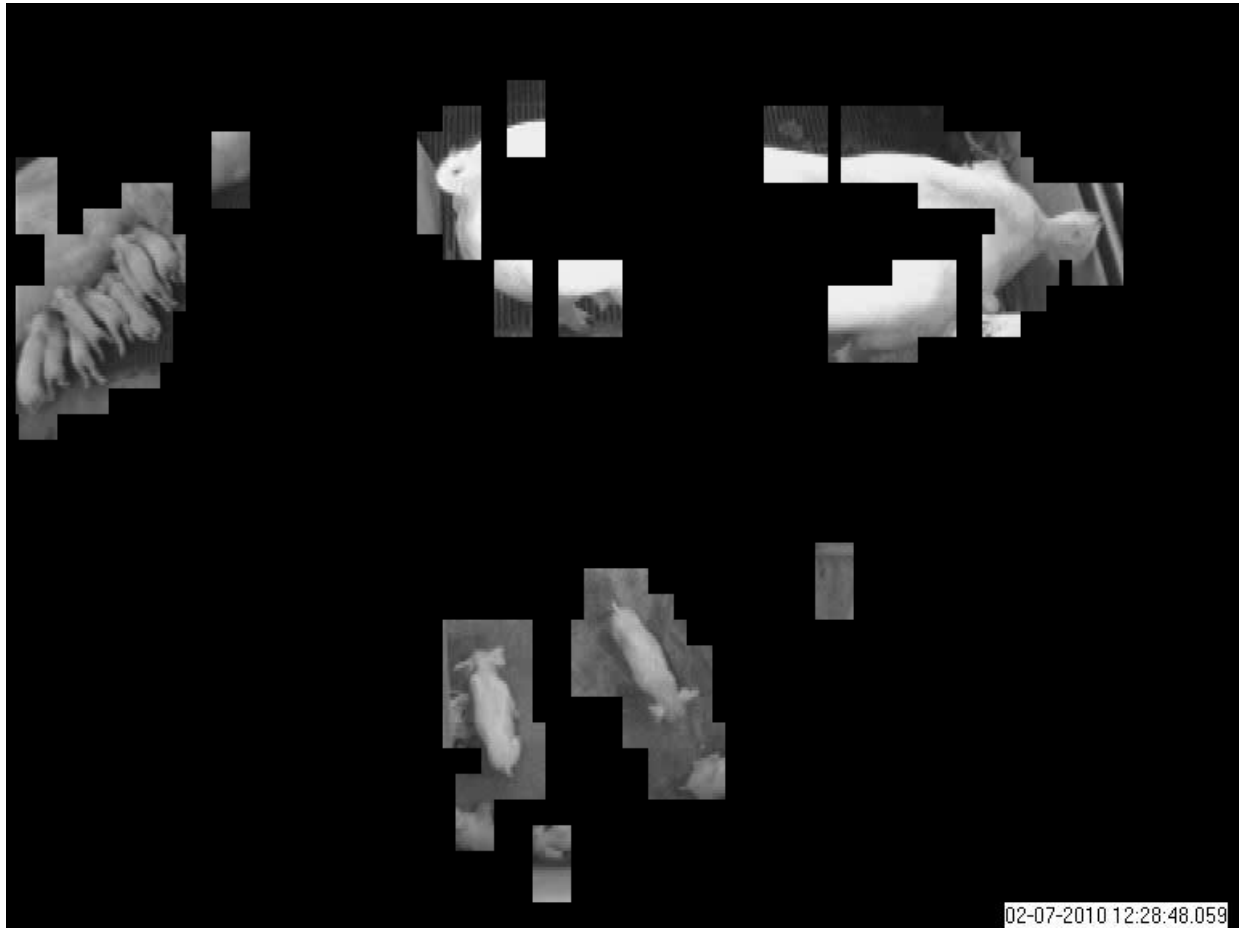
Piglet mortality, expressed as numbers, in crates and pens in Herds A, B and C.
White bars=mortality before litter equalisation, Black bars=mortality after litter equalisation. P-value for herd × housing interactions: mortality before equalisation: P =0.107; mortality after equalisation: P =0.031. Black bars with different superscripts differ (P <0.05).

Animal (2014), 8:1, pp 113–120

SEGES INNOVATION

Piglet survival

- Sow versus pig welfare
- ‘Killer’ sows
  - ~50% of the loose sows are ‘Killers’
  - ~20% of the sows in crates
- Identification of ‘Killer’ sows
  - Need to find them in time to save the piglets
  - Research-fishing-expedition (5 to 10 years??)
  - How many will we find?
  - Likely intervention = crate (50% of the sows?)

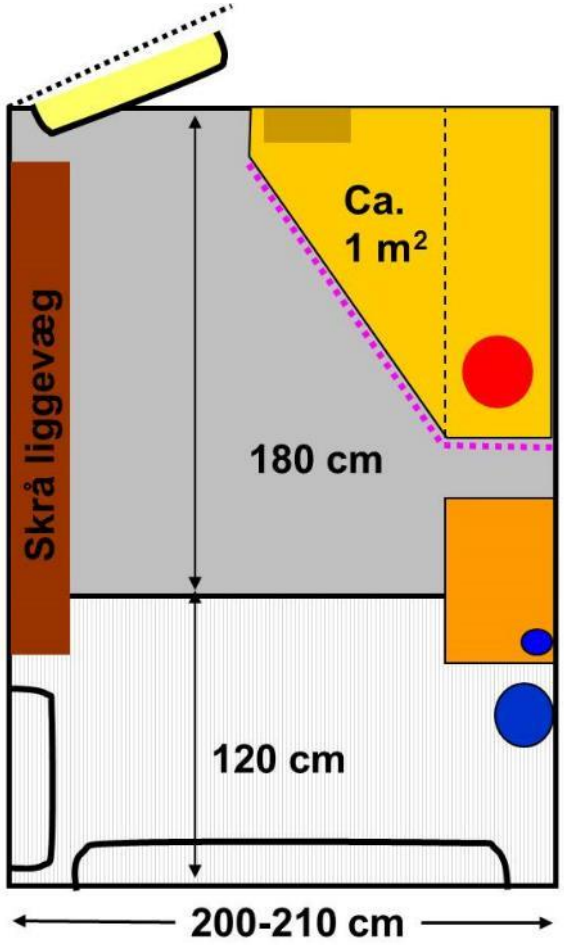


Impact of confinement?

SEGES INNOVATION

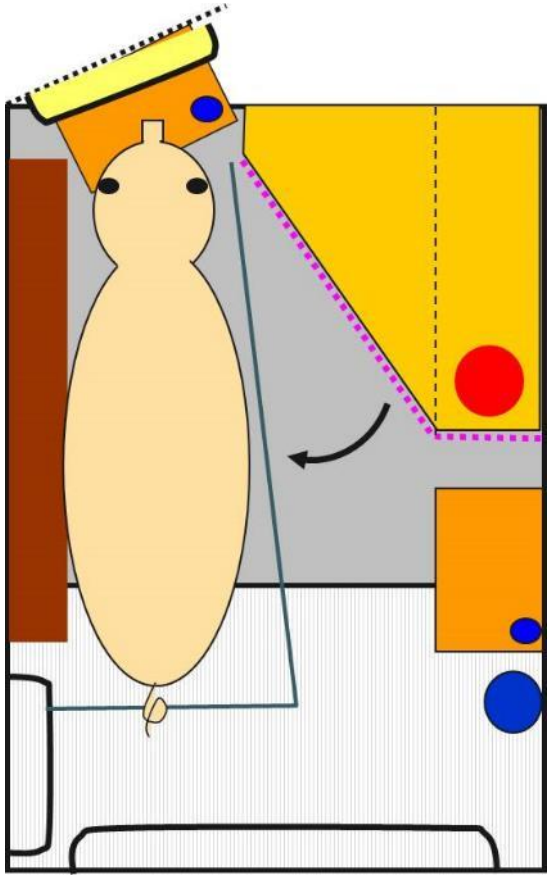
Two pen designs

FF = Free Farrowing



AU/DAWS/PRC +

SWAP = Sow Welfare And Piglet protection



UCPH/PRC

SEGES INNOVATION

Two designs

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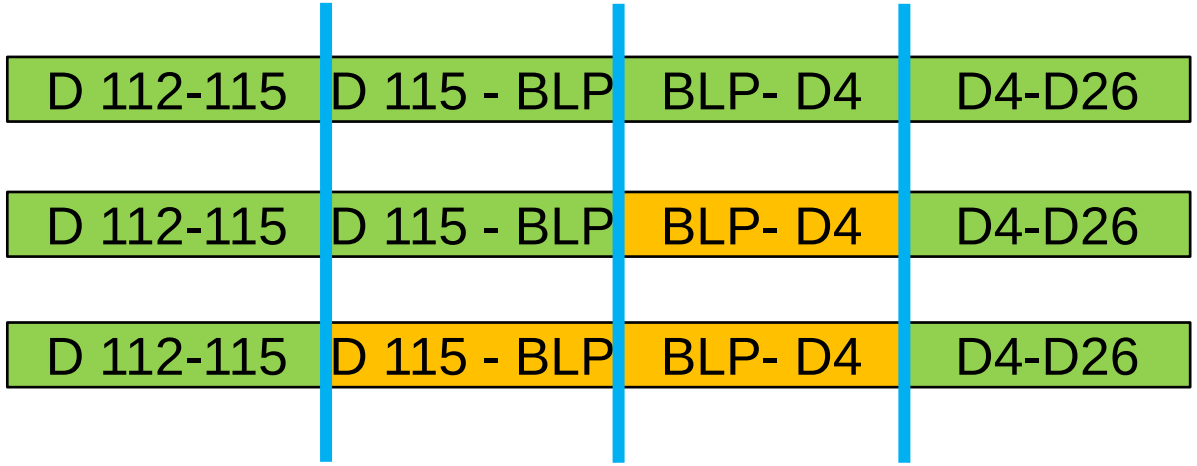
SWAP

Herd trial
Three groups (nest building/day 0-4)

- LL
- LC
- CC



- 570 litters per group (PRC)
  - Production results and post mortem analysis

- 3*36 sows (+ double up) (Hales - PhD)
  - Cortisol (saliva)
  - Pulse/HRV
  - Behaviour

SEGES INNOVATION

Impact of swap on sow movement?

- Before farrowing – nest building period
  - No difference in duration of nest building period
  - No difference in duration of nest building per hour
- After farrowing
  - The sows were lying lateral majority of the time
  - >110 minuts out of 120 minuts observed (4 x daily)

No difference between loose and confined
- in pens designed for loose housed sows

Hales et al., 2014

SEGES INNOVATION

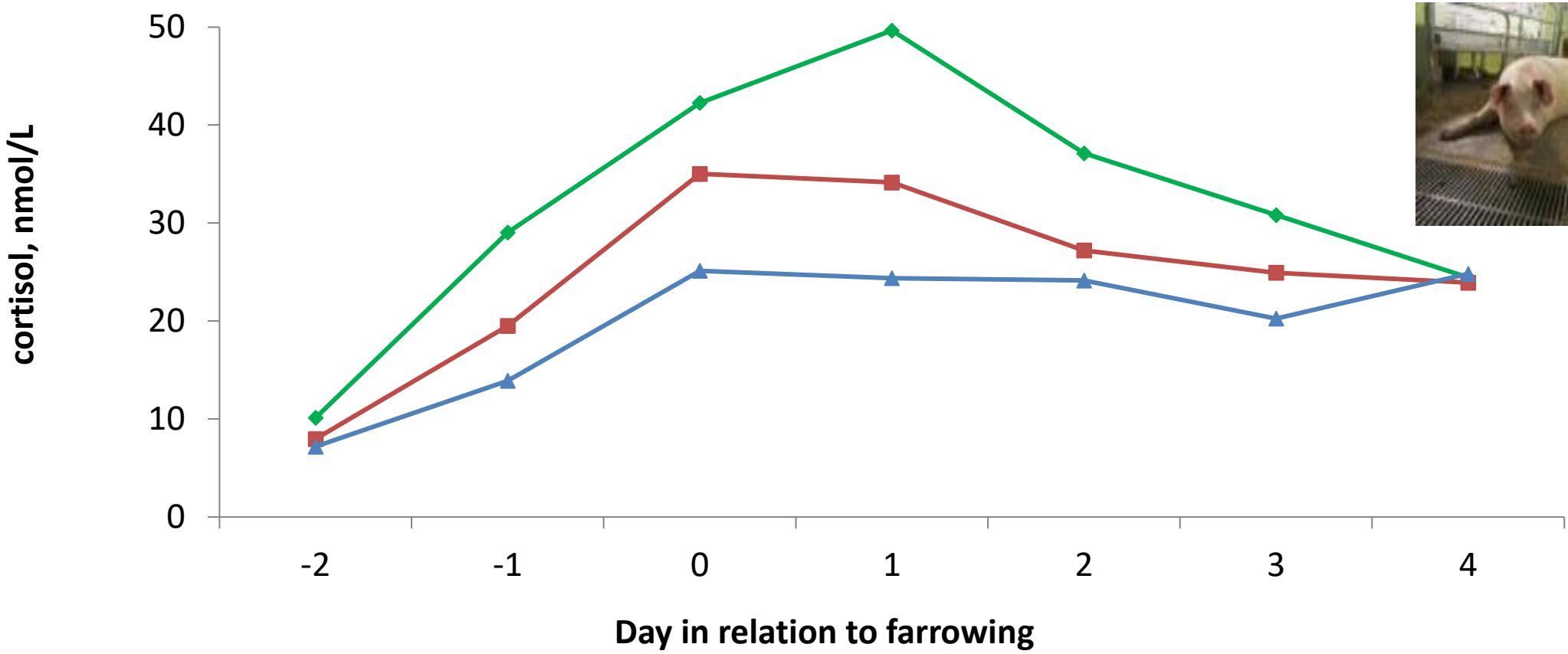
Hales, 2015

Cortisol

LC: Loose-Confined: *Loose D114 gest until finished farrow then confined day 4 post farrowing*

LL: Loose-Loose: *Loose D114 gest until day 4 post farrowing*

CC: Confined-confined: *Confined D114 gest until day 4 post farrowing*



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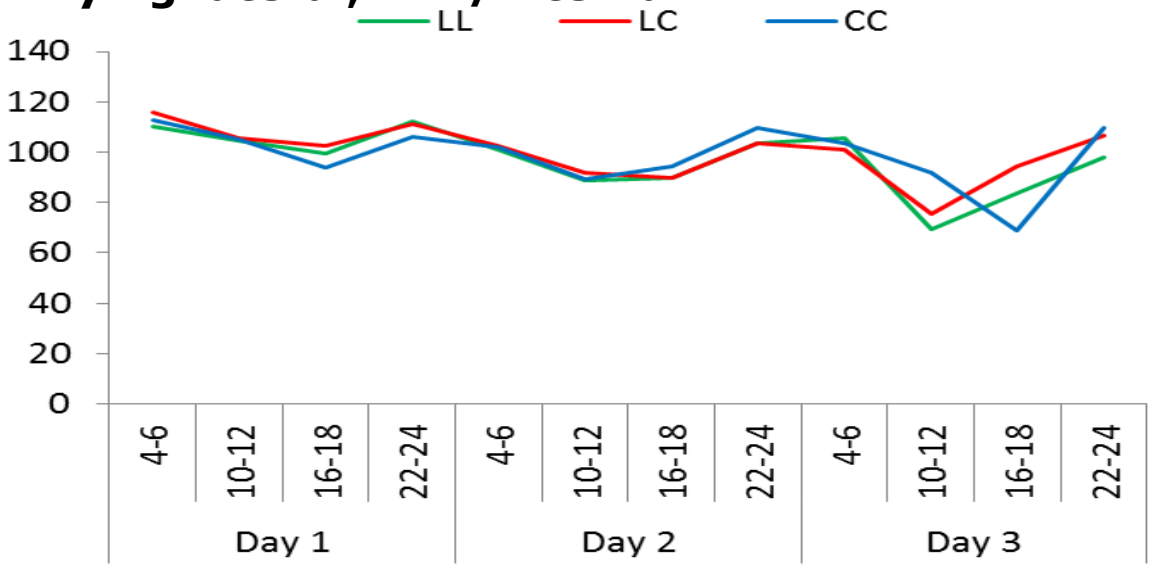
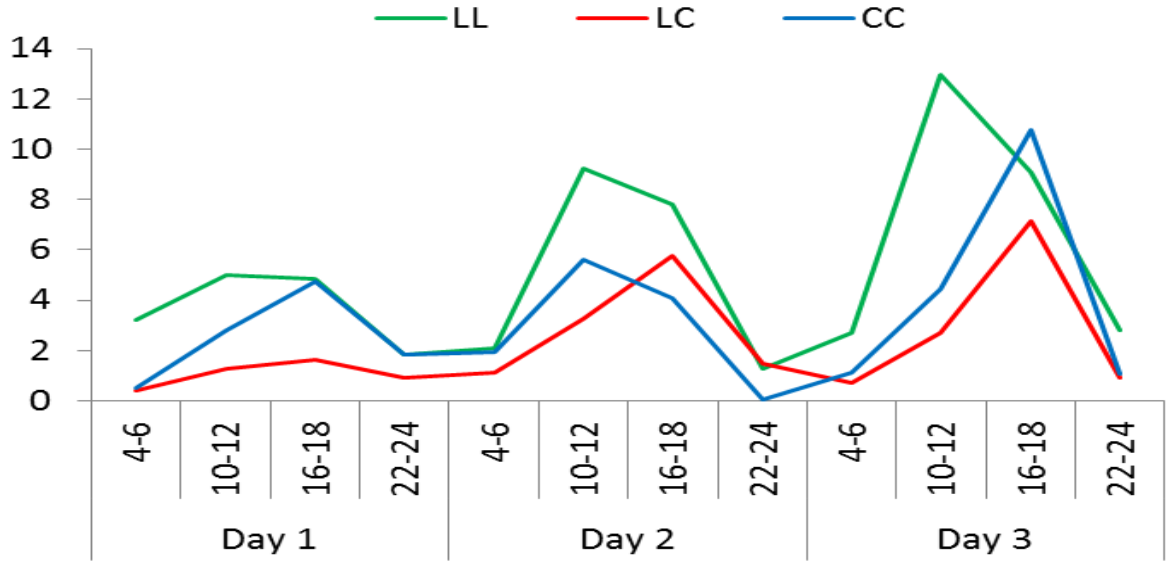
Sows postures

Lying lateral, min/interval



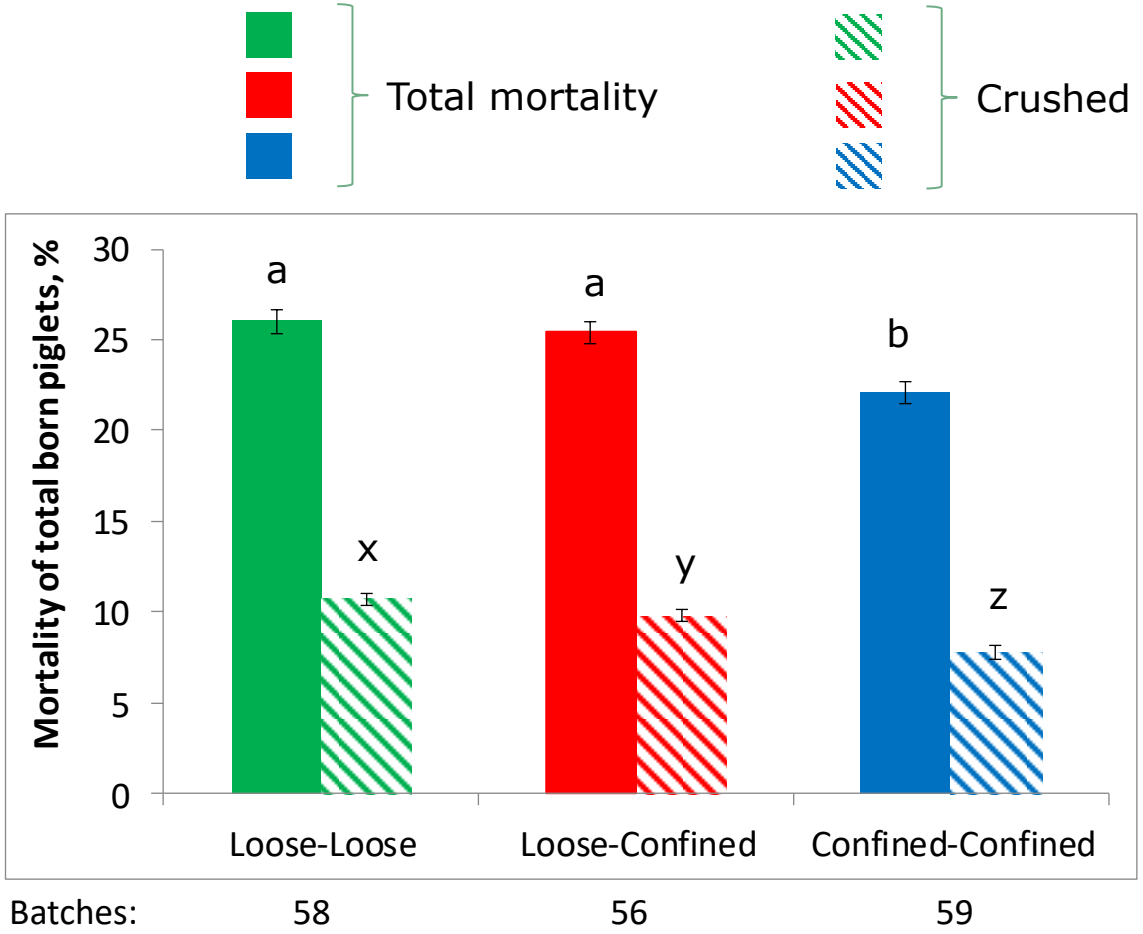
Standing, min/interval



Hales, 2015

SEGES INNOVATION

Piglet mortality - impact of confinement



Hales, 2015

SEGES INNOVATION

Decisions before building and running afterwards

- Key decisions
- Once you've build – conditions are given - live with it….and optimize within conditions

- Start with successful implementation of higher welfare initiatives
  - Understanding:
    - What do pigs do
    - When do they do it
    - Why do they do it
    - How do they do it
    - …

SEGES INNOVATION

Initial key decisions

- Pen size
- Pen layout
- Flooring
- Handling of manure/slurry
- Zero- or temporary confinement (TC)

Other key decisions

- Litter size in pen
- If TC - how and when to confine
- Nesting material and amount
- Enrichment
- Weaning age

SEGES INNOVATION

Initial key decisions

‘Irreversible’ decisions

- Pen size
- Pen layout
- Flooring
- Handling of manure/slurry
- *Zero- or temporary confinement (TC)*

Other key decisions

- Litter size in pen
- If TC - how and when to confine
- Nesting material and amount
- Enrichment
- Weaning age

SEGES INNOVATION

Space – dilemma between space for welfare and risk of emissions

- Austria
  - 5.5 m^2/sow
- Germany
  - 6. m^2/sow
- It’s not as simple
  - Is there a perfect size?
    - Key decisions
  - Solid or partly slatted floor?
- Examples
  - Square pens (equal sided)
    - Fully slatted floor
  - Rectangular pens
    - Dimensions – pen
      - Fixed width
      - Fixed length
      - Fixed ratio width/length
    - Dimensions flooring (solid / slatted)
      - Within each of the above designs
        - Fixed ratio solid/slatted floor
        - Fixed depth of slats of 100 cm
        - Fixed depth of solid of 200 cm

SEGES INNOVATION

Also discussed

- Needed:
  - What is/will be minimum square meter
    - However, it’s irreversible - so also important it is evidence/scientifically based

SEGES INNOVATION

Pen dimensions – green field and TC

Four sizes: 5.5 / 6.0 / 6.5 / 7.0

- Square pens (equal sided)
  - Fully slatted floor
- Rectangular pens
  - Dimensions – pen
    - Fixed width
    - Fixed length
    - Fixed ratio width/length
  - Dimensions flooring (solid / slatted)
    - Within each of the above designs
      - Fixed ratio solid/slatted floor
      - Fixed depth of slats of 100 cm
      - Fixed depth of solid of 200 cm

SEGES INNOVATION

ID / names for pens

Abbreviation which includes type (square/rectangular); space (m2); dimensions (width and depth whether fixed width, fixed depth, fixed ratio); flooring (fixed ratio (slat and solid), fixed depth slatted, variable depth slatted (=fixed depth solid)

ID pen				if 2/3 solid and 1/3 slats	if 100 cm slats	if 200 cm solid
	Area	depth	width			
Fixed width	5,5	2,5	2,2	R55FWFR	R55FWFS	R55FWVS
	6,0	2,7	2,2	R60FWFR	R60FWFS	R60FWVS
	6,5	3,0	2,2	R65FWFR	R65FWFS	R65FWVS
	7,0	3,2	2,2	R70FWFR	R70FWFS	R70FWVS
	Area	depth	width			
Fixed depth	5,5	3	1,8	R55FDFR	R55FDFS	R55FDVS
	6,0	3	2,0	R60FDFR	R60FDFS	R60FDVS
	6,5	3	2,2	R65FDFR	R65FDFS	R65FDVS
	7,0	3	2,3	R70FDFR	R70FDFS	R70FDVS
Fixed ratio width/depth	Area	depth	width			
	5,5	2,9	1,9	R55FRFR	R55FRFS	R55FRVS
	6,0	3,0	2,0	R60FRFR	R60FRFS	R60FRVS
	6,5	3,1	2,1	R65FRFR	R65FRFS	R65FRVS
	7,0	3,2	2,2	R70FRFR	R70FRFS	R70FRVS
Square pens	5,5	S55				
	6,0	S60				
	6,5	S65				
	7,0	S70				

R55FWFR:
R: **R**ectangular pen
55: Area of **5.5** m2
FW: **F**ixed pen **W**idth
FR: **F**ixed **R**atio between depth of slatted and depth of solid floor

R55FDFR:
R: **R**ectangular pen
55: Area of **5.5** m2
FD: **F**ixed pen **D**epth
FR: **F**ixed **R**atio between depth of slatted and depth of solid floor

R55FRFR:
R: **R**ectangular pen
55: Area of **5.5** m2
FR: **F**ixed **R**atio pen depth:width
FR: **F**ixed **R**atio between depth of slatted and depth of solid floor

S55:
S: **S**quare pen
55: Area of **5.5** m2

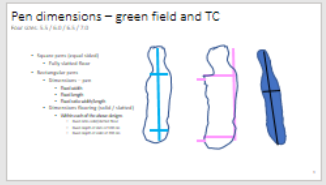
R60FWFS:
R: **R**ectangular pen
60: Area of **6.0** m2
FW: **F**ixed pen **W**idth
FS: **F**ixed depth of **S**latted floor

R65FDVS:
R: **R**ectangular pen
65: Area of **6.5** m2
FD: **F**ixed **D**epth
VS: **V**ariable depth of **S**latted floor

R70FRVS:
R: **R**ectangular pen
70: Area of **7.0** m2
FR: **F**ixed **R**atio pen depth:width
VS: **V**ariable depth of **S**latted floor

SEGES INNOVATION

Oversigt



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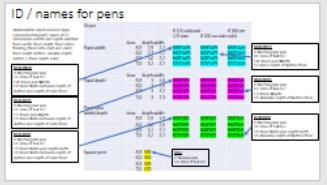

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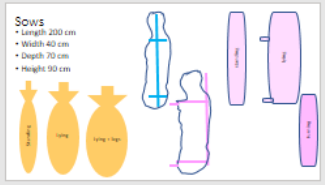

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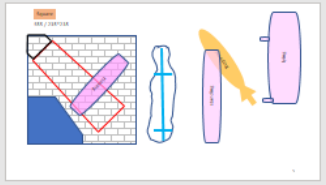
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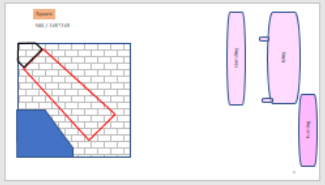
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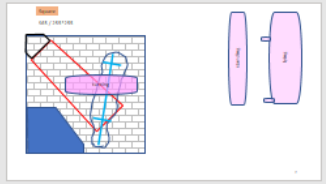
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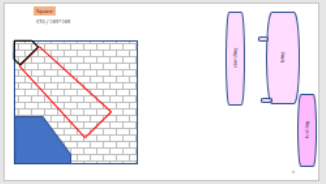
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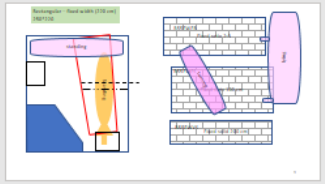
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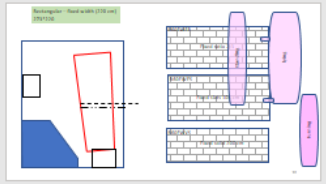
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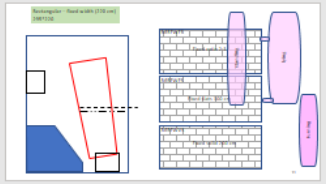
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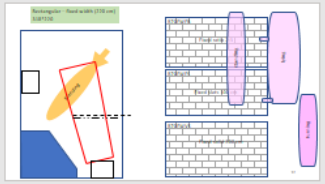
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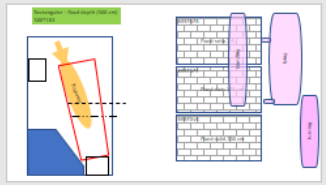
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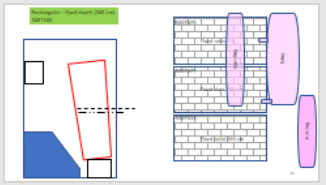
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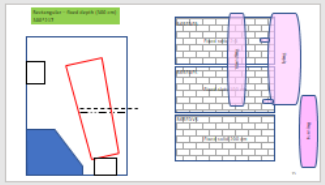
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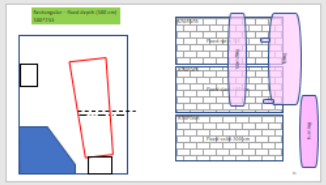
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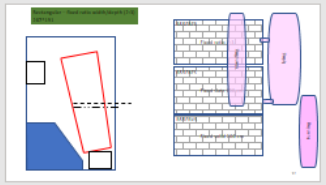
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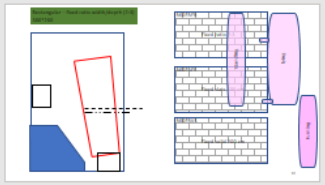
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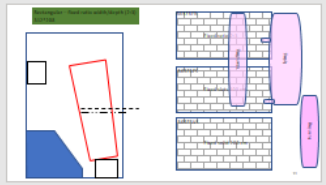
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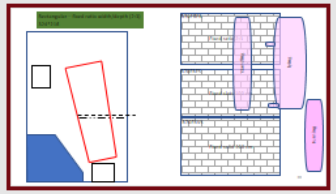
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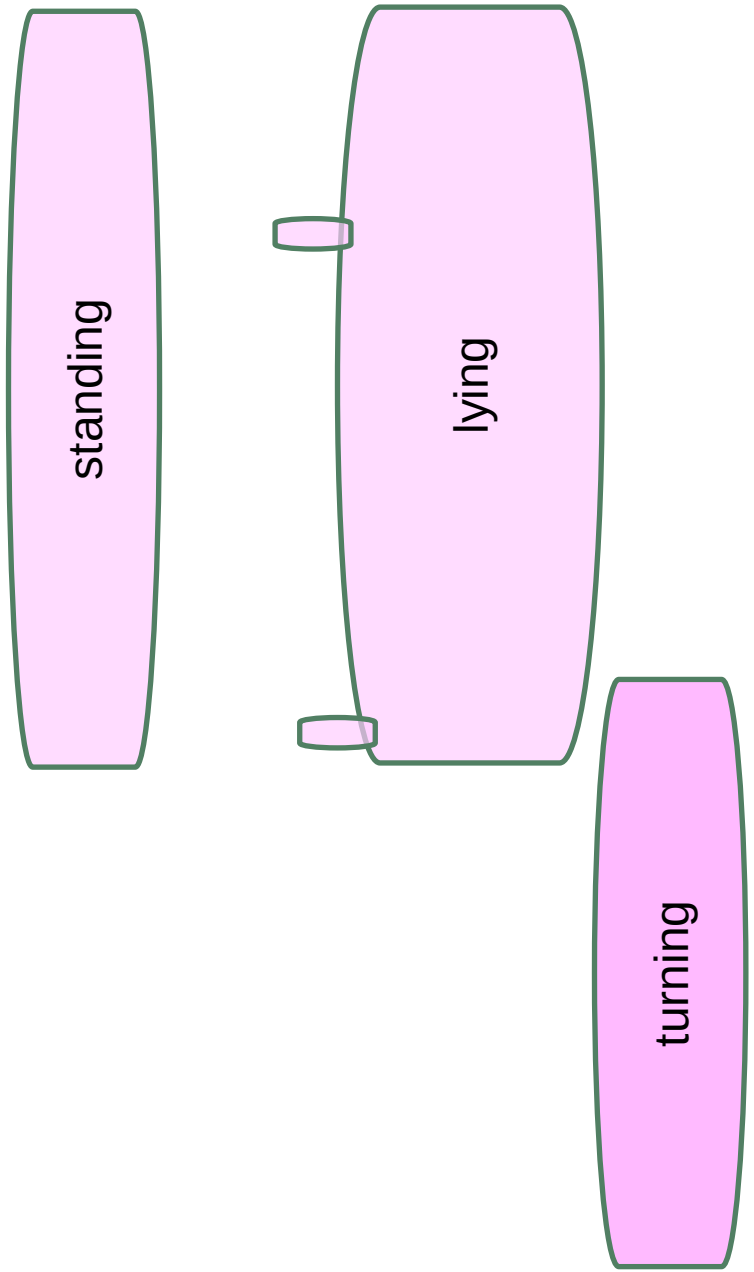
SEGES INNOVATION

Sows

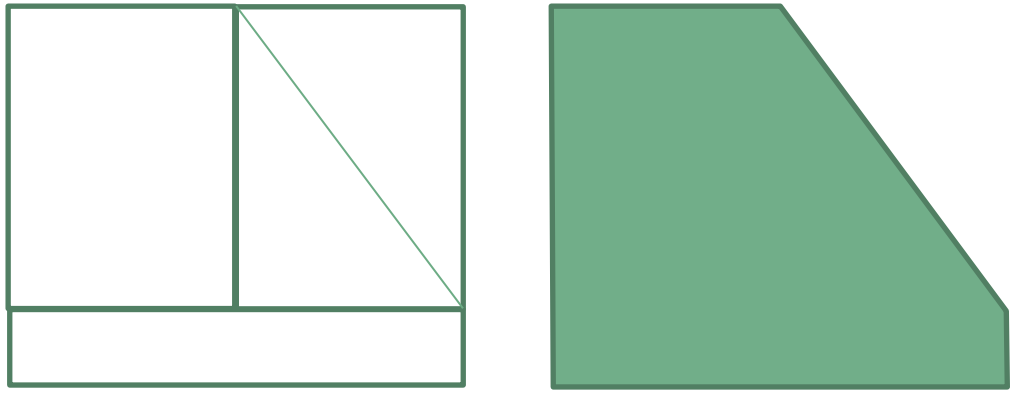
- Length 200 cm
- Width 40 cm
- Depth 70 cm
- Height 90 cm



SEGES INNOVATION

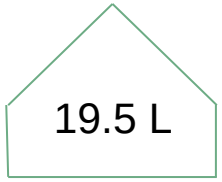
Elements – creep, trough, confinement

- Creep; app. 1 m2



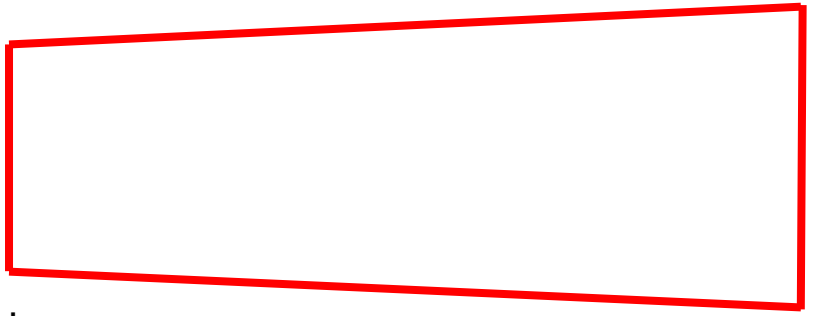
- Feed trough;

Square pens



Rectangular pens

- Confinement; length 210 cm; width front 60 cm; width rear 80 cm



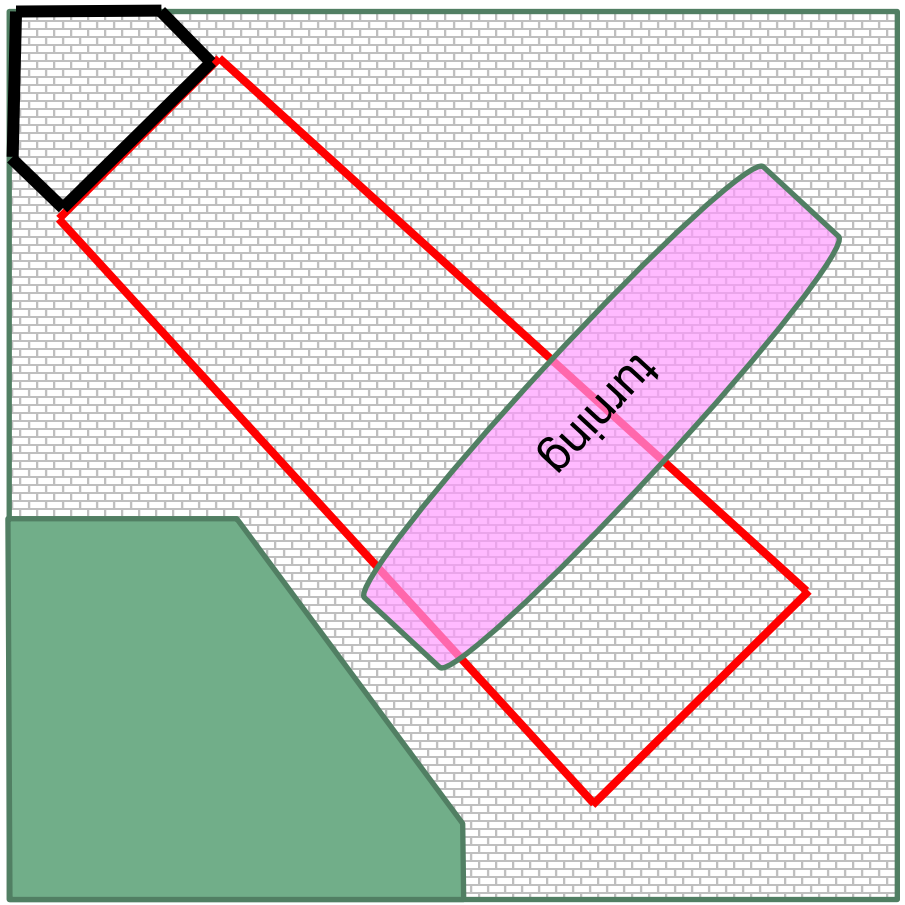
- Distance of 125 cm from back of sow to pen division

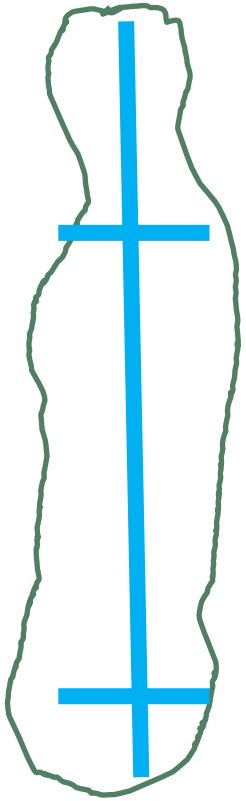
- Distance of 100 cm from back of sow to pen division

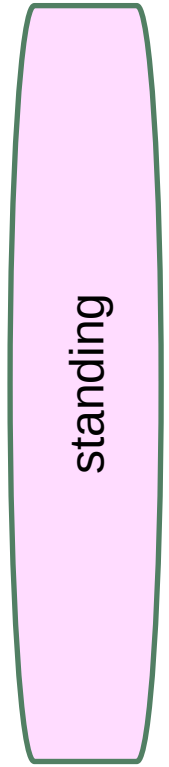
SEGES INNOVATION

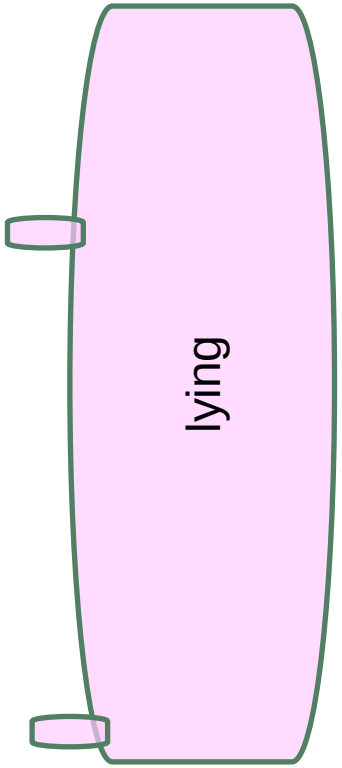
Square

S55 / 235*235

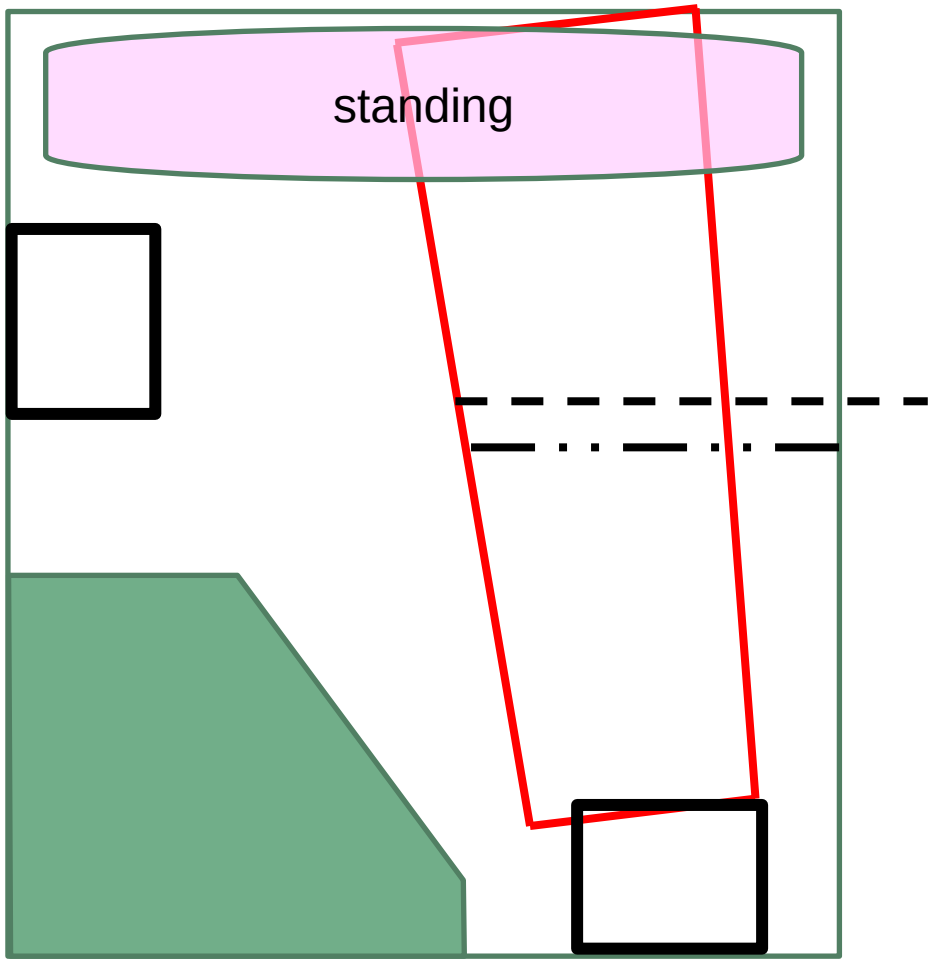


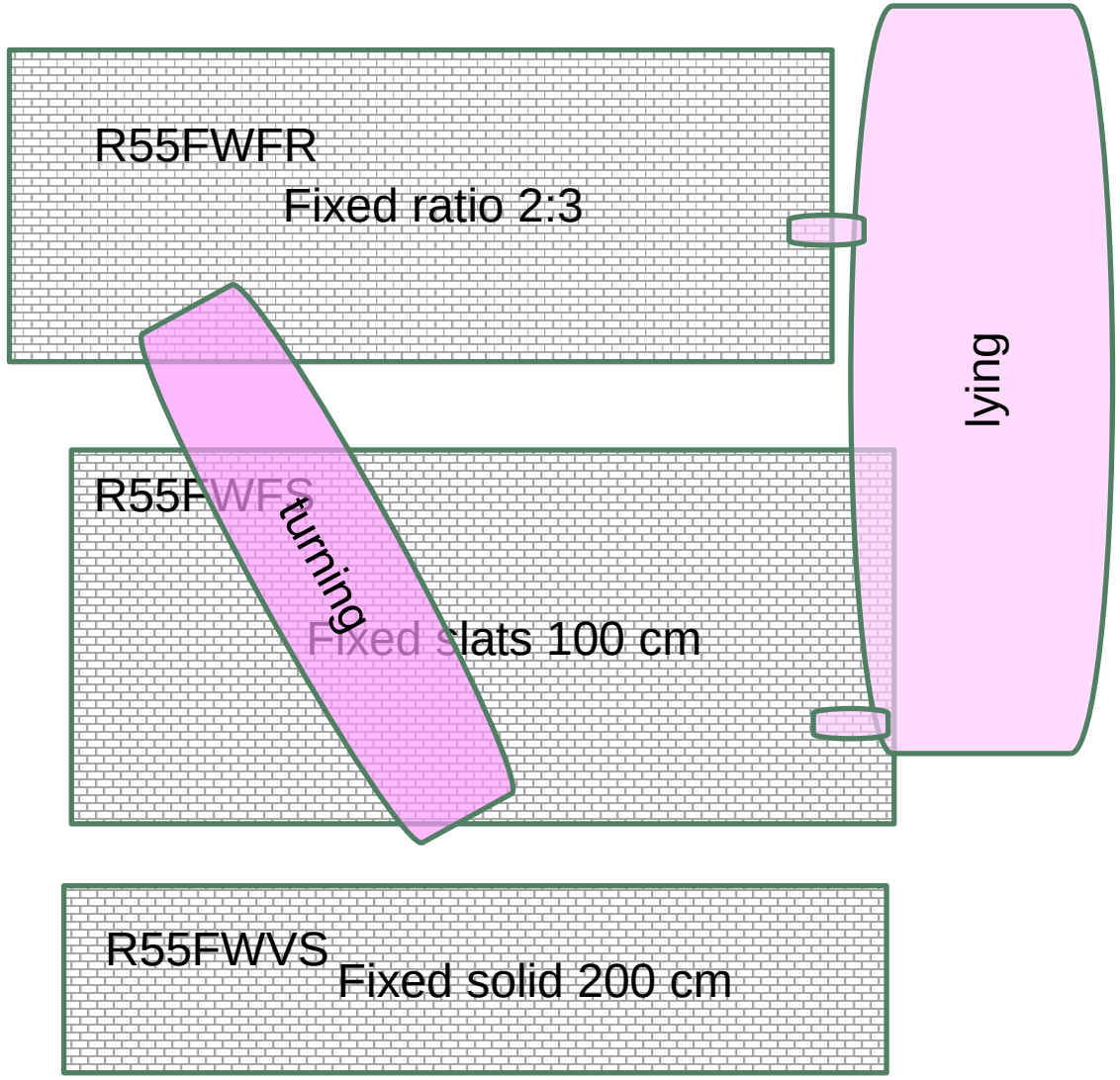






Rectangular – fixed width (220 cm) 250*220





SEGES INNOVATION

Vurdering

Scoring table			Each pen is scored																																					
			1/2/3/4				Add comments with 'add comment' feature				1 = inadequate; 2 = barely adequate; 3 = just over adequate; 4 = plentiful and there is room for further explanation of the rating and/or other comments.																													
			Square				Rectangular																																			
							FWFR				FWFS				FWVS				FDFR				FDFS				FDVS				FRFR				FRFS				FRVS			
	Sow	Pen	$55	$60	$65	$70	R55	R60	R65	R70	R55	R60	R65	R70	R55	R60	R65	R70	R55	R60	R65	R70	R55	R60	R65	R70	R55	R60	R65	R70	R55	R60	R65	R70	R55	R60	R65	R70	R55	R60	R65	R70
Be able to:	Turn around comfortably																																								
	Gather piglets (reduce risk of crushing)																																								
	Maintain functional areas	Nest	1	1	1	1																																			
		dung	1	1	1	1																																			
		Feed	4	4	4	4																																			
	Give birth		4	4	4	4																																			
	Expose udder																																								
	Nesting substrate		1	1	1	1																																			
	thermoregulation		2	2	2	2																																			
	Pre-farrowing activity		1	1	1	1																																			
	Ease of posture changes																																								
	Comfort when lying																																								
	Piglet																																								
Be able to:	Born in thermoneutral situation		2	2	2	2																																			
	find creep quickly		3	3	3	3																																			
	Dry resting area		3	4	4	4																																			
	Warm resting area		4	4	4	4																																			
	Crushing avoidance	no blind corners																																							
		no BD																																							
	Enrichment		1	1	1	1																																			
	Space for play		1	2	4	4																																			
	Human																																								
	Ease of management																																								
	Accessing piglets		3	3	3	3																																			
	visibility	feeders	2	2	2	2																																			
	Confine sows	ergonomics	2	2	2	2																																			
		safety	1	1	1	1																																			
	Enclosing piglets																																								
	Environmental																																								
	Minimal slurry surface		1	1	1	1									4	4	4	4																							
	Dry and clean solid floor (non fouling)										3	3	3	3	1	1	4	4																							
	option to control climate		1	1	1	1																																			
		sum	38	40	42	42	0	0	0	0	3	3	3	3	5	5	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SEGES INNOVATION

‘Ideal’ pen size (1)

- Sows’ dimensions

- Planar width – turning space

Planar width of 153 cm
Planar area of 3.17 m^2

considered necessary to allow unobstructed turning for sows with the 95-percentile weight.

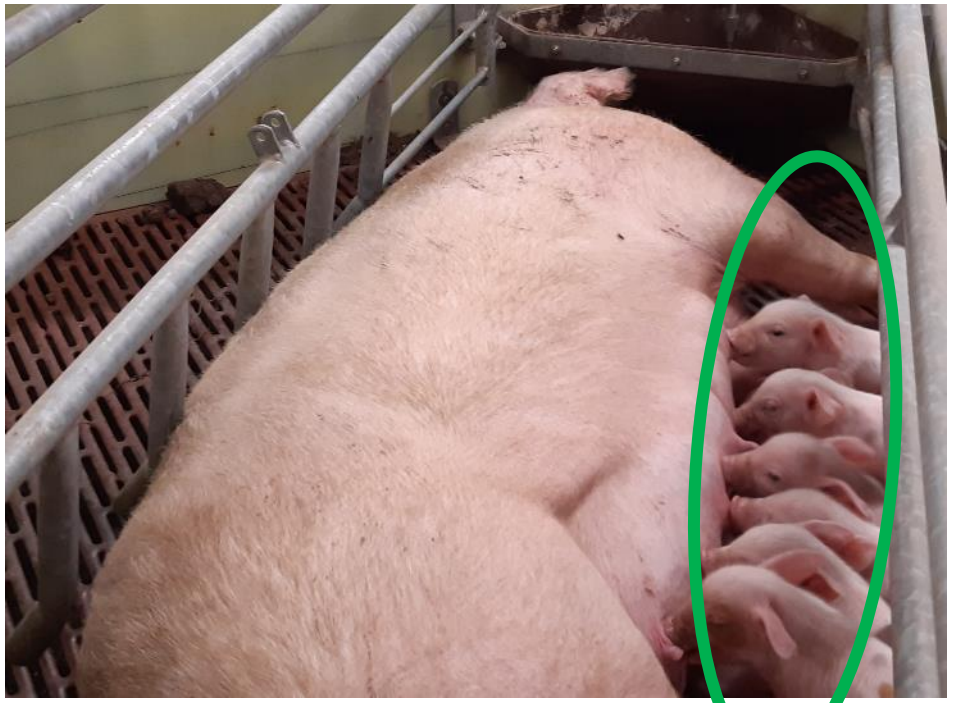
Needs further research

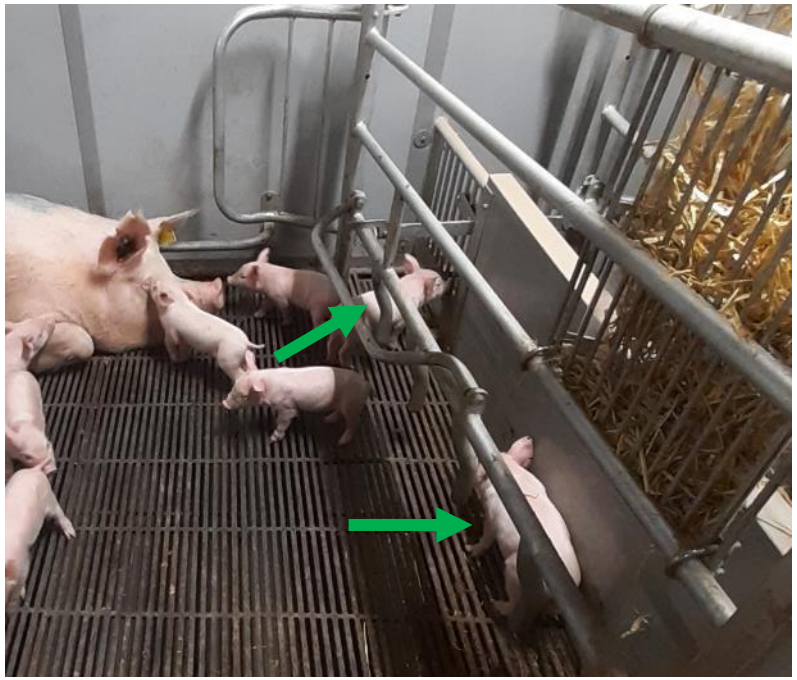
SEGES INNOVATION

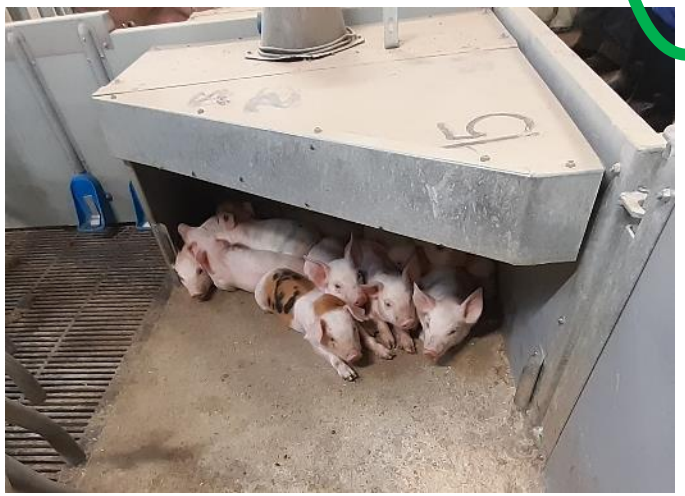
‘Ideal’ pen size (2)

- Dimensions*number
- Piglet dimensions
  - Birth,
  - One week
  - Four-five weeks
- Litter size in pen

- Functional areas
- Piglet safety zones







Pen layout (1)

- First decision
  - Creep area along passageway
    - Safety
    - Efficency
    - Reduce risk of transferring diseases
    - Easy access

https://www.freefarrowing.org/research/references/freedom-in-farrowing-and-lactation-2021-ffl21/

Overcoming barriers, facilitating change

Virtual Workshop August 12th-13th 2021

As part of the Free Farrowing series of workshops, a virtual event (organized by FLI, SEGES, SRUC and Vetmeduni Vienna) was held over two days.

SEGES INNOVATION

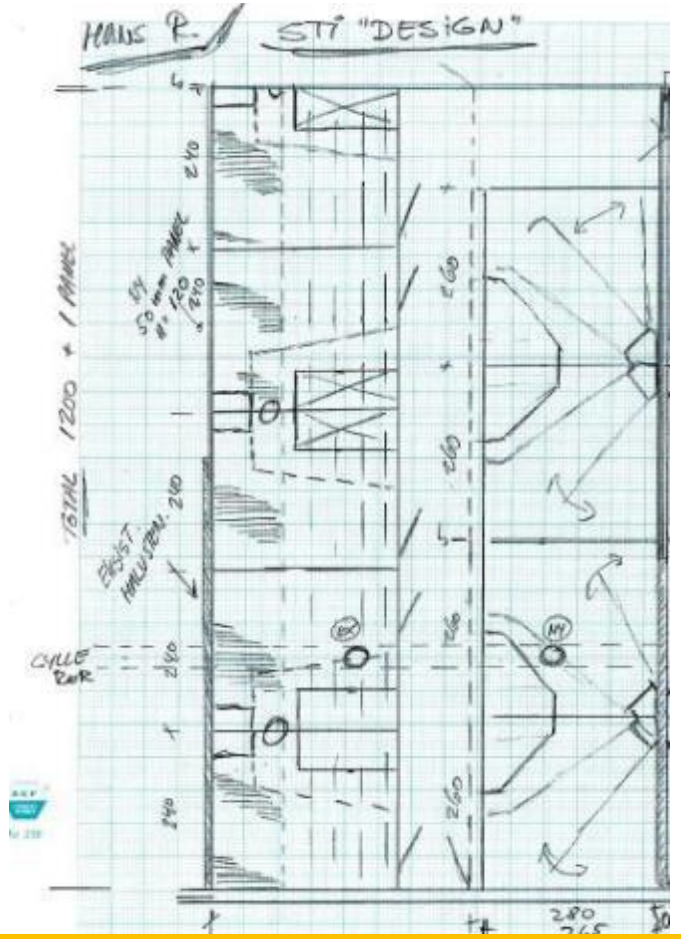
FFL21 : Change experiences by a Danish farmer (openagrar.de)

Limited number (e.g. five-ten pens) or full scale – pros and cons

2010-2015

- Limited numbers – pros
  - Get experience
  - Develop and optimize
  - Limited investment

- Limited numbers - cons
  - Ventilation etc
  - Management
  - Sows



2015-

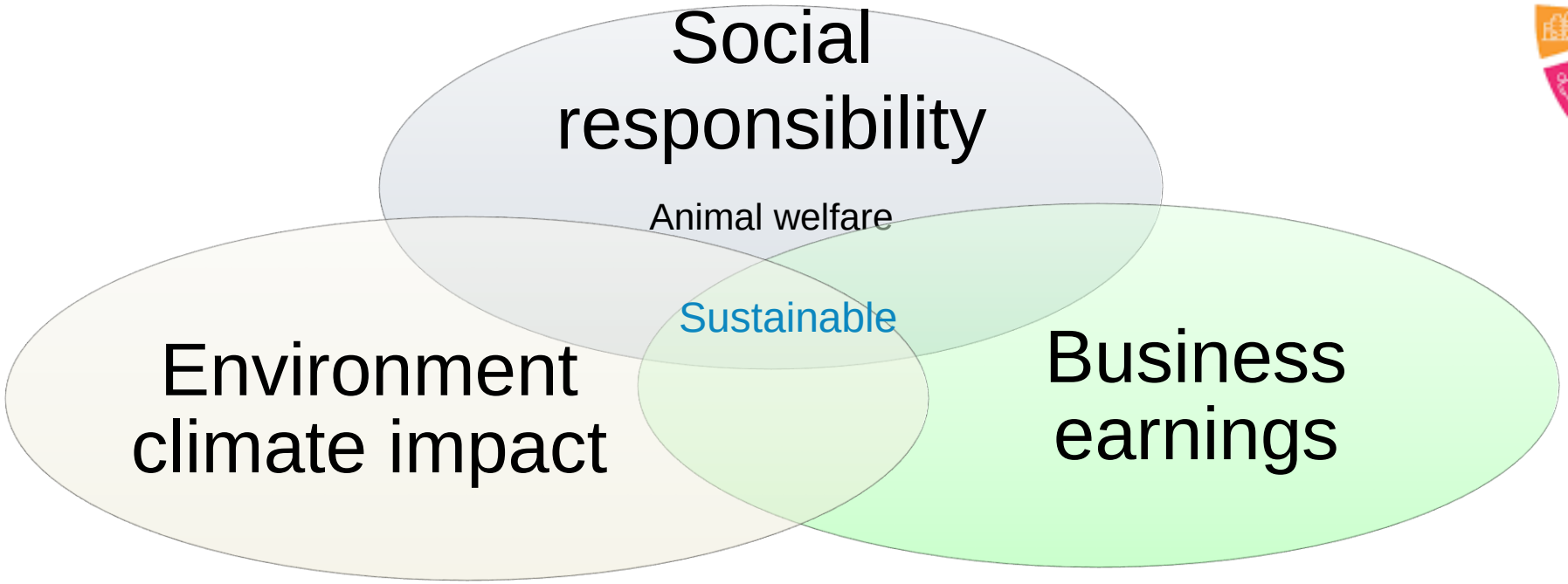
- Full scale – pros
  - Optimize management
  - Sows accustome
  - Stockpeople accustome

- Full scale - cons
  - 'Irreversible'
  - Large investment

Be aware of the pros and cons of the way you start up with loose housing

SEGES INNOVATION

A more sustainable Danish pork production



SUSTAINABLE DEVELOPMENT GOALS

SEGES INNOVATION

From animal welfare to sustainability

‘We’ want

- Space
- Cleanliness
- Low input labour
- Healthy piglets

‘However:

- Space
  - Larger surfaces - increase emissions
- Cleanliness
  - If slatted floor – increase emissions
- Low input labour
  - If slatted floor – increase emissions
- Healthy piglets
  - If slatted floor – increase emissions

SEGES INNOVATION

Critical points

Before investment

- Decision making
- Key decisions

Daily management

- Calm handling of sows
- Use of confinement

SEGES INNOVATION

Daily work-routines

- Safe and efficient to work in and with
  - Calm handling of female animals from gilts and until slaughter
- If TC – how many days – many trials
  - Vast majority of studies show a reduction in mortality when some period of crating is imposed *(ref. Goumon et al, submitted)*
  - Confinement to start at the end of nestbuilding and until day 4 (Austria/ProSAU)
  - Confinement to start at day 115 of gestation and until day 4 (Denmark)
- When to open *(ref. King et al., 2019)*
  - Not all at one time
  - Better in the afternoon than mornings

Staff training – exchange of experiences

- Limited experience
- Different work conditions
- Better sow-human interaction
- Expect transition period
  - Sows and staff
- Let the sow know you enter pen
- Special awareness first days after farrowing
  - Sow is protective
- Avoid ‘upsetting’ sows

Daily management

- Calm calm calm
- Not just in farrowing unit
- Include ‘calmness’ in layout
  - Sections
  - Less pens per section
  - Creep alongside passageway
- Include ‘calmness’ in daily routines
  - Handling of sows and piglets

SEGES INNOVATION

Newly farrowed sow

Handling of sick sows

MANAGEMENT IS VERY VERY IMPORTANT when working with loose sows

SEGES INNOVATION

Confinement

- Temporary confinement – take the best of both loose and confined
  - Loose – natural behaviour, access to udder,
  - Confined – lower piglet mortality, safe work conditions
- Before farrowing - loose
  - No piglets at risk, active nest seeking and nestbuilding
  - Quiet/calm the last couple of hours
- During farrowing - confined
  - Ensure access to udder when confined
  - Recent review
    - ‘Lower’ mortality with TC than FF
    - ‘Higher’ mortality with TC than permanent C
- After a few days – loose again
  - Awareness when opening

Ref:
https://doi.org/10.3389/fvets.2022.811810

SEGES INNOVATION

Critical points

Before investment

- Decision making
- Key decisions

Daily management

- Calm handling of sows
- Use of confinement

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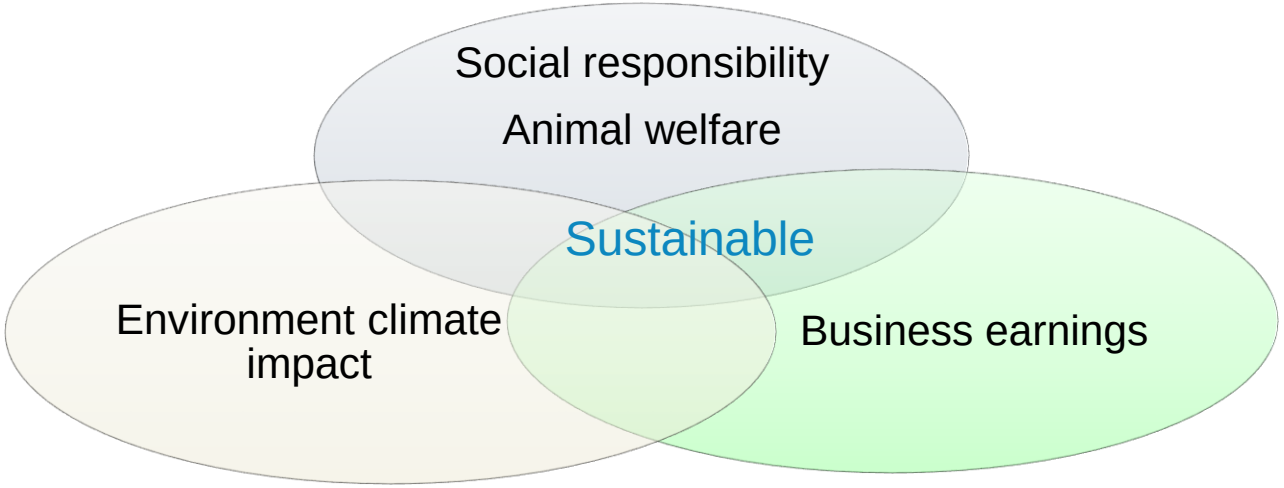
Critical points

- Investment
  - Design for a loose sow
    - Acknowledge key decisions and complexity
  - Ensure space for piglets
  - Include three pillars of sustainability
- Daily management
  - Calm handling
  - Optimize
    - Mindset

SEGES INNOVATION

Critical points

- Loose housing – with an option to confine
- In respect of the three pillars of sustainability
- Science based
- Work together – across borders



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Considerations and recommendations 2021

Floor: Solid/slatted floors

- Hygiene / straw / emissions

Temporary confinement

- Improve piglet survival
- Transition step ?

Pen dimensions

- Quality vs. Quantity – and sow access/piglet safety/staff work conditions
- Hyper prolific sows – supplementary milk or feed for piglets (outside sow area)
- Space allowance sows and piglets
- Planar width

Investment's lifetime

- Increase in littersize
- Legislation?

License to produce

- Natural behaviour?

Be aware of dilemma

- Environment and welfare

Days of confinement

- Sow: Two-three days
- Piglets: Until using the creep area when not nursing
- Caretakers: While processing litters and piglets (three-four days)

SEGES

Loose housing of farrowing and lactating sows

Problem to be addressed:

- Loose housing has limited prevalence – except in countries with legislative enforcement

Content of options:

- Free farrowing; Temporary Confinement (TC) in pen or open crate

Implemented alternatives:

- Free farrowing in countries with legislation; TC in countries with ‘voluntary’ uptake

Possible main impacts:

- More pig producers willing to try TC; challenge between behaviour and emissions

Mitigate negative impacts:

- Important to consider designed pens; understand sow and piglet behaviour; technical (costly) solutions

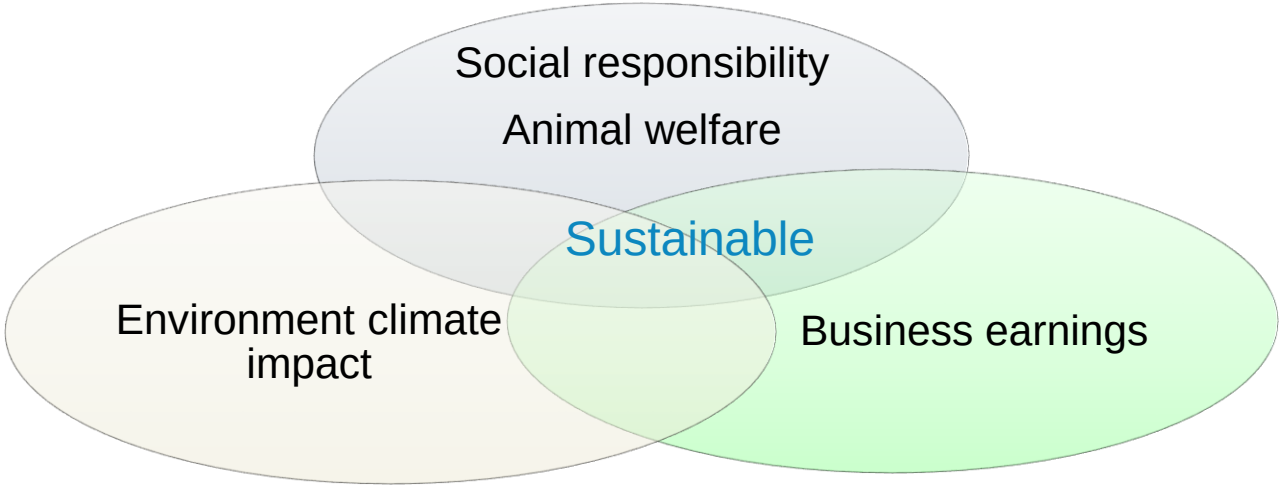
Other options to address:

- First movers; share experience; identify knowledge gaps - research

SEGES INNOVATION

Where do we go from here – which path do we take?

- Loose housing – with an option to confine
- In respect of the three pillars of sustainability
- Science based
- Work together – across borders



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