



제34회 전국양돈세미나

함께 사는 한돈 - 냄새 저감

Associated with : **DANISH FARM Concept[©]**

Martin Krusborg Jakobsen

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dalum
landbrugsskole
ACADEMY OF AGRICULTURAL BUSINESS • DENMARK

Associated with:  **DANISH FARM**
Concept[©]



PRESENTATION

www.danishfarmconcept.com
www.dalumls.dk/english



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Danish Farm Concept®

How to achieve +30 PSY

**Sustainability
Environmental friendly
Danish farm model.**



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Danish Farm Concept®

Introduction

**Martin Krusborg Jakobsen
Pig Specialist**



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Danish Farm Concept®

Introduction



**DANISH FARM
Concept®**

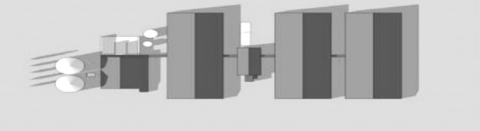
Danish Farm Concept – attributes ...



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Danish Farm Concept comprises :

- Modern farm design
- Danish genetics
- Efficient technology
- Nutrition program
- Sustainable solution for animal waste
- Education and management





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Danish pig production – facts ...



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- 1 million sows
- 31 million pigs per year
- High tech production
- Own research program
- Own genetics
- 90% of meat exported

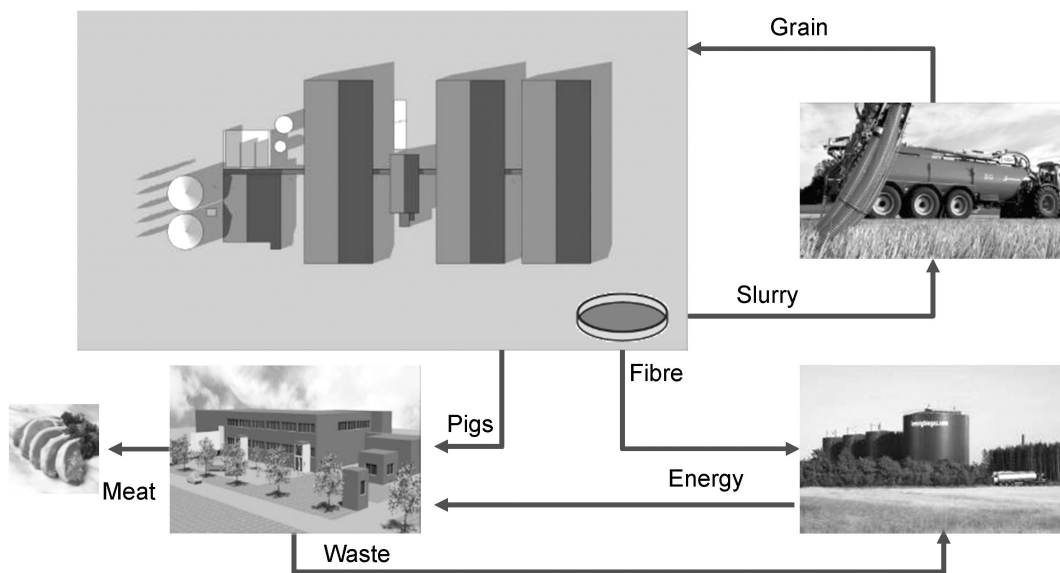


The Danish farm model

– an efficient sustainable system



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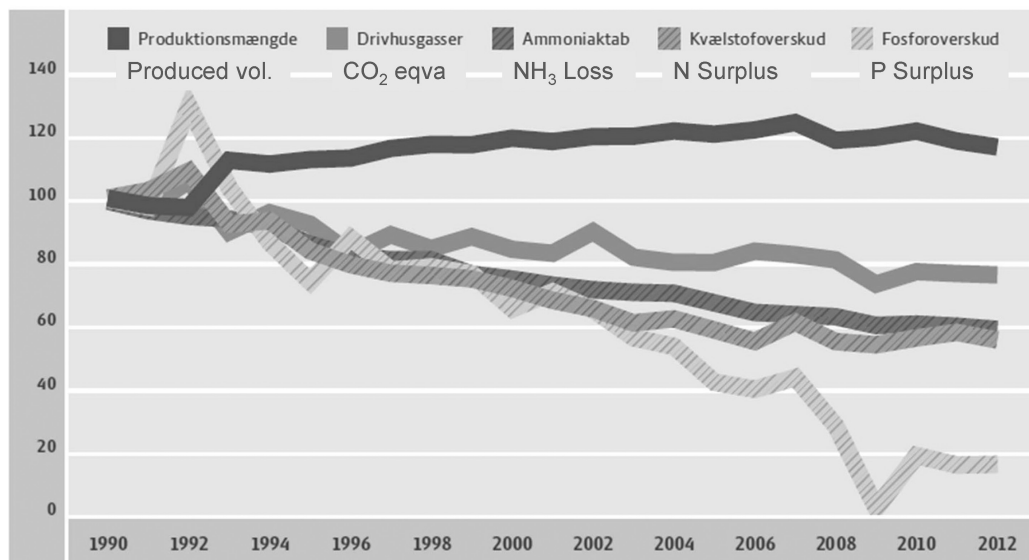
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The Danish farm model

– an efficient sustainable system



Danish Farm Concept®



The Danish farm model

– an efficient sustainable system



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Foto: infarm

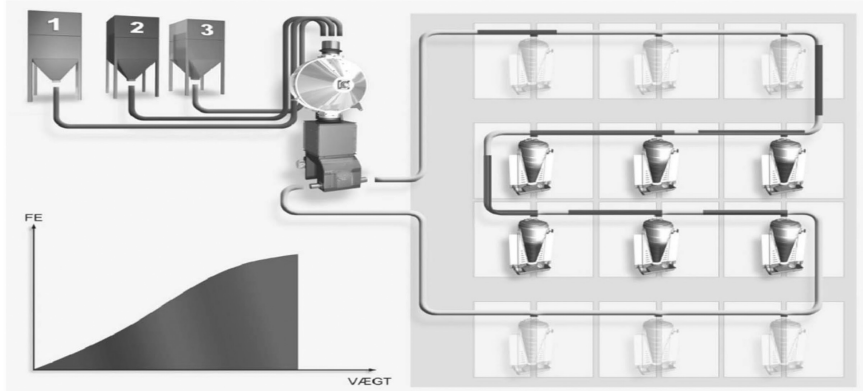


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The Danish farm model – an efficient sustainable system



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Kilde: Skild Sæby.

Figur 7.10 Principskitse af multifasefodring

Med udgangspunkt i måske tre indkøbte færdigblandinger (1, 2 og 3) med faldende proteinindhold kan der ske et gradvist skifte mellem disse blandinger. Men der er mange måder at gøre det på, og det kan naturligvis også gennemføres som hjemmeblender. Der blandes på stiniveau. Den enkelte blanding transporteres separat ud til den foderautomat, blandingen er fremstillet til.

The Danish farm model – an efficient sustainable system



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The Danish farm model

– an efficient sustainable system



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Kilde: Skov.

Luftvaskerenhed placeret på loft

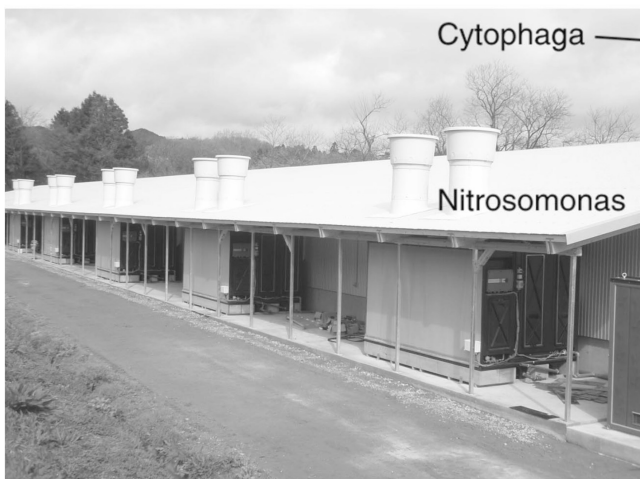
De isolerede rør i højre side leder luften op nede fra stalden. Det lodrette rør i toppen af billedet leder luften ud i det fri gennem taget. Denne opbygning er bare én af flere mulige.

The Danish farm model

– an efficient sustainable system



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Biofilmen

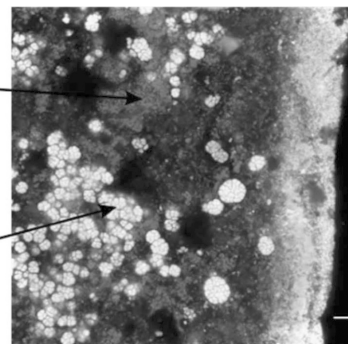


Foto: Aron Saunders

Cytophaga

Nitrosomonas

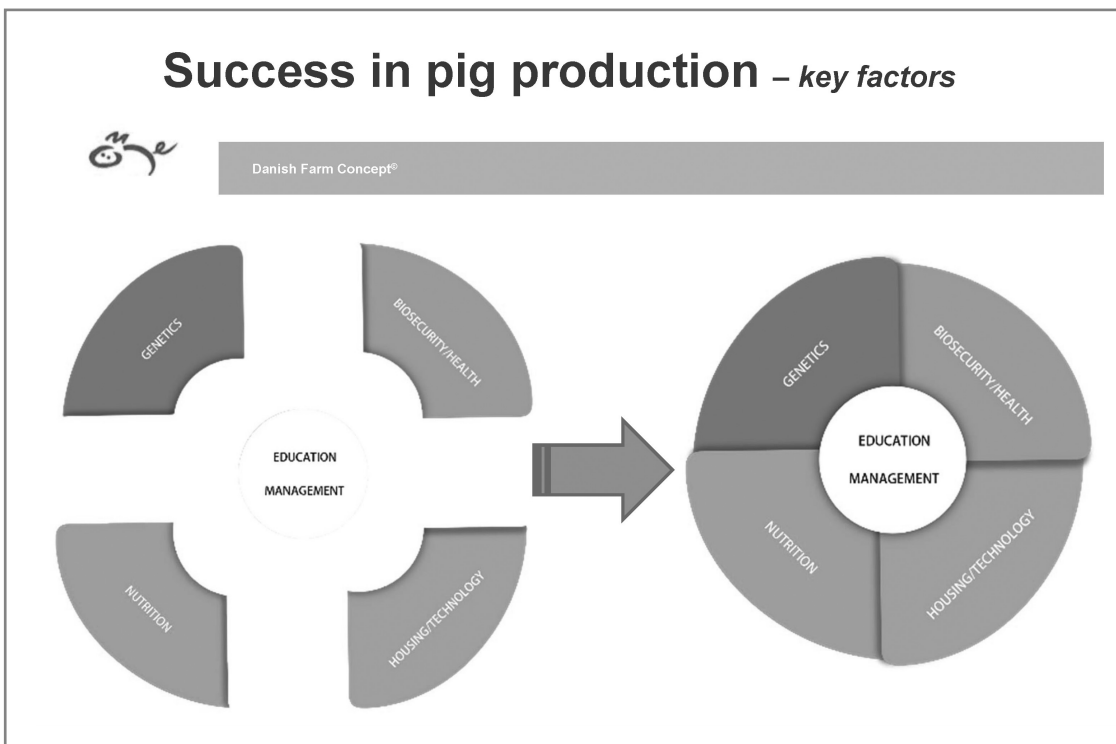


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The Danish farm model – an efficient sustainable system

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Key factors for success



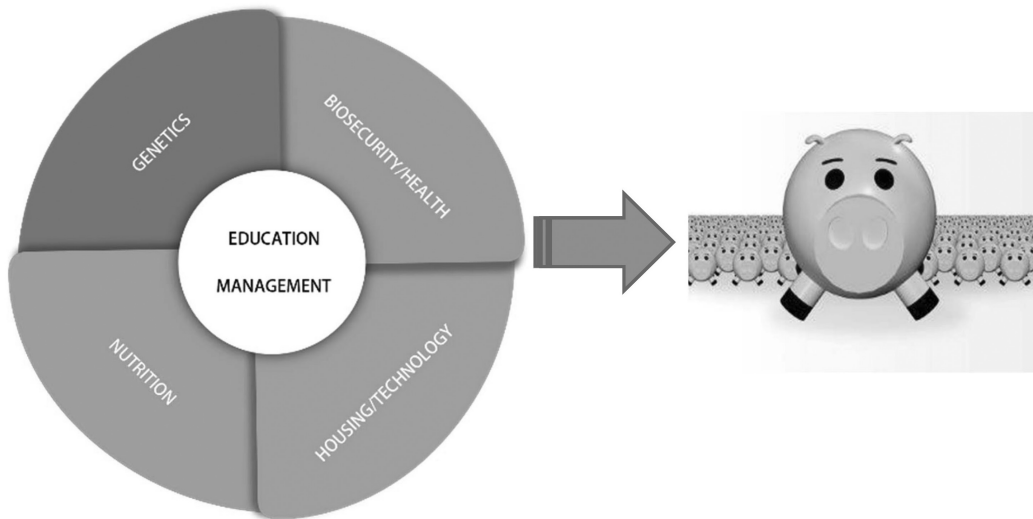


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Success in pig production



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Success in pig production – require specialists



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Genetics



Farm design & management



Equipment & feeding systems



Ventilation and heating systems



Nutrition



Education and training





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Genetics



Genetics – DANAVAL ...



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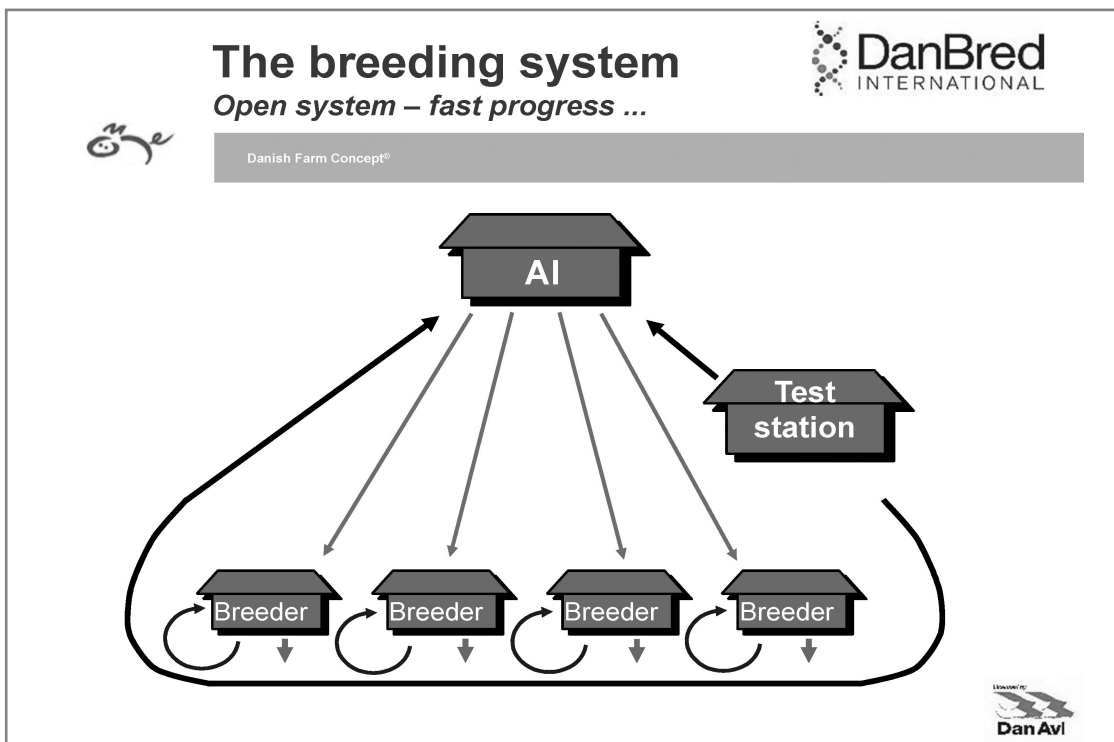


- Danish genetics “Danavl”
 - 35 PSY
 - 1000 g/day
 - 2.6 FCR
 - High meat content

Yorkshire × Landrace = LY Hybrid

LY Hybrid × Duroc =







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Genetics – On-farm testing

DanBred
INTERNATIONAL



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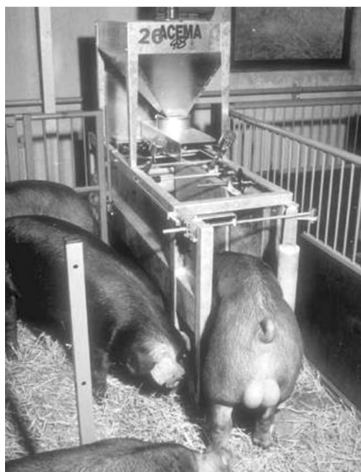
Powered by
Dan Avl

Genetics – Boar test station

DanBred
INTERNATIONAL



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Dan Avl

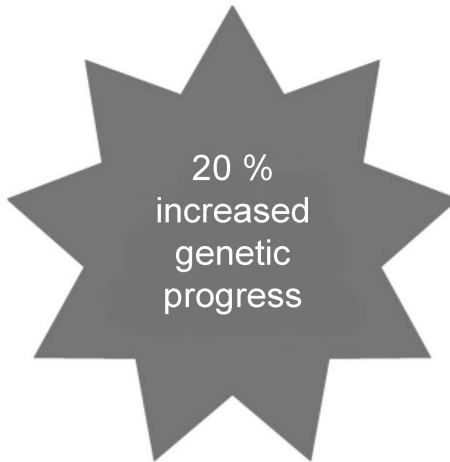
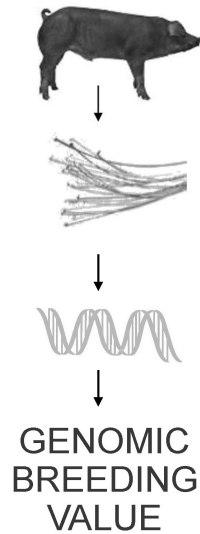


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Using Genomic Information - Fast progress for specific traits



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Using Genomic Information - Fast genetic progress



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DanAvi is ahead in development

- Use of DNA to select the best parents
- 20.000 males/females tested per year
- All traits
- 60,000 SNP's





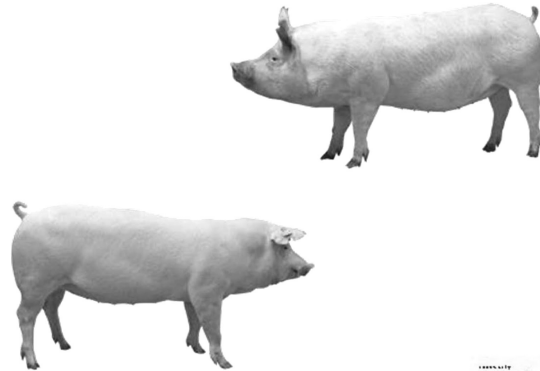
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DanAvl – Ahead in development



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- Boar taint
- Maternal traits
- Social interaction

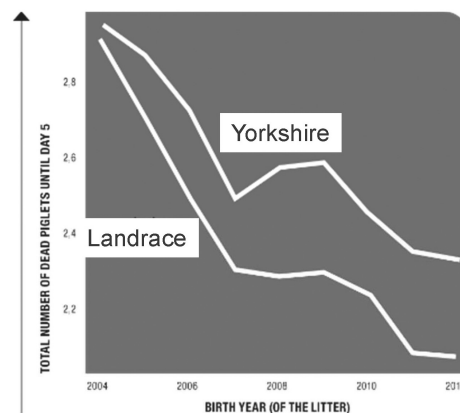
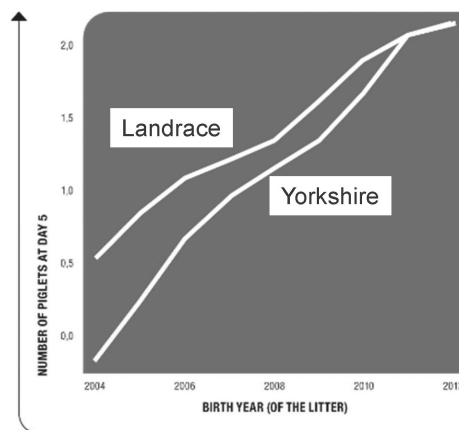


DanAvl – Live born piglets at day 5



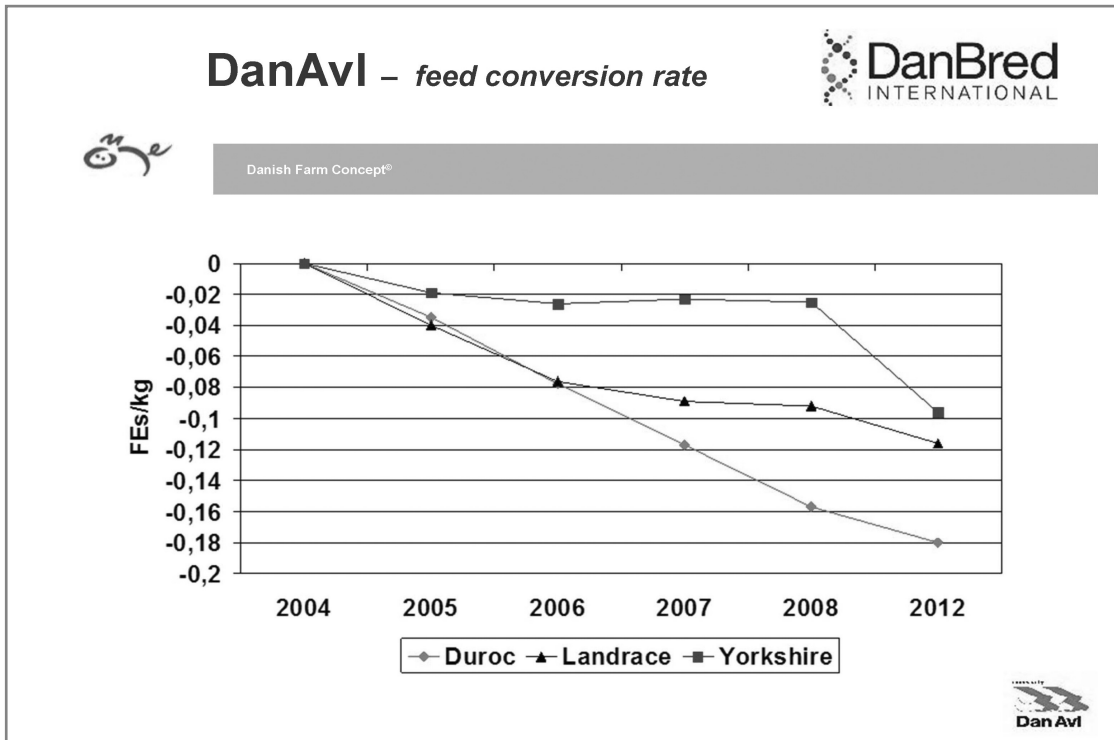
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DanBred nucleus / multiplier herds genetic progress





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Farm design and biosecurity

Design – Capacity ...

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The production assumptions are used for estimating the capacity of the pig unit and does not guarantee final output

Sows		Gilts	
Sows/gilts	1000	Weaners in weekly	19
Replacement rate, %	50	Weight in, kg/pig	31.2
Farrowing rate, %	85	Mortality, %	2
Liveborn per litter	16	Daily gain, g	700
Mortality, %	10	Feed conversion, kg/kg gain	5
Age at weaning, days	26	Days in unit	109
Litters/sow annually	2.33	Gilts out annually	550
Non-productive days/litter	16	Gilts out weekly	11
Weaned piglets/year	33542	Gilt age out, weeks	27
Weaned piglets/sow annually	33.5	Weight out, kg/gilt	107
Weaned piglets/week	645	Finishers out annually	430
Weight at weaning, kg/pig	7.3	Finishers out weekly	8

Weaners		Finishers	
Weight in, kg/pig	7.3	Weaners in weekly	613
Mortality, %	2	Weight in, kg/pig	31
Daily gain, g	450	Mortality, %	2
Feed conversion, kg/kg gain	1.8	Daily gain, g	769
Days in unit	53	Feed conversion, kg/kg gain	5
Weaners out annually	32871	Days in unit	109
Weaners out weekly	632	Finishers/rejected gilts out annually	31664
Weight out, kg/pig	31.2	Finishers/rejected gilts out weekly	609
		Finishers/sow annually	31.7
		Weight out, kg/pig	115



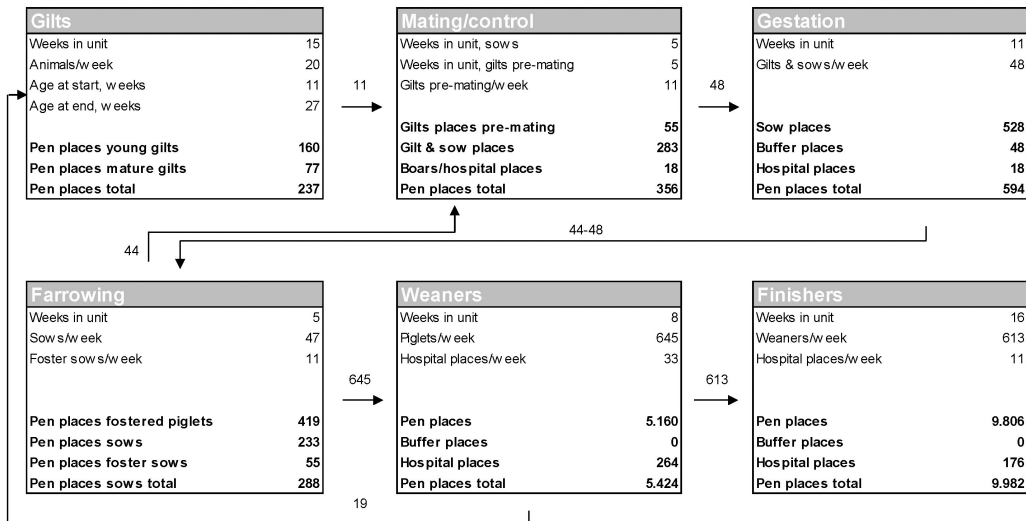
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Design - Capacity of pig units...



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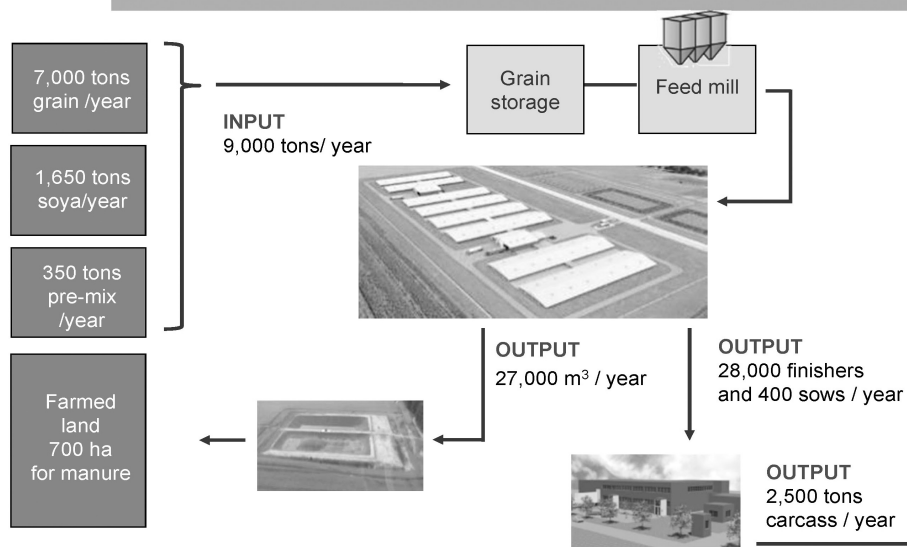
The flow diagram shows the biological basis for the pig production and flow of animals and is used for designing the pig facilities
The final number of pen places might vary from the biological estimate due to adjustment of design to building length and width



Strategy - Master plan example : 1,000 sows



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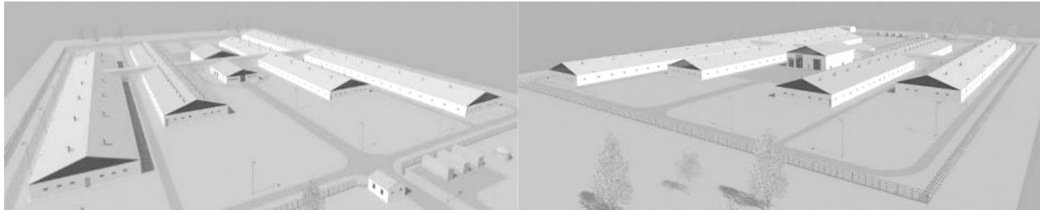
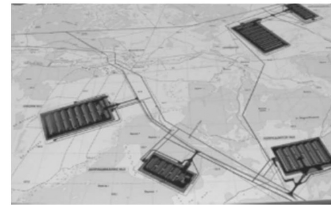


Biosecurity - Location ...



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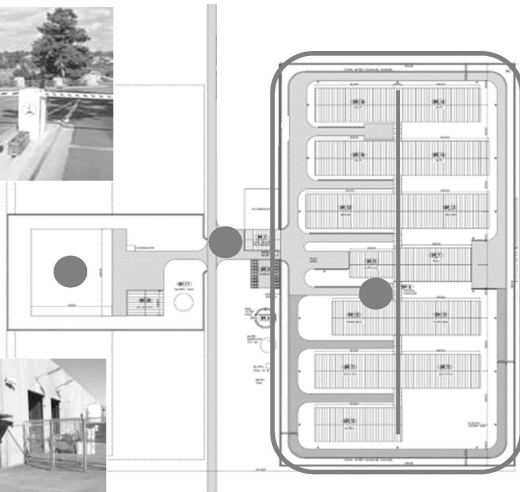
- Distance to other pig farms
- Distance to slaughterhouse
- Layout of pig unit



Biosecurity - Access points and logistics...



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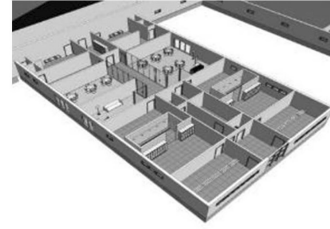


Biosecurity – Staff...



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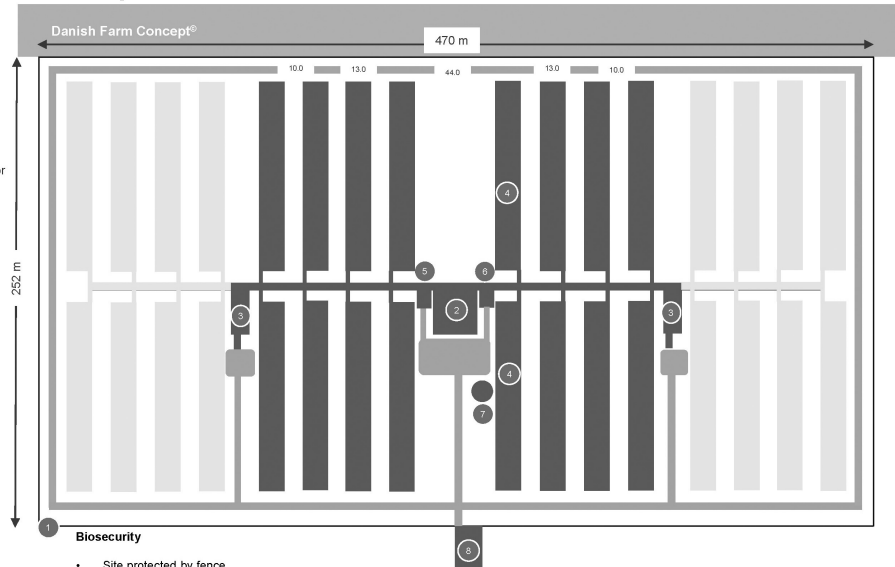
- One entrance
- No contact to pigs
- Change of clothes/shoes
- Shower
- Farm clothes



Layout - site plan finishers (2,500 sows) prepared for expansion

Site explanation

- 1: Fence and site boarder
- 2: Staff entrance and storage
- 3: Delivery of pigs
- 4: Finisher unit
- 5: Generator room
- 6: Cooling room and incinerator
- 7: Water tank (750 m3)
- 8: Gate house and truck wash

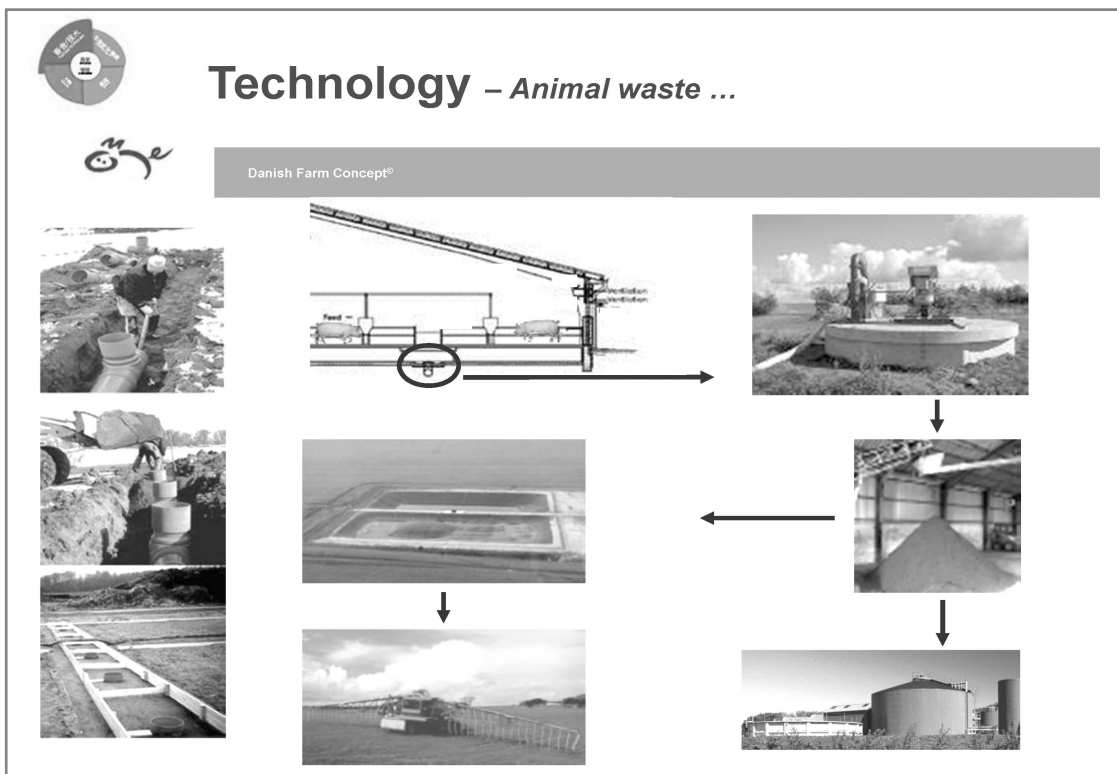
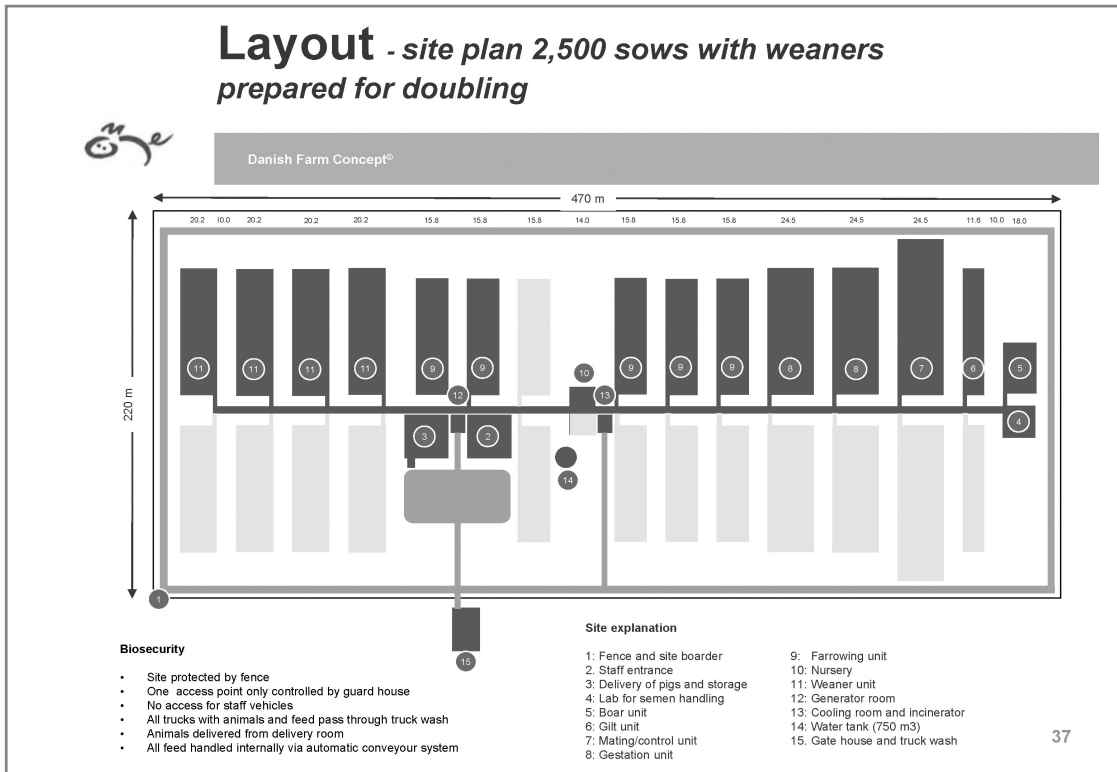


Biosecurity

- Site protected by fence
- One access point only controlled by guard house
- No access for staff vehicles
- All trucks with animals and feed pass through truck wash
- Animals delivered from delivery room
- All feed handled internally via automatic conveyour system



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Technology – Animal waste ...



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- 1 ton of slurry = 4-5 kg nitrogen
- Fertilizer value = 6 \$/ton
- Value of slurry from 1,000 sows full line = 150,000 \$ year



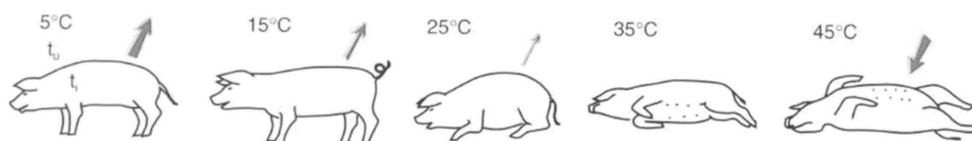
Animal waste recycled in fields = sustainable and profitable production



Technology – Environmental control ...



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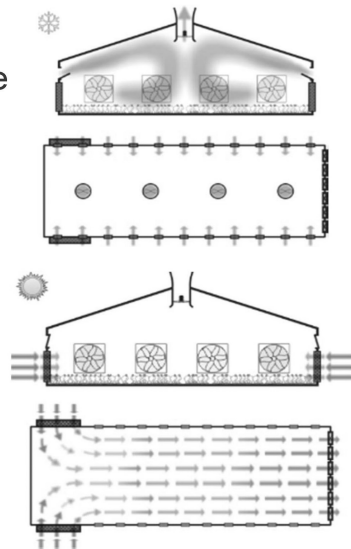


Technology – Environmental control ...



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- Ventilation designed for local climate
- Computer controlled:
 - Heating
 - Ventilation
 - Cooling



Technology – Housing ...



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- Mating / control unit
 - Individual feeding
 - Partly slatted floors
 - 5 weeks in unit
- Gestation
 - Group-housed sows
 - Individual feeding
 - Partly slatted floors
 - 11 weeks in unit





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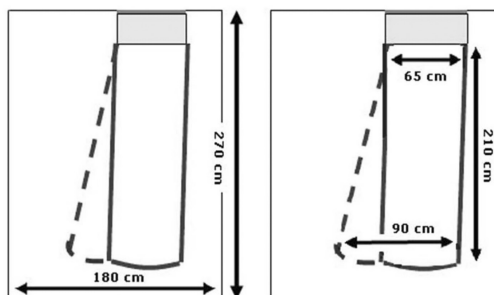
Technology – Housing ...



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■ Farrowing

- Farrowing crate
- Fully slatted floor
- Heated piglet zone
- 5 weeks in unit



Technology – Housing ...



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■ Weaner

- 20-24 pigs/pen
- Partly slatted floor
- Heated piglet zone
- 8 weeks in unit



■ Finisher

- 20-24 pigs/pen
- Fully slatted floor
- 14-15 weeks in unit





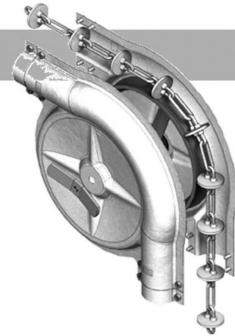
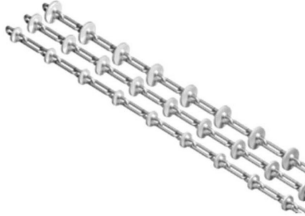
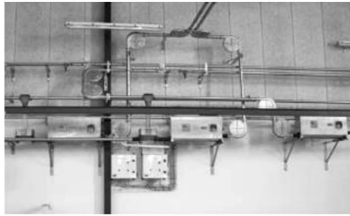
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Technology – Feeding technology ...



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45



Nutrition – Feed preparation ...



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- Good raw materials
- Diet for each category of pig
- Nutritional program
- Recipes prepared by nutritionists





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Agricultural education – Programs ...



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- Dalum Academy of Agricultural Business (DAAB) provides:
 - Short term programs of 4-12 weeks
 - Management programs
 - 8-10 months livestock/crop programs
 - Diploma programs
 - MBA program
- Education programs provided with full board



Management – Programs ...



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- Before animals arrive:
 - Training courses in Denmark
 - Prepare diets, working plans, vaccination plans, etc
- After animals arrive:
 - Danish manager on site (optional)
 - Practical training of staff on location
 - Online support between visits
 - Support from Danish vets and nutritionists
 - Report to top management and to farm management





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Management – Results from other countries ...



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- Danish technology
- Danish genetics
- Danish management

	Support 2007 - 2013		Denmark 2014	
	Year 1	Year 2	Average	Top 25%
Farrowing rate	85	89	87	90
Live born/litter	13.7	14.6	15.6	16.2
Litters/sow/year	2.33	2.37	2.26	2.32
Weaned/sow/year	29.3	31.0	30.6	33.0

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DANISH FARM
Concept® 康贝模式



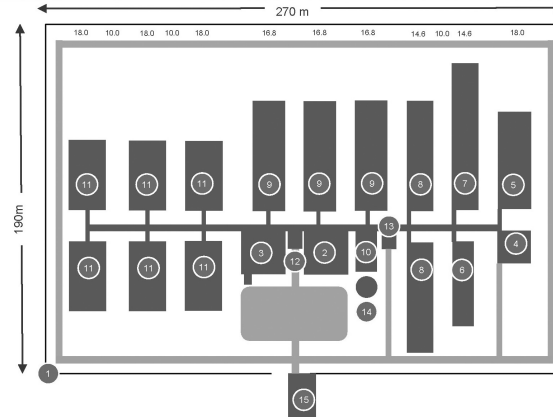


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Layout - site plan 1,250 sow breeder farm



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Biosecurity

- Site protected by fence
- One access point only controlled by guard house
- No access for staff vehicles
- All trucks with animals and feed pass through truck wash
- Animals delivered from delivery room
- All feed handled internally via automatic conveyour system

Site explanation

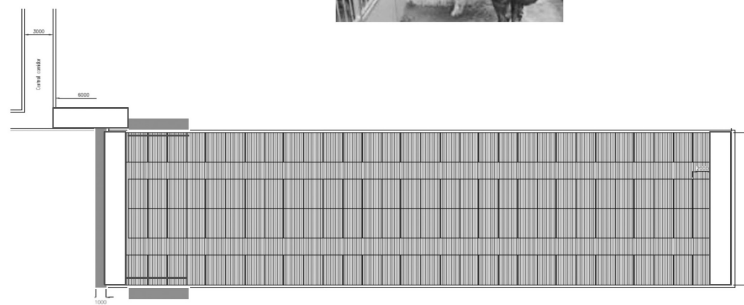
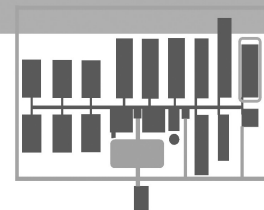
- 1: Fence and site boarder
- 2: Staff entrance
- 3: Delivery of pigs and storage
- 4: Lab for semen handling
- 5: Boar unit
- 6: Gilt unit
- 7: Mating/control unit
- 8: Gestation unit
- 9: Farrowing unit
- 10: Nursery
- 11: Weaner/gilt unit
- 12: Generator room
- 13: Cooling room and incinerator
- 14: Water tank (750 m3)
- 15: Gate house and truck wash

Breeder - Boar unit



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Building	53.0 x 18.0
Sections	1
Pens per section	100
Pen places total	100
Pen dimension	3.50 x 2.00





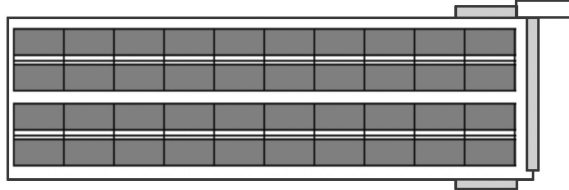
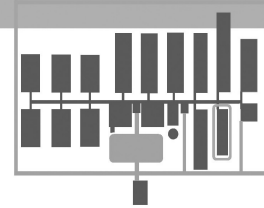
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Breeder - Gilt unit (own replacement)



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Building	47.0 x 12.6
Sections	1
Pens per section	40
Pen places gilts 16-28 weeks	252
Gilts per pen	6-7
Pen dimension	4.50 x 2.40
Space per pig, m2	1.5-1.8

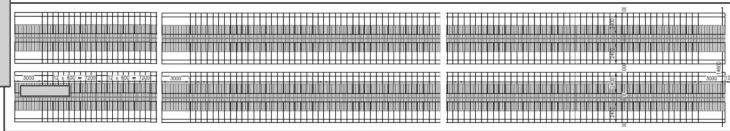
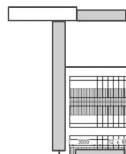
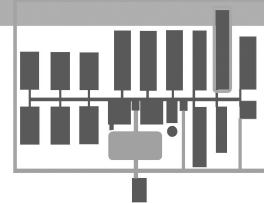


Breeder - Mating/control unit



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Building	84.0 x 14.6
Sections	1
Stalls, gilts	88
Stalls, sows	352
Gilt pens	4
Boar pens	4
Hospital pens	4





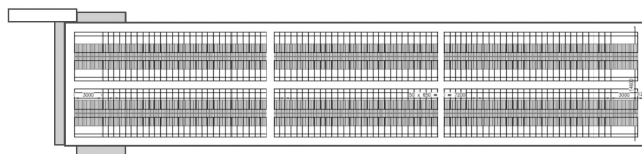
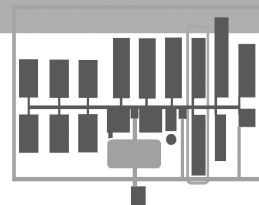
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Breeder – Gestation right side (other side identical)



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Building	60.0 x 14.6
Sections	2
Stalls, sows	348
Hospital pens	8

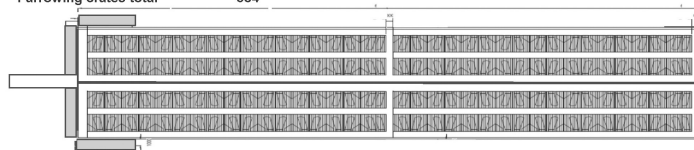
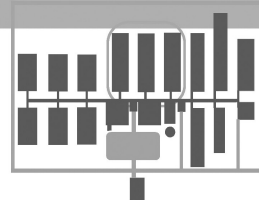


Breeder – Farrowing unit



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Building	60.6 x 16.8
Sections per building	2
Sections total	6
Farrowing crates/section	64
Pen dimension	2.7 x 1.8
Farrowing crates total	384





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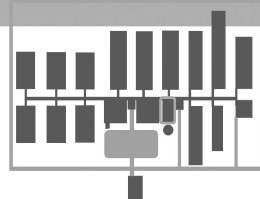
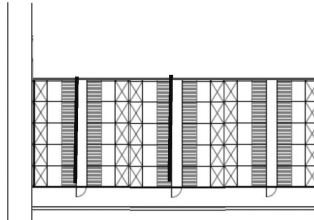
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Breeder - Nursery unit



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Building	22.2 x 10.5
Sections total	3
Pens per section	10
Pen places per section	200
Pen dimension	3.2 x 1.8
Space/pig, m2	0.29
Pen places in total	600

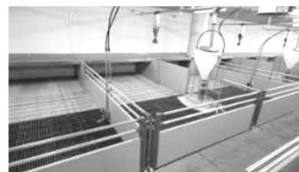
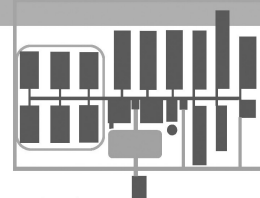
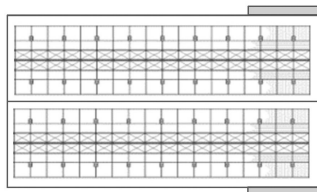


Breeder - Weaner and gilt unit



Danish Farm Concept®

Building	38.0 x 20.0
Sections per building	2
Sections total	12
Pens per section	36
Pen places per section	650/325
Pen dimensions	4.00 x 2.00
Space/pig, m2	0.44/0.88
Pen places weaners total	5,200
Pen places gilts total	1,300



It is assumed that castrates are sold at 30 kg and that gilts remain in the unit until 50 kg

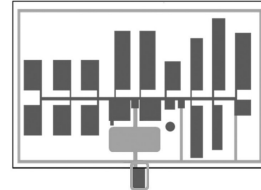
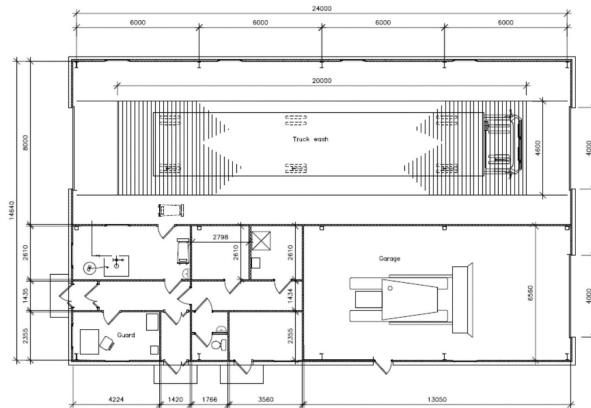


제34회 전국양돈세미나 / 함께 사는 한돈 - 냄새 저감

Breeder - Truck wash and gate house



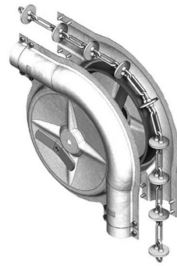
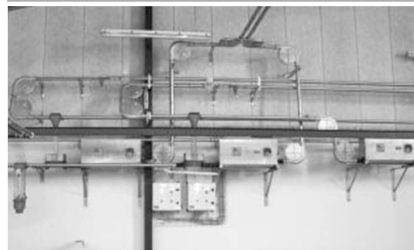
Danish Farm Concept®



Technology feeding



Danish Farm Concept®





❖ Associated with : DANISH FARM Concept®

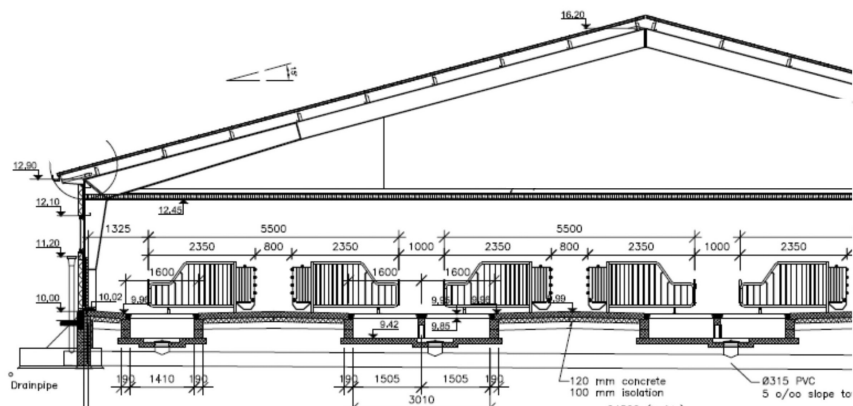
Building cross • section principle



Danish Farm Concept®

Important construction details to ensure bio security and good ventilation with low energy use:

- The building must be free from air leaks
- The roof must be insulated (minimum 50 mm) to avoid sun radiation and heavy heat load
- Slurry channels must be closed

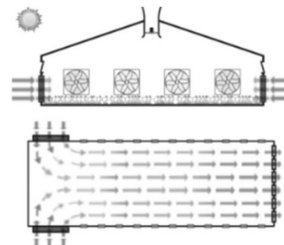


Technology • Ventilation System - Pad Cooling



Danish Farm Concept®

- Tunnel ventilation is used in all buildings except nursery
- Tunnel ventilation is provided by gable fans providing 35,000 m³/hour and cool pads
- The air flow rate is 2-2.5 m/second
- The cool pads should be protected from the sun via a roof



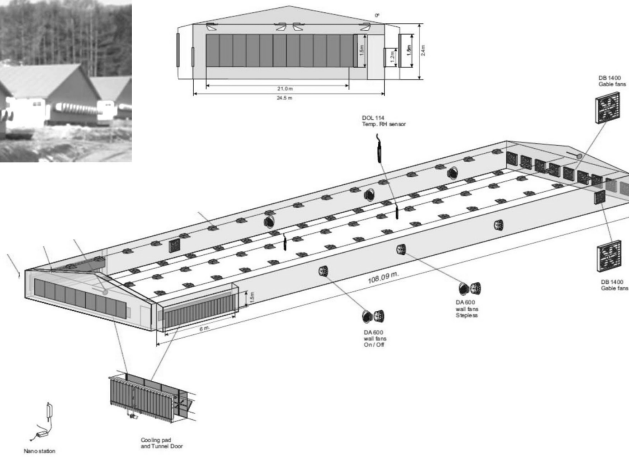


제34회 전국양돈세미나 / 함께 사는 한돈 - 냄새 저감

Technology • Ventilation System - Pad Cooling (gilts and sows)



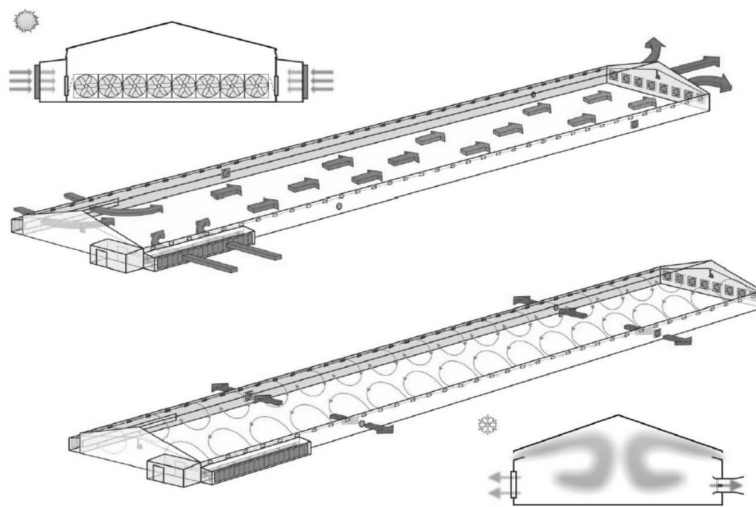
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Technology • Ventilation System – Combi-tunnel (weaners)



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Technology • Ventilation principle – LPV (nursery)

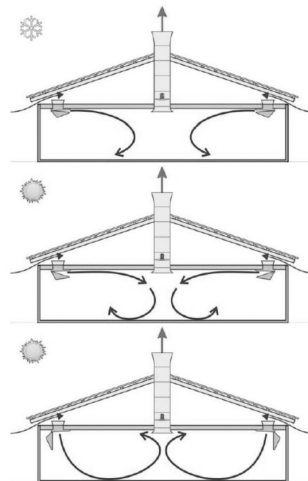


Danish Farm Concept®

- Low Pressure Ventilation (LPV) is provided for the youngest animals in nursery.
- Air inlets in the ceiling automatically directs the air flow into the building depending on the needs of the pigs – see sketch on the right.
- No cooling is required in the nursery



• Air inlets in ceiling



Danish Farm Concept – *your key to success*



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