

Healthy and Resilient Livestock

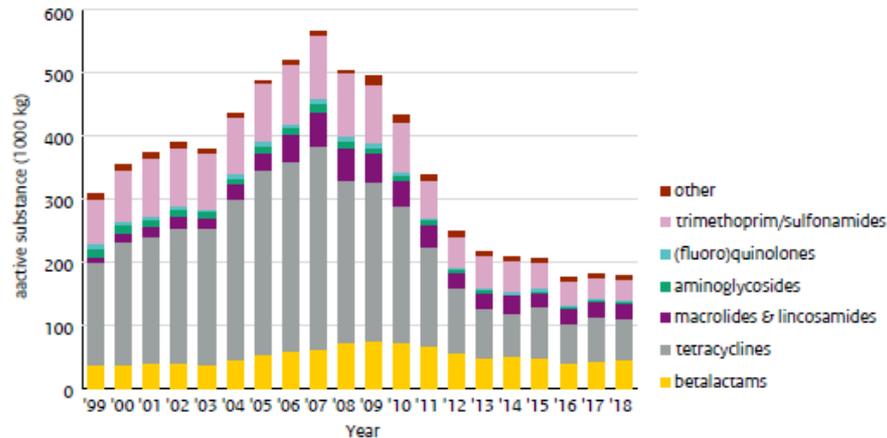
Annemarie Rebel, Ingrid van Dixhoorn,
Wageningen Bioveterinary Research
Wageningen Livestock research



Rational and societal needs

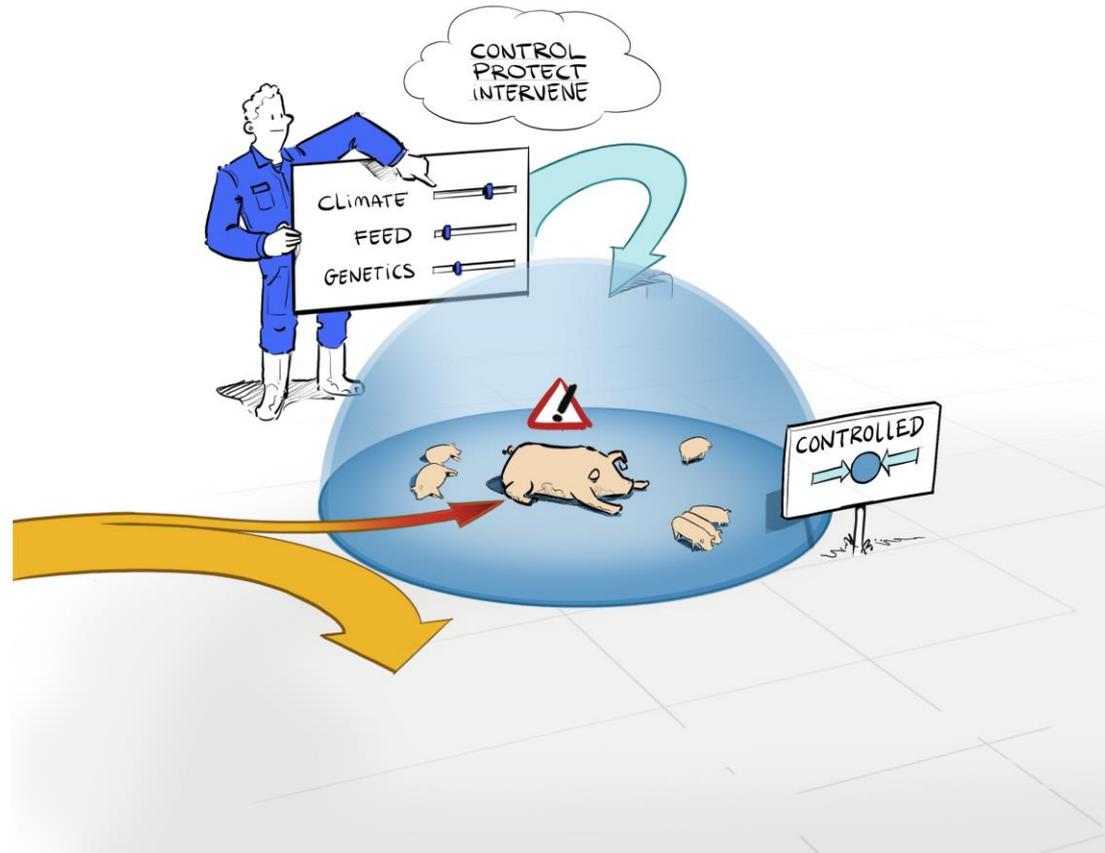
- Healthy animals and reduction of antibiotic usages

Figure ABuse01 Antimicrobial veterinary medicinal product sales 1999-2018 in kg (thousands).



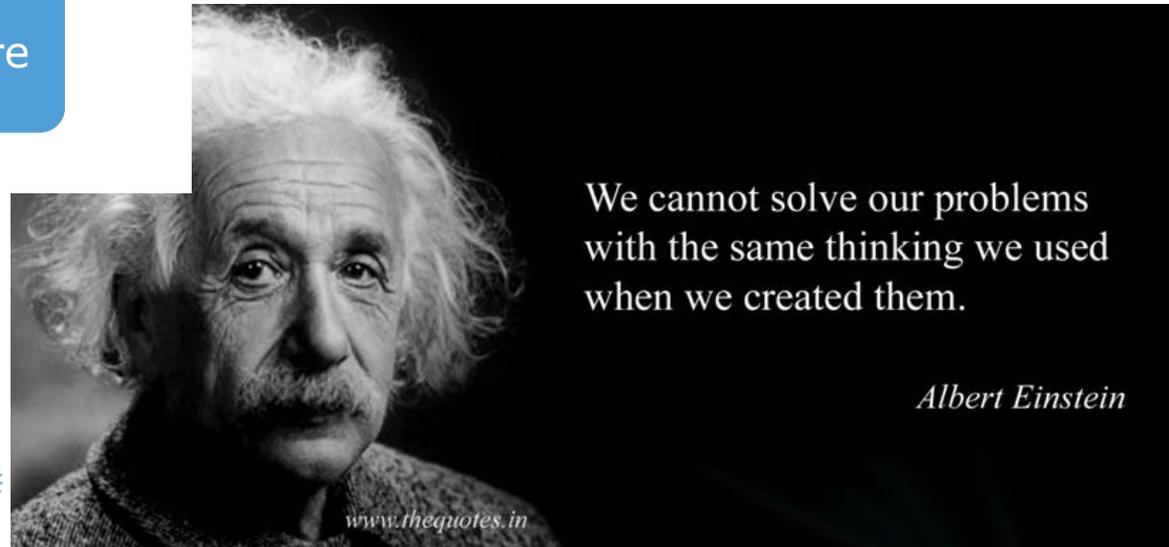
- Healthy people living together with healthy livestock

Prevention of animal diseases



Resilience

Resilience is the capacity of a complex system to adapt to changes and continue to function and develop (Holling, 1973)



Disease susceptibility

Define

Influence

Genetic
susceptibility

Pathogenicity

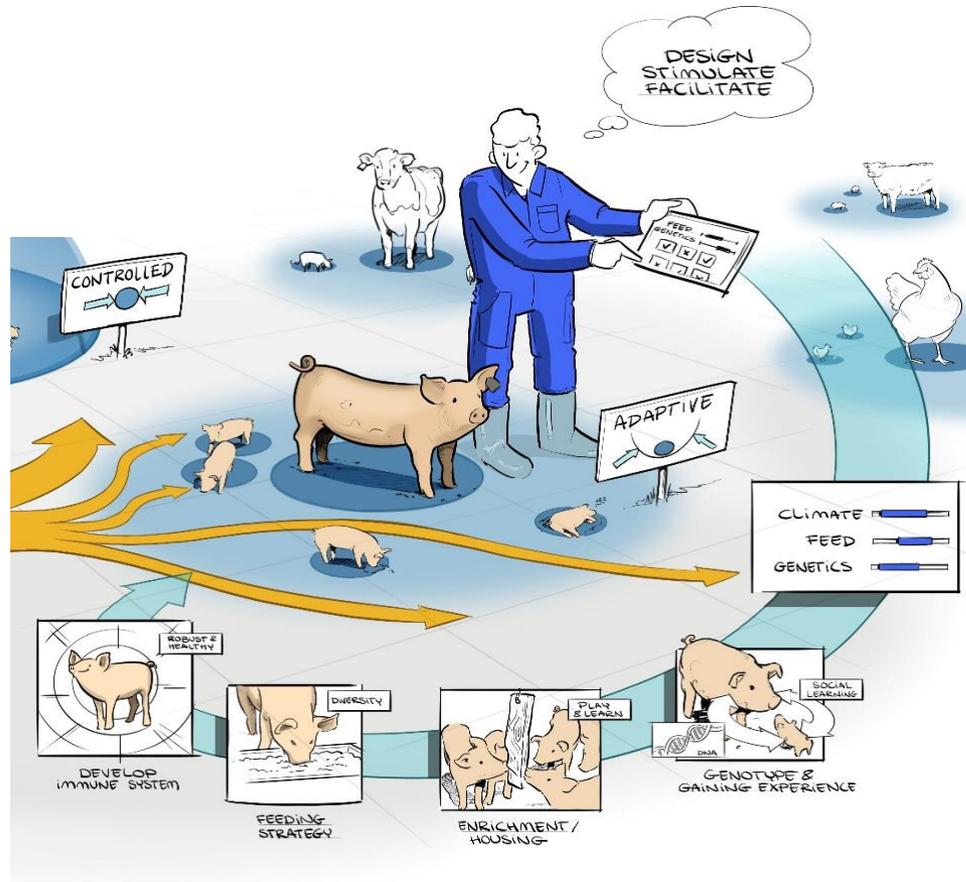
Husbandry
Conditions,
Hygiene

Age

Environment,
welfare



Health and resilient livestock



Diminish the risk factors with hygiene measures and vaccination

However, increase resilience of animals to improve the intrinsic capacity of the animal

Enriched housing reduces disease susceptibility to co-infection (PRRSV and *Actinobacillus pleuropneumoniae*, *App*) in young pigs, van Dixhoorn *et al*, Plos ONE, 2016



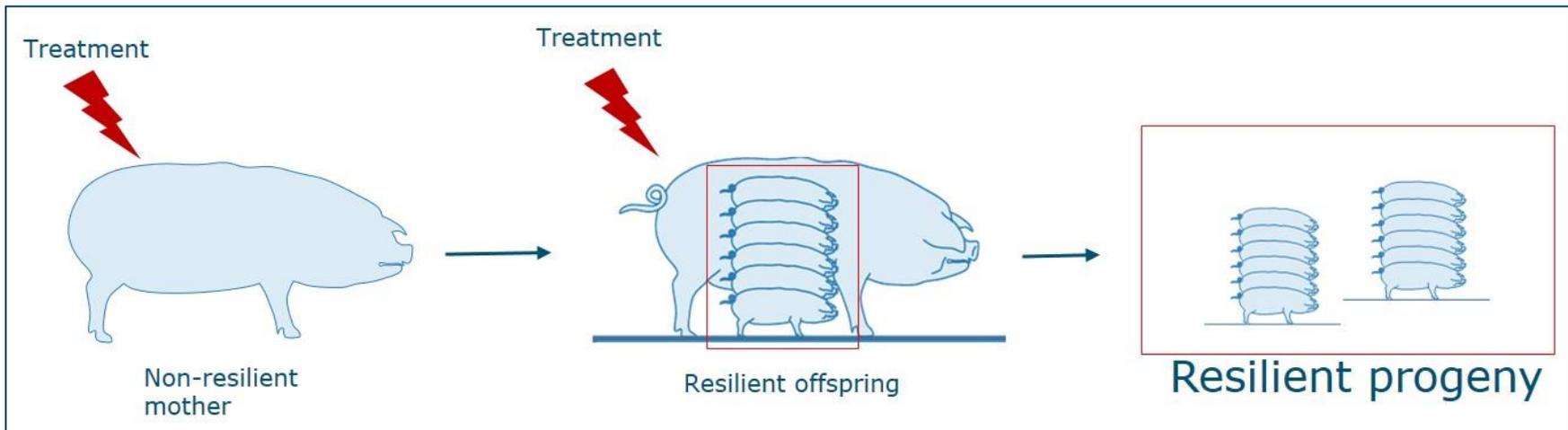
Influence



Effect of dietary intervention on intestinal development in piglets



- Two different feeding strategies to apply intervention:
 - Maternal administration
 - Neonatal administration by oral gavage



Epigenetic transfer
of resilience to
next generation

Conclusions



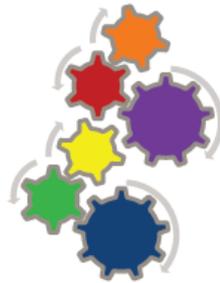
- Administration route (maternal or in young piglets) determines the outcome of intestinal development and on microbiota composition
- Feed in early life has consequences for the programming of the host immune system and therefore for resilience
- And therefore feed intervention could influence health



Interactions physiological systems

- To understand how physiological systems interact and contribute to the resilience of animals, requires an integrative approach.
 - connecting different systems and physiological regulation mechanisms.

**Systems
Behaviour**

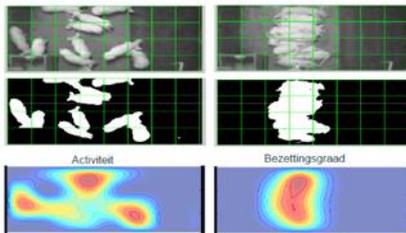
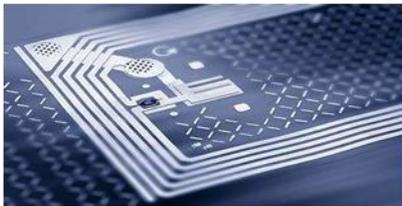


Resilient and healthy livestock

Animal based measurements

Sensor technology

- Monitoring performance, health and wellbeing of individual animals and groups
- Monitoring behaviour
- Methods: Video, RFID, Audio, E-nose, 3D-data logger, Infrared



Data

- Combining and translation of real time data (sound / images and activity)

Observation

Participation



Location of feeder

Enrichment



Prenatal flavour learning

Enrichment : burden or blessing?

Influence



35 ways to kill innovation

1. Don't be ridiculous
2. We have already tried this
3. This is too expensive
4. That is impossible
5. That is not our responsibility
6. That is a too drastic change
7. We don't have time for this
8. This makes other things we do unnecessary
9. We are too small for this
10. This is not our problem
11. We have never tried this before
12. Let's be realistic
13. Why changing, everything goes well?
14. You are years ahead of your time
15. We are not ready for this yet
16. This is not in the budget
17. This is not according to our policies
18. We have to use the resources we have got
19. You can never make this happen
20. The management will never buy this
21. We will make a fool out of ourselves
22. Let's keep this for a while in our head
23. We always managed without it
24. Has somebody else tried this one?
25. In our organisation this will never work
26. Can you guarantee that this will work?
27. This idea is good, but you know our system..
28. This is the way we have done it for years
29. If we do this, than that should also be changed
30. This is something for later
31. Let somebody have a look on this
32. If this would be a good idea, somebody else would already have done it
33. We will never find somebody to do this for us
34. You will never find a customer for this
35. Since when are you the expert?

