

Animal health and welfare aspects of different housing and husbandry systems for pig production

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Directorate-General for
Health & Consumers



Executive
Agency for
Health and
Consumers

OUTLINE

✓ Background

✓ Examples of housing and management aspects affecting welfare and health

✓ Monitoring systems and strategies for improvement

BACKGROUND

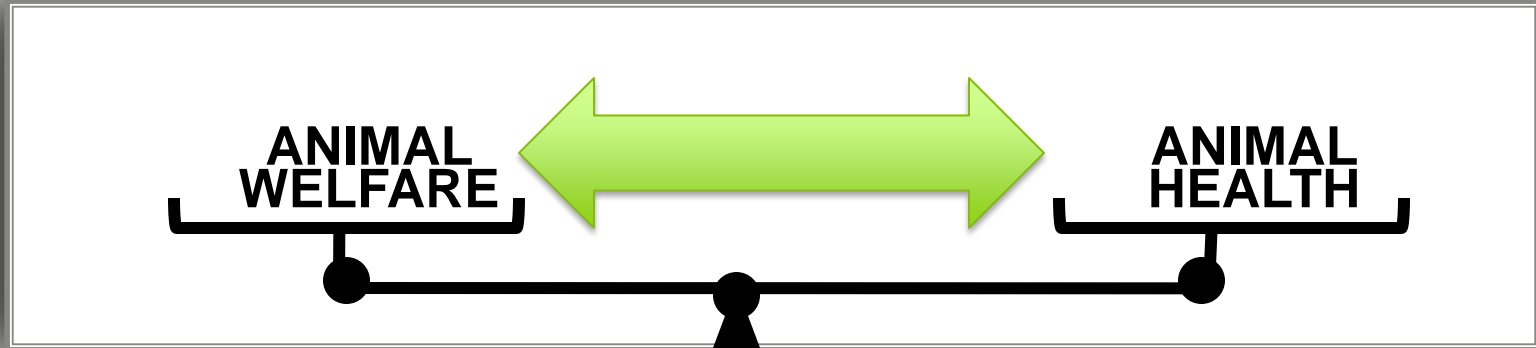
“Why zebras don’t get ulcers?”

R.M. Sapolsky (1998)



“Stress-related disease emerges, predominantly, out of the fact that we so often activate a physiological system that has evolved for responding to acute physical emergencies, but we turn it on for months on end, worrying about mortgages, relationships, and promotions.”

BACKGROUND



MULTIFACTORIAL DISEASES

BACKGROUND

Stimulus

CNS

Previous experiences
Age
Sex
Genetics
Individual traits
(Cognitive bias)

Stress response

Behavioural
response

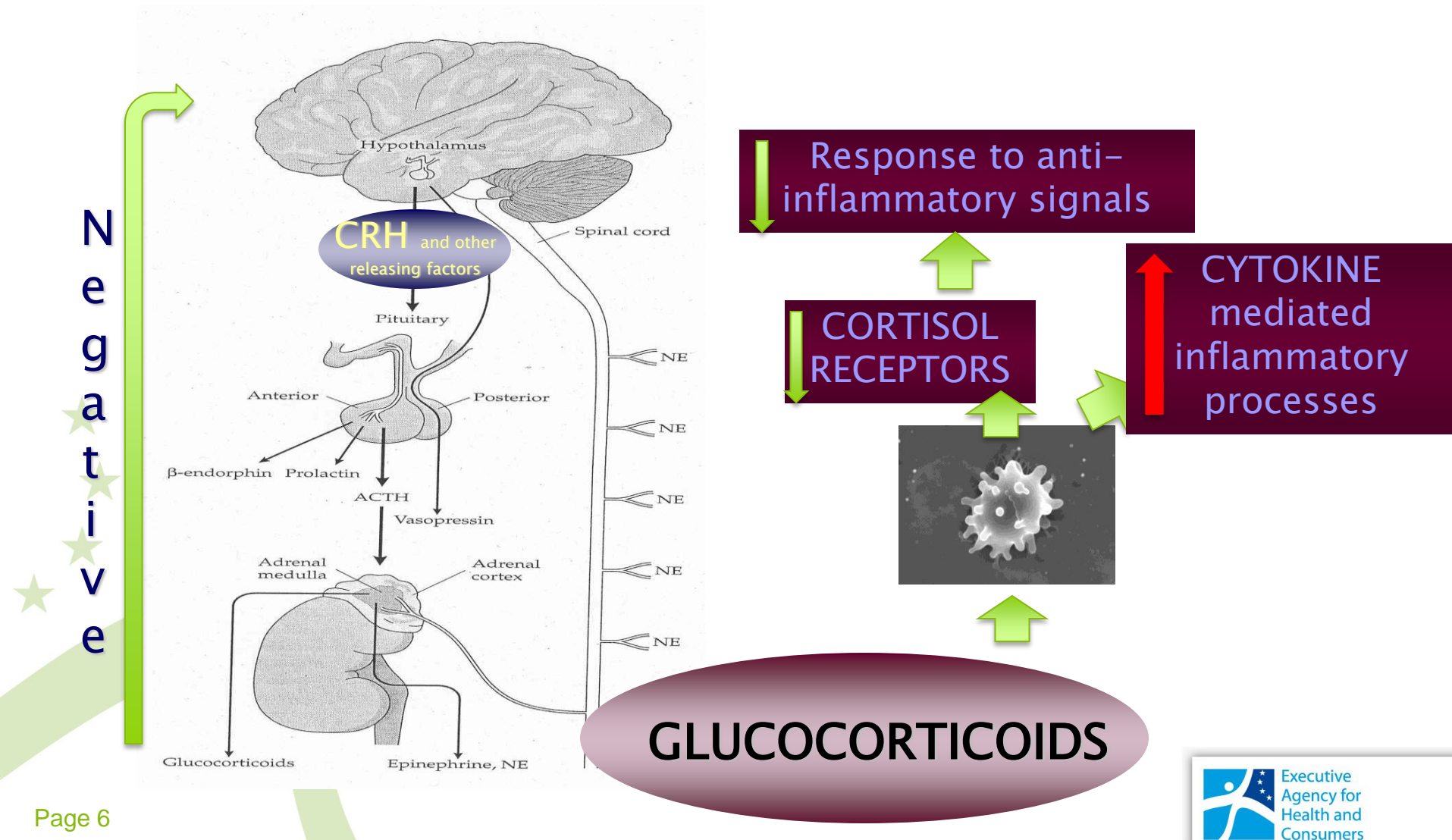
Physiological
response

ANS

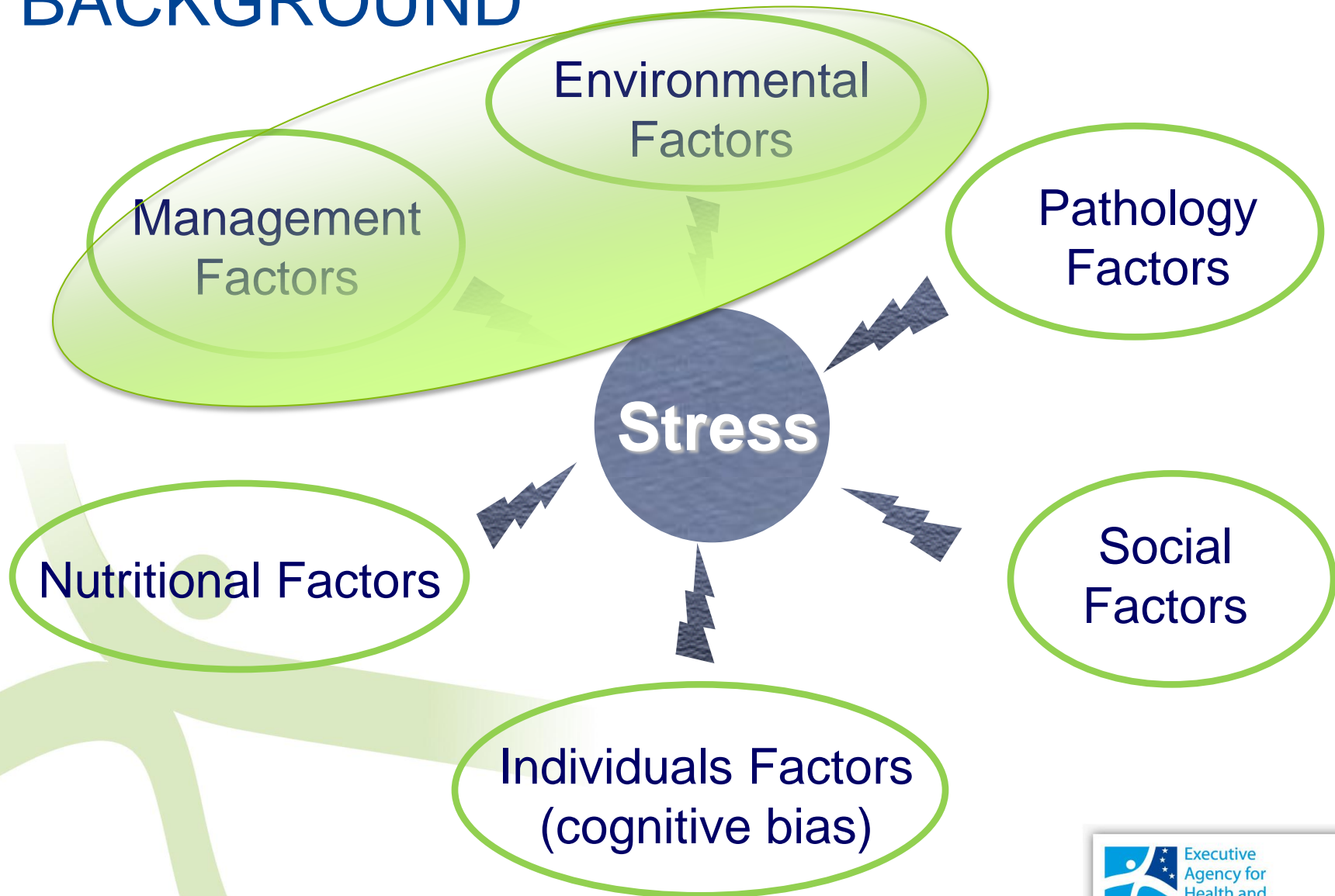
HPA axis

▼ WELFARE

BACKGROUND

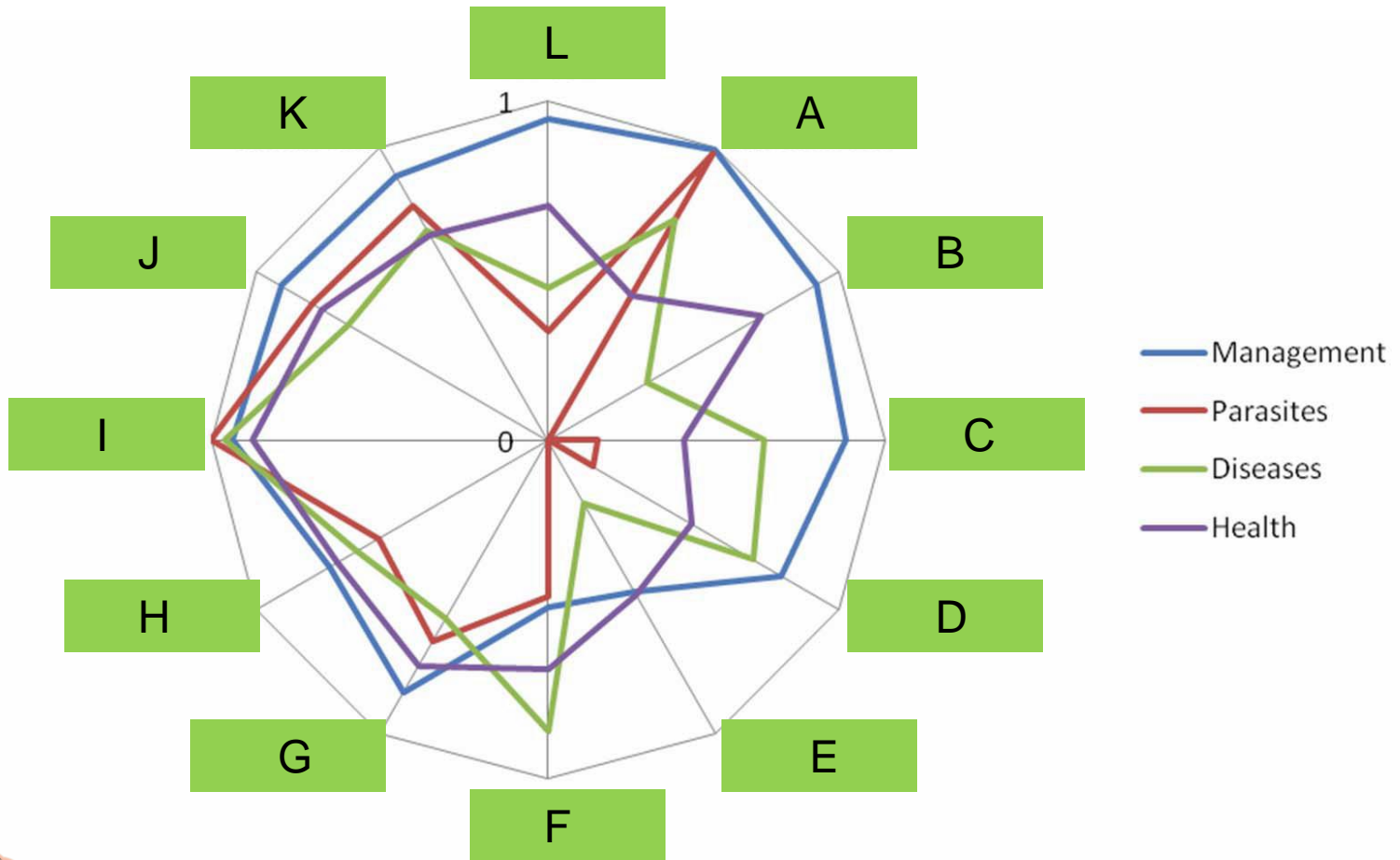


BACKGROUND



BACKGROUND

SUSTAINABILITY EVALUATION: HEALTH TOOL



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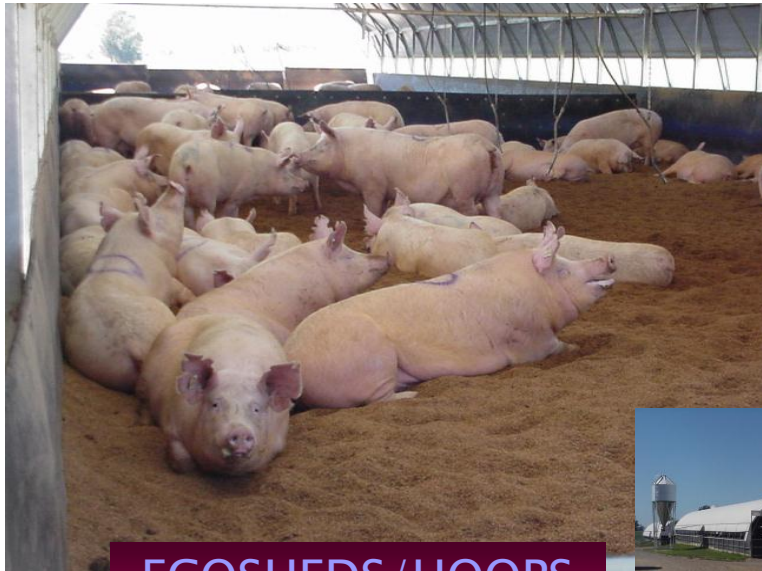
EXAMPLES –GESTATING SOWS

SOME HEALTH AND WELFARE PROBLEMS IN GROUP HOUSED SOWS

- ✓ Aggression and other redirected injuries (vulva biting)
- ✓ Disease control
- ✓ Multifactorial diseases (PRRS...)
- ✓ Lameness (quality of flooring vs. Incapacity to move)
- ✓ ...

EXAMPLES –GESTATING SOWS

SOME HEALTH AND WELFARE PROBLEMS IN GROUP HOUSED SOWS



ECOSHEDS/HOOPS



Karlen et al., 2006



**MORE CHALLENGES AT
THE BEGINNING:
AGGRESSION**



CONVENTIONAL STALLS

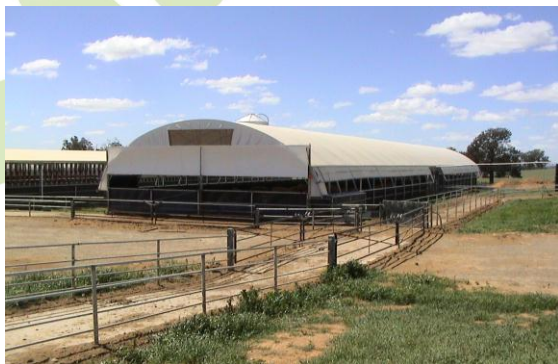


**MORE CHALLENGES
AT THE END:
STRESS**

EXAMPLES –GESTATING SOWS groups and stalls

EFFECT OF HOUSING SYSTEM ON LAMENESS SCORE

	STALLS	HOOPS
% 2 or 3 Scoring at week 9	7	0
% 2 or 3 Scoring at week 15	13.8	0.8

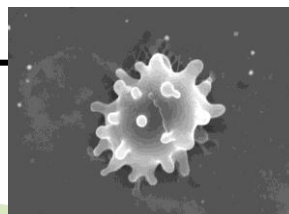


(Karlen et al., 2006)

EXAMPLES –GESTATING SOWS groups and stalls

EFFECT OF HOUSING SYSTEM ON WBC COUNTS

	STALL	HOOPS
Neutrophil (%WBC)	46.0	41.0
Lymphocytes	41.62	46.45
Neu/Lymp ratio	1.22	0.939



GLUCOCORTICOIDS

Redistribution in WBC counts



NEUTROS



LYMPHOS

(Karlen et al., 2006)

EXAMPLES –GESTATING SOWS groups and stalls

EFFECT OF HOUSING SYSTEM ON FEAR TO HUMANS

	STALL	HOOPS
Withdrawal (%)	64	24
Return after withdrawal (s)	13.4	1.4
Total feeding time (s)	16.6	24.0

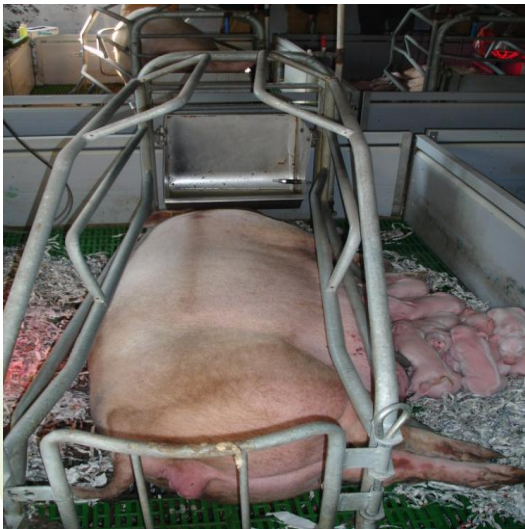


FEAR AS STRESS INDICATOR ???

(Karlen et al., 2006)

EXAMPLES –LACTATING SOWS

FARROWING CRATES VS. LOOSE FARROWING SYSTEM



PIGLET MORTALITY

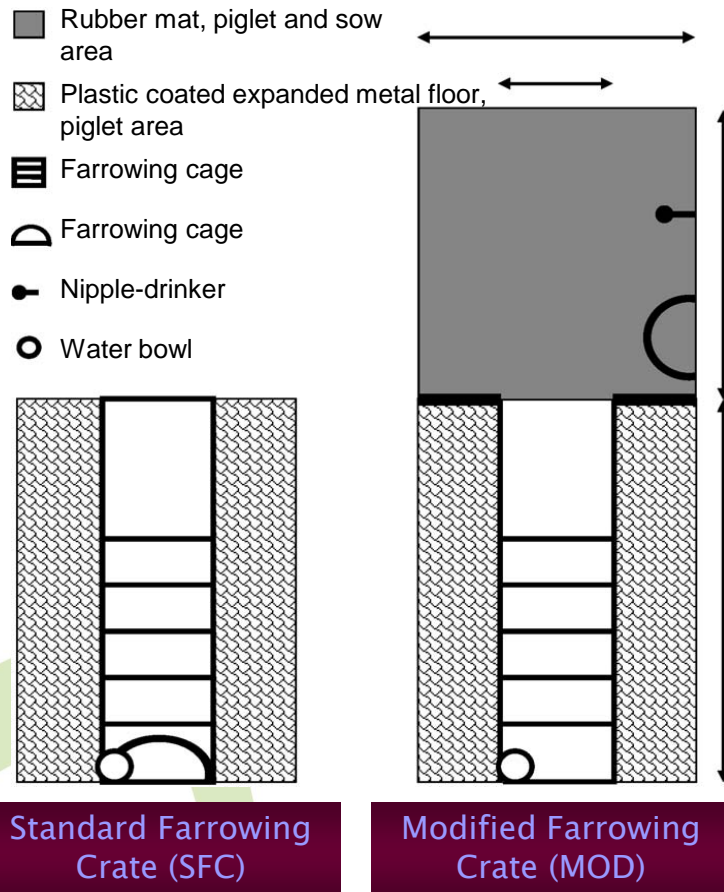
SOW WELFARE AND RECOVERY

ENVIRONMENT

HEALTH

EXAMPLES –LACTATING SOWS

EFFECT OF FARROWING PEN TYPE AND SEASON ON SOW AND LITTER PERFORMANCE AND AIR QUALITY



✓ MOD PENS BENEFICIAL TO SOWS AND PIGLETS IN HOT SEASON NOT COOL

✓ AIR QUALITY AFFECTED BY TYPE OF PEN AND SEASON

EXAMPLES –LACTATING SOWS

EFFECT OF FARROWING PEN TYPE AND SEASON ON SOW AND LITTER PERFORMANCE AND AIR QUALITY

	21°C		29°C	
	STD	MOD	STD	MOD
Sow Weight at weaning (kg)	177.3	175.9	156.0	169.3
Backfat thickness at weaning (mm)	15.3	15.1	10.9	12.3
Feed intake week 3 lactation (l/day)	5.78	5.90	4.19	5.16
Water use (l/day)	21.3	25.9	32.2	58.9

(Farmer et al., 2006)

EXAMPLES –LACTATING SOWS

EFFECT OF FARROWING PEN TYPE AND SEASON ON SOW AND LITTER PERFORMANCE AND AIR QUALITY

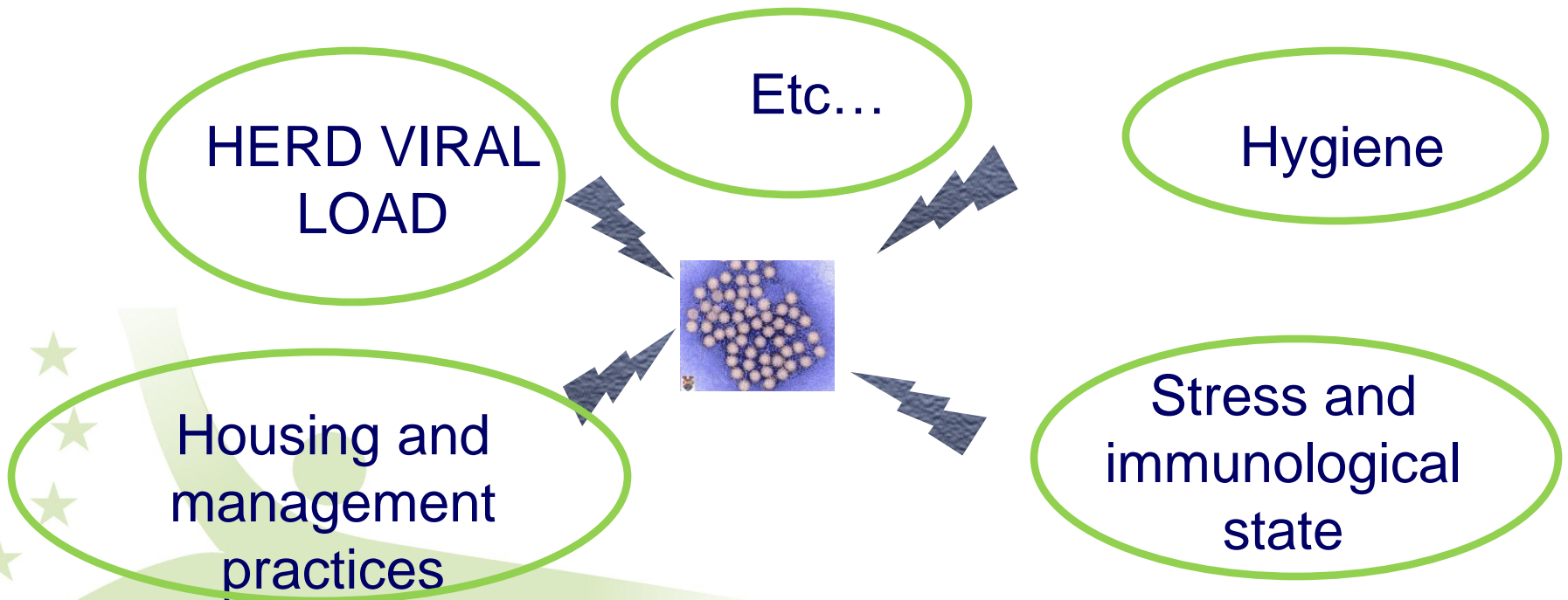
	SEASON		PEN TYPE	
	21°C	29°C	STD	MOD
AMMONIA EMISSIONS (ppm)	8.12	12.95	9.41	11.70
METHANE EMISSIONS (ppm)	7.70	9.06	6.39	10.37

CARBON
FOOTPRINT ??
NOT SO EASY...

(Farmer et al., 2006)

EXAMPLES –WEANING

POST WEANING MULTISYSTEMIC WASTING SYNDROME (PMWS), A MULTIFACTORIAL DISEASE



“From a general point of view, all the measures that could help to lower all stressful conditions such as, successive mixing or bad rearing and hygiene conditions might be of interest to lower PMWS expression.”

EXAMPLES –WEANING

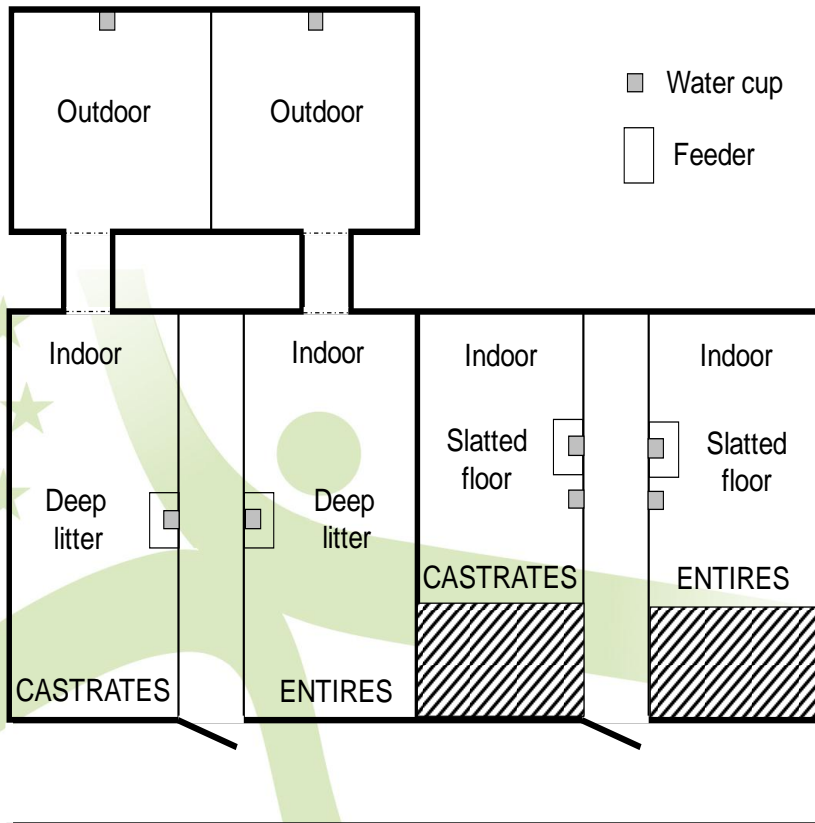
POST WEANING MULTISYSTEMIC WASTING SYNDROME (PMWS), A MULTIFACTORIAL DISEASE

	OR
Average pen area in weaning facilities >7.8 m ²	3.2
Setting up a pre-nursery for early-weaned piglets	0.1
Separated pit for adjacent rooms	0.9
Collective rearing of sows during pregnancy	0.3
PRRSv Status of 20-week old fattening pigs (>50% positives)	6.5



EXAMPLES – GROWING PIGS

EFFECT OF HOUSING ENVIRONMENT AND SURGICAL CASTRATION ON THE IMMUNE FUNCTION OF FATTENING MALE PIGS



✓ **ANDROGENS STIMULATE MATURATION OF IMMUNE SYSTEM IN JUVENILE PIGS (CONTRARY TO ADULTS)**

✓ **NO EFFECT OF HOUSING SYSTEM**

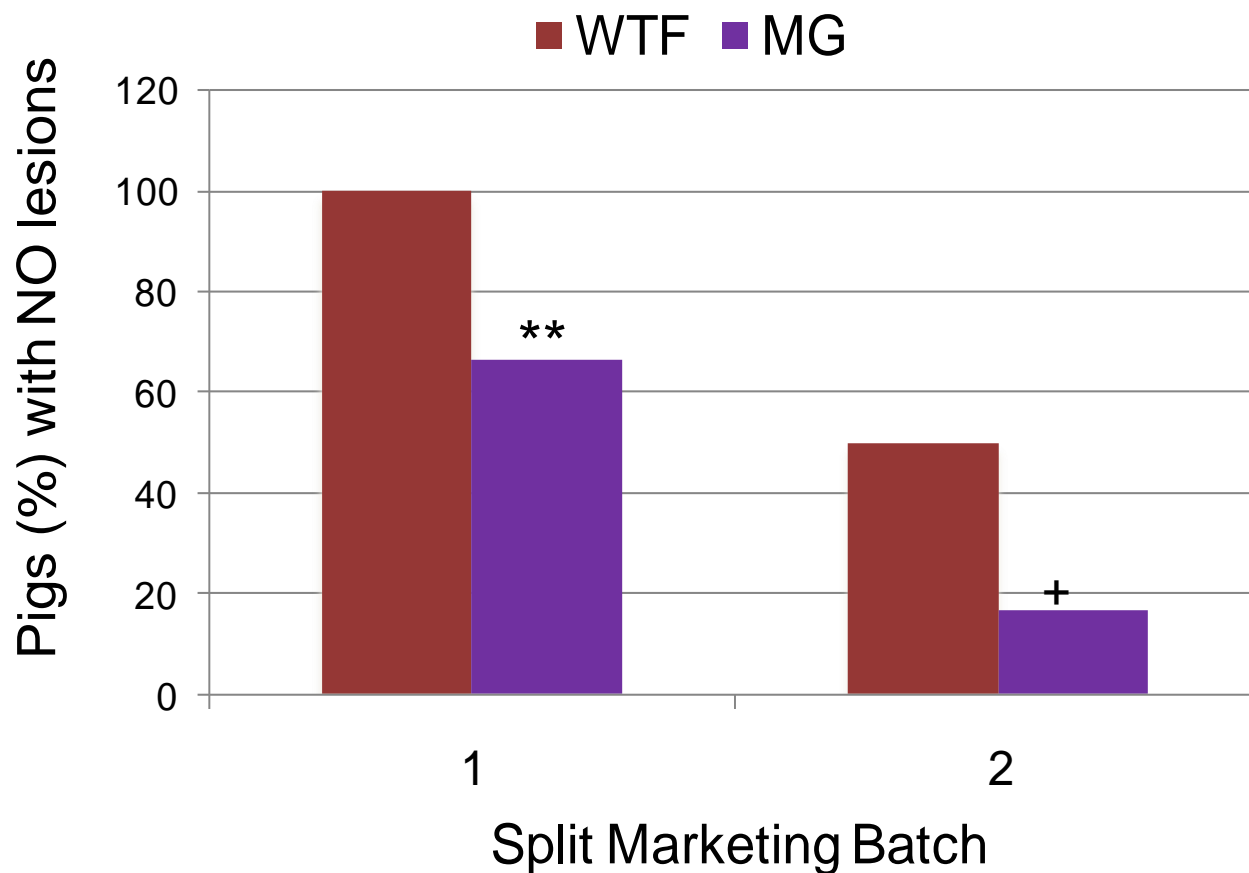
EXAMPLES – GROWING PIGS

EFFECT OF HOUSING ENVIRONMENT AND SURGICAL CASTRATION ON THE IMMUNE FUNCTION OF FATTENING MALE PIGS

	SLATTED FLOOR		ENRICHED ENVIRONMENT	
	Castrates	Entires	Castrates	Entires
★ Leucocytes at M5 (x1000/ml blood)	18.2	24.3	22.3	27.5
★ % Lymphocytes at M5	58.9	62.3	57.0	62.1
★ % Granulocytes at M5	39.3	36.4	41.3	36.4
Thymus weight (g/kg live weight)	2.5	3.3	2.7	3.0

EXAMPLES – GROWING PIGS/SLAUGHTER

EFFECT OF SPLIT MARKETING ON SKIN LESIONS



OUTLINE

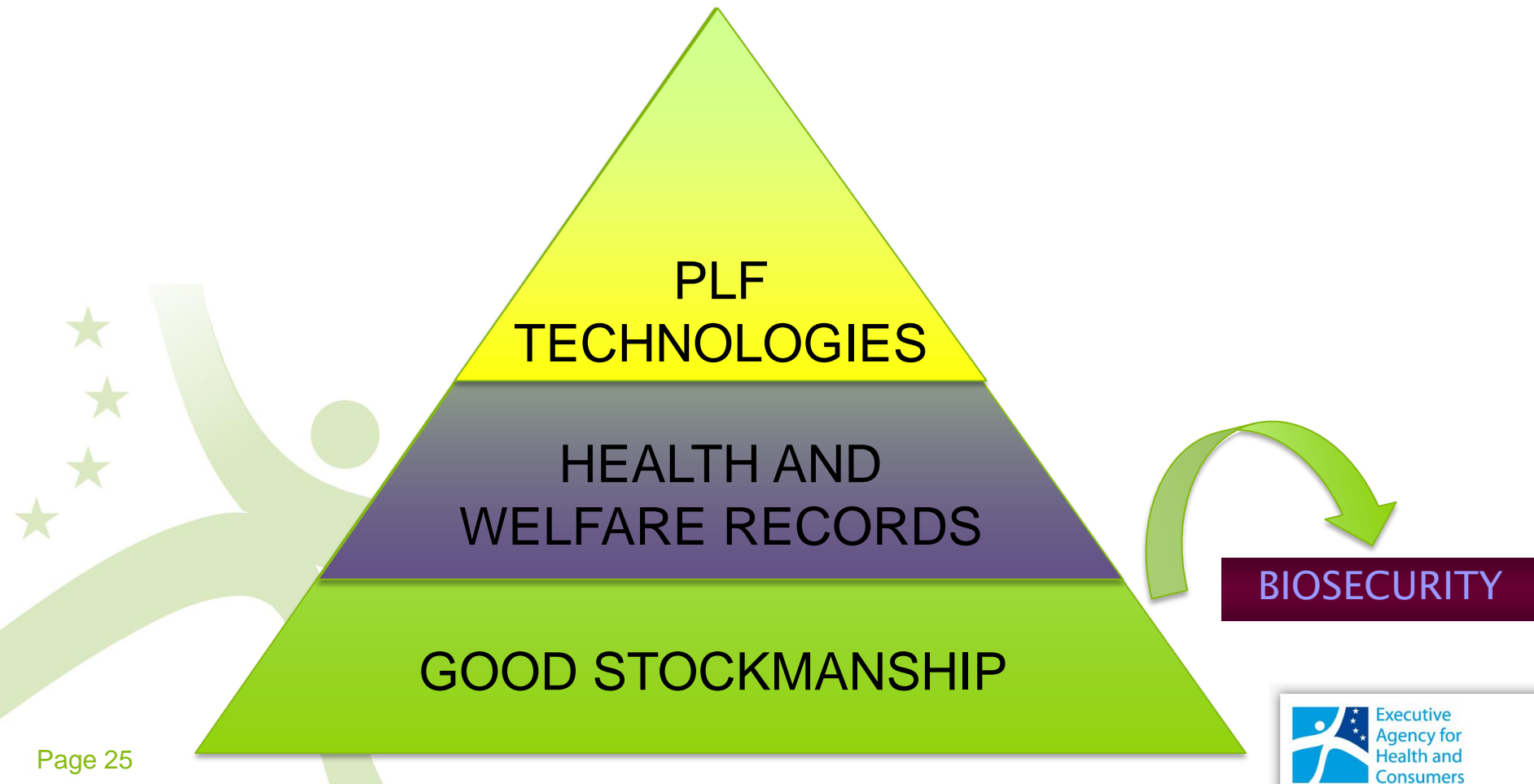
✓ Background

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MONITORING SYSTEMS

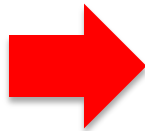
A PYRAMID FOR HEALTH AND WELFARE MONITORING AND PREVENTION



MONITORING SYSTEMS

GOOD STOCKMANSHIP

DILEMMA
WELFARE
LEGISLATION



HIGHER STOCKPEOPLE
SKILLS AND MOTIVATION



DIFICULTIES TO
FIND STOCKPEOPLE
and to MOTIVATE



MONITORING SYSTEMS

GOOD STOCKMANSHIP

IS IT A QUESTION OF



✓ **FORMATION**

✓ **JOB SOCIAL PERCEPTION**

✓ **WORKING CONDITIONS**

EG.WC Included in the
SUSTAINABILITY tools in
QCHAINS



MONITORING SYSTEMS

HEALTH AND WELFARE RECORDS

✓ RECORDS OF “NORMAL” *ON FARM* INFORMATION

(respiratory and digestive signs, behaviour, body condition, treatments...)

✓ RECORDS OF *ON LINE* ABATTOIR INFORMATION

(respiratory and digestive tracts, lesions...)

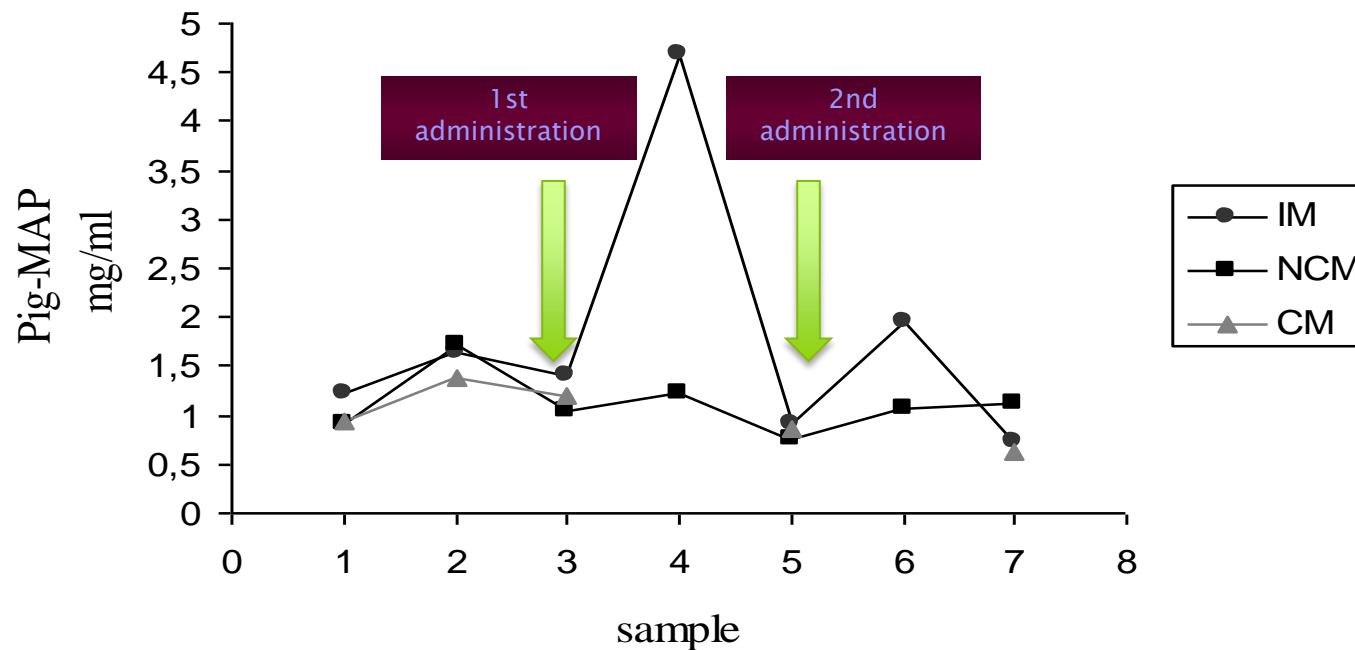
✓ DISEASE CONTROL PROGRAMS: SALMONELLA (DANISH SYSTEM), PRRS...

✓ DETECTION OF SUBCLINICAL STATES: ACUTE PHASE PROTEINS ??

MONITORING SYSTEMS

HEALTH AND WELFARE RECORDS

ACUTE PHASE PROTEINS AFTER VACCINATION AGAINST BOAR TAINT



MONITORING SYSTEMS

PLF TECHNOLOGIES

SOME EXAMPLES

✓ ANIMAL VOCALIZATIONS:

➔ stress indicator, adaptability to temperature (Moura et al., 2008; Hillman et al. 2004)



✓ COUGH RECORDS:

➔ early detection of respiratory disease (Exadaktylos et al., 2008; Guarino et al., 2008; soundtalks...)



✓ STATIC CLAW PRESSURE DISTRIBUTION:

➔ lameness prediction (de Carvalho et al., 2009)

**BRIGHT ANIMAL
PROJECT**

MONITORING SYSTEMS

PLF TECHNOLOGIES

BUT...WHY THEY ARE NOT AS WIDESPREAD AS EXPECTED?

✓ **TOO EARLY**

✓ **NEED MORE DEVELOPMENT**

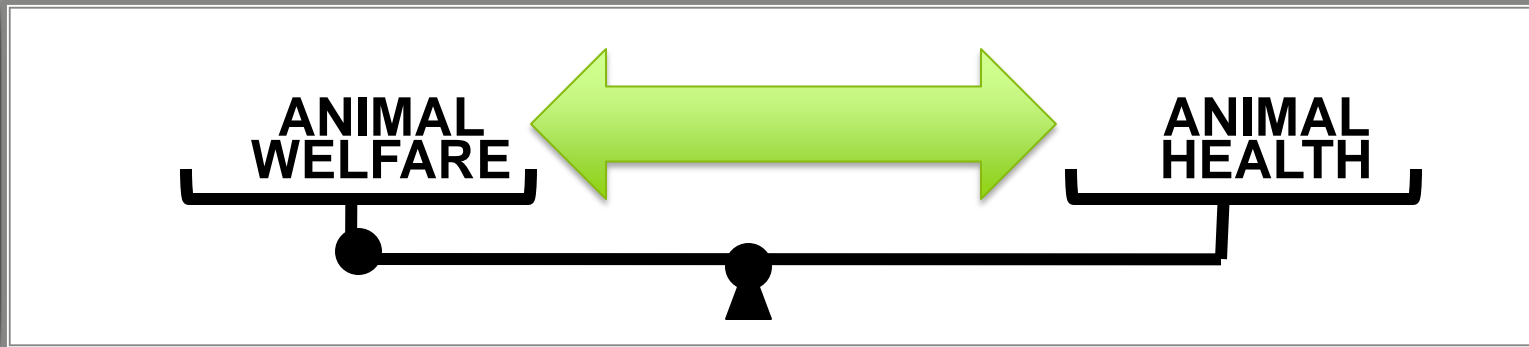
✓ **FINE-TUNING WITH FARMERS' NEEDS**

✓ **TOO EXPENSIVE**

✓ ...

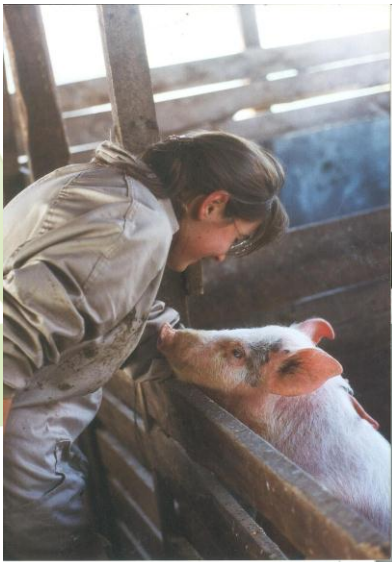


CONCLUSIONS ?



**PROBABLY NOT..BUT THERE IS
ROOM FOR IMPROVEMENT...**

MANY THANKS FOR YOUR ATTENTION!!!



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