

# Sustainability of bedded pack barns

... an overview ...

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# Why Bedded Pack Barns?



Labour efficiency



Animal welfare and  
manure quality



# Why Bedded Pack Barns?



Lying area is also manure storage



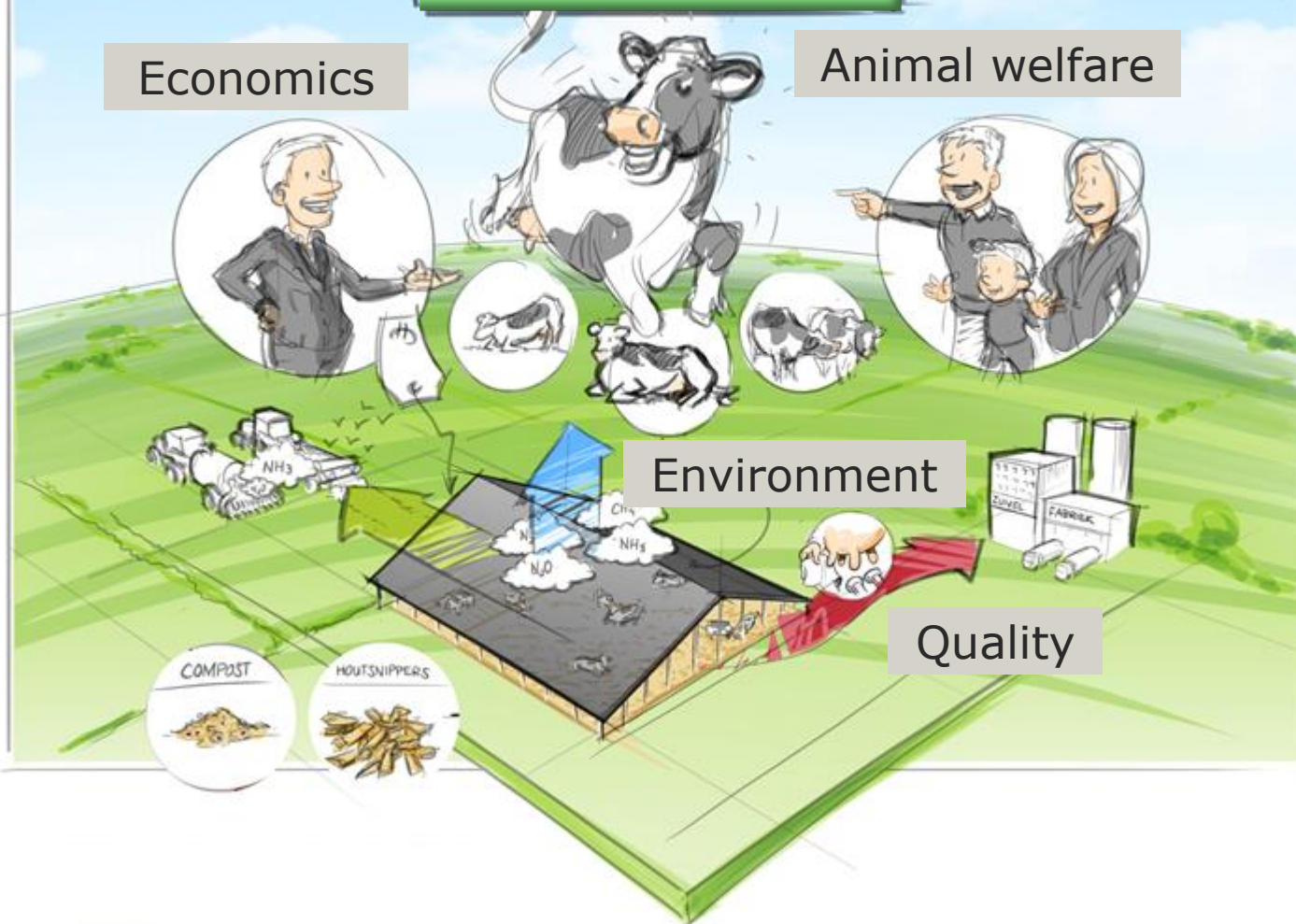
# Sustainability

Economics

Animal welfare

Environment

Quality



# Environment

# Manure quality

Input NPC



export NPC



Emission land

Emission stable

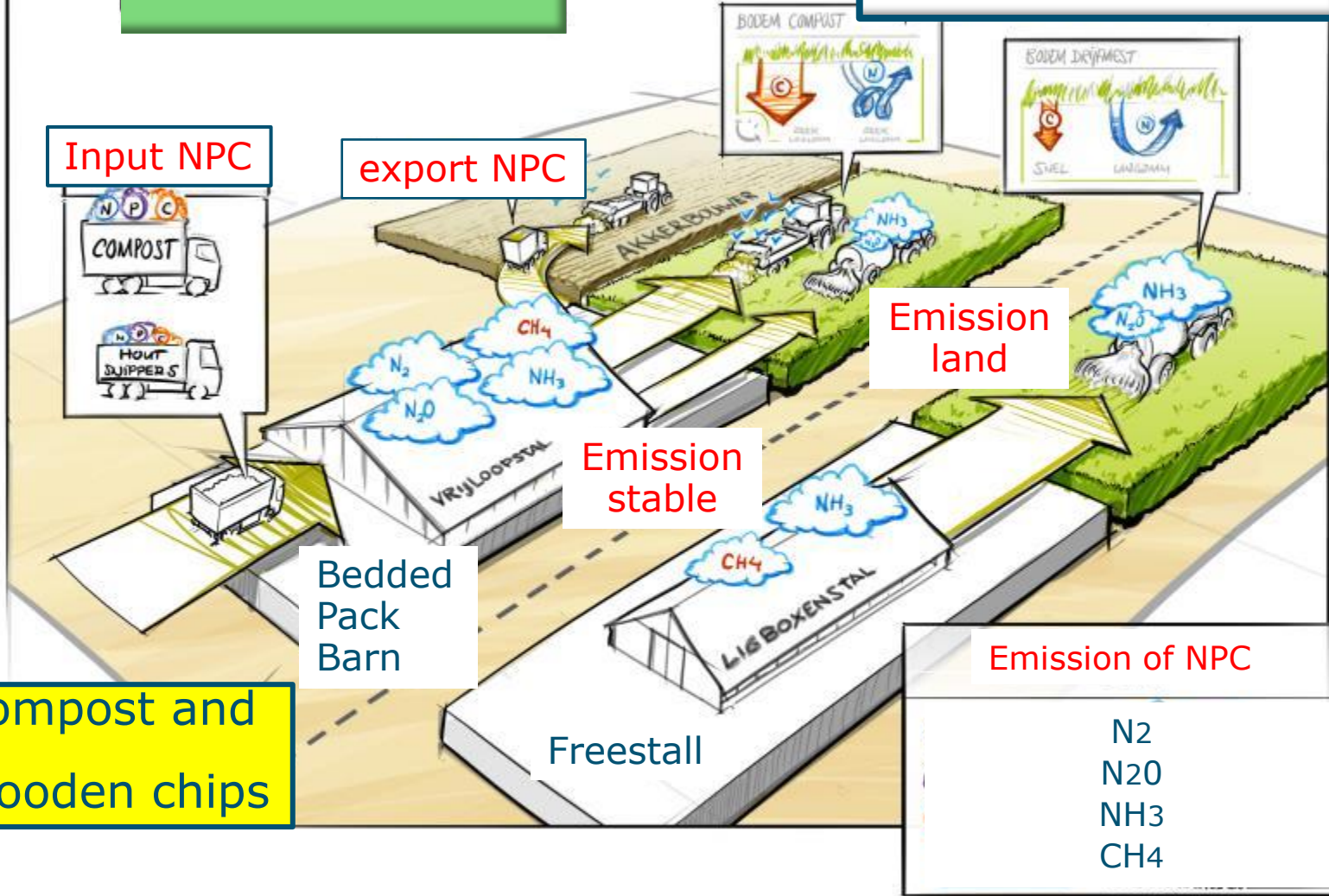
Bedded Pack Barn

Freestall

Emission of NPC

Compost and Wooden chips

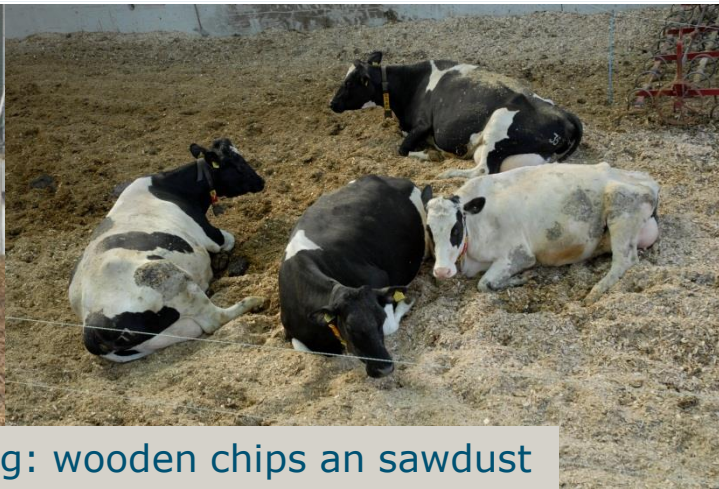
- N<sub>2</sub>
- N<sub>2</sub>O
- NH<sub>3</sub>
- CH<sub>4</sub>



# Experiments on 3 regional farms



Composting: wooden chips and sawdust



Drainage with sand



Absorbing with peat ground and reed



Cows in Green house with folie

# Monitoring 10 commercial farms; 5 are composting wood chips



1. Blowing air



2. Blowing air



3. Suckling air



4. Suckling air



5. No aerating



# four using green waste compost one cultivates straw



Farms 6 to 9  
use compost



10 Straw







Composting ...

once a day mill the bedding

12 ÷ 15 m<sup>2</sup> per cow



Aerating system,  
Blowing air



Aerating system,  
Suckling air



# Bedding material used on grassland and arable land



Roof from horticulture







# Animal welfare and health

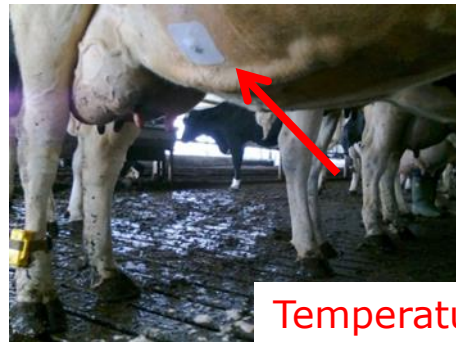
<b>Welfare</b>	<b>Bedded pack vs freestall</b>
Time required to lie	+
Hygiene	0/+
Skin injuries	++
Legs and claws	+
Natural behaviour	+
<b>Health</b>	
Udder health	0
Antibiotics usage	0
Longevity	+?





# Animal welfare and health

No heat stress from  
heat production bedding



Temperature sensor

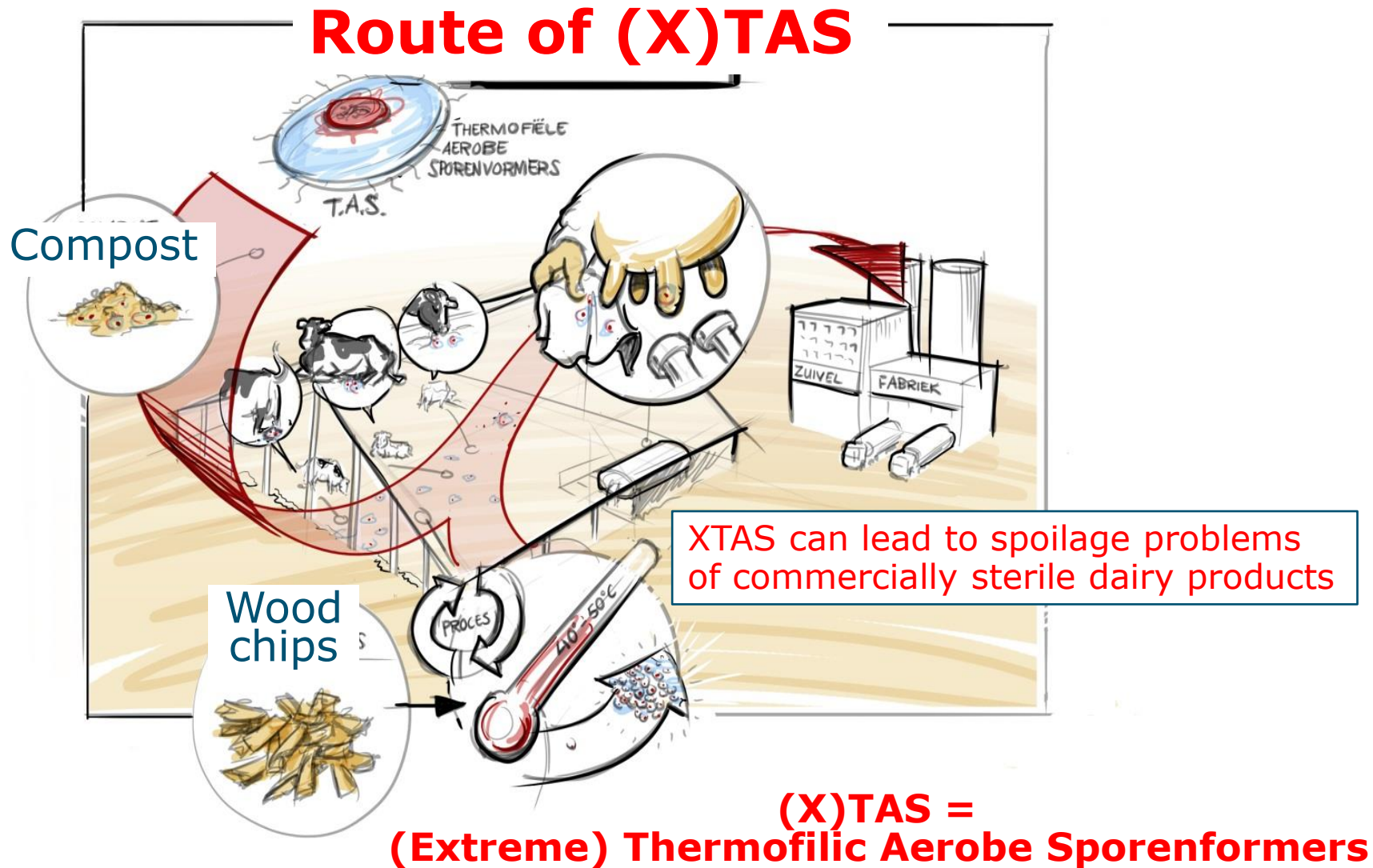


# Economics bedded pack barns

	Bedded pack barn vs freestall
Investment manure storage	-
Investment roof	++
Total investment	+
Yearly costs stable and bedding	+
higher production per cow	+
lower replacement	--
Total yearly cost	-



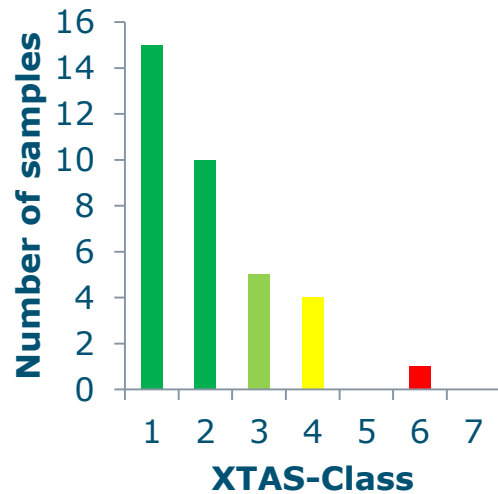
# Risk of sporeforming bacteria for milk quality



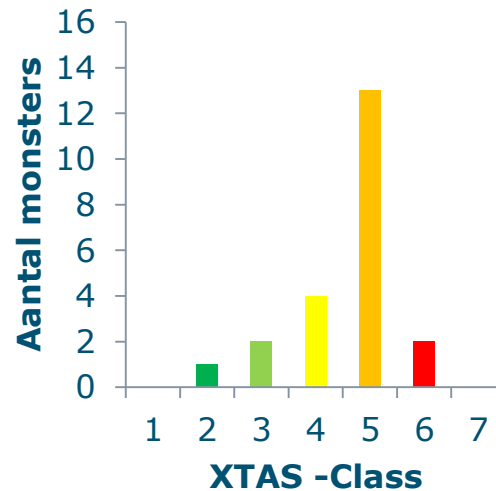
# XTAS in beddingmaterials

variation between samples

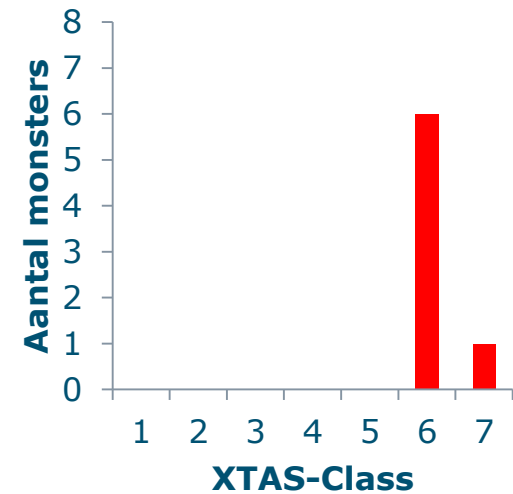
Sawdust / straw



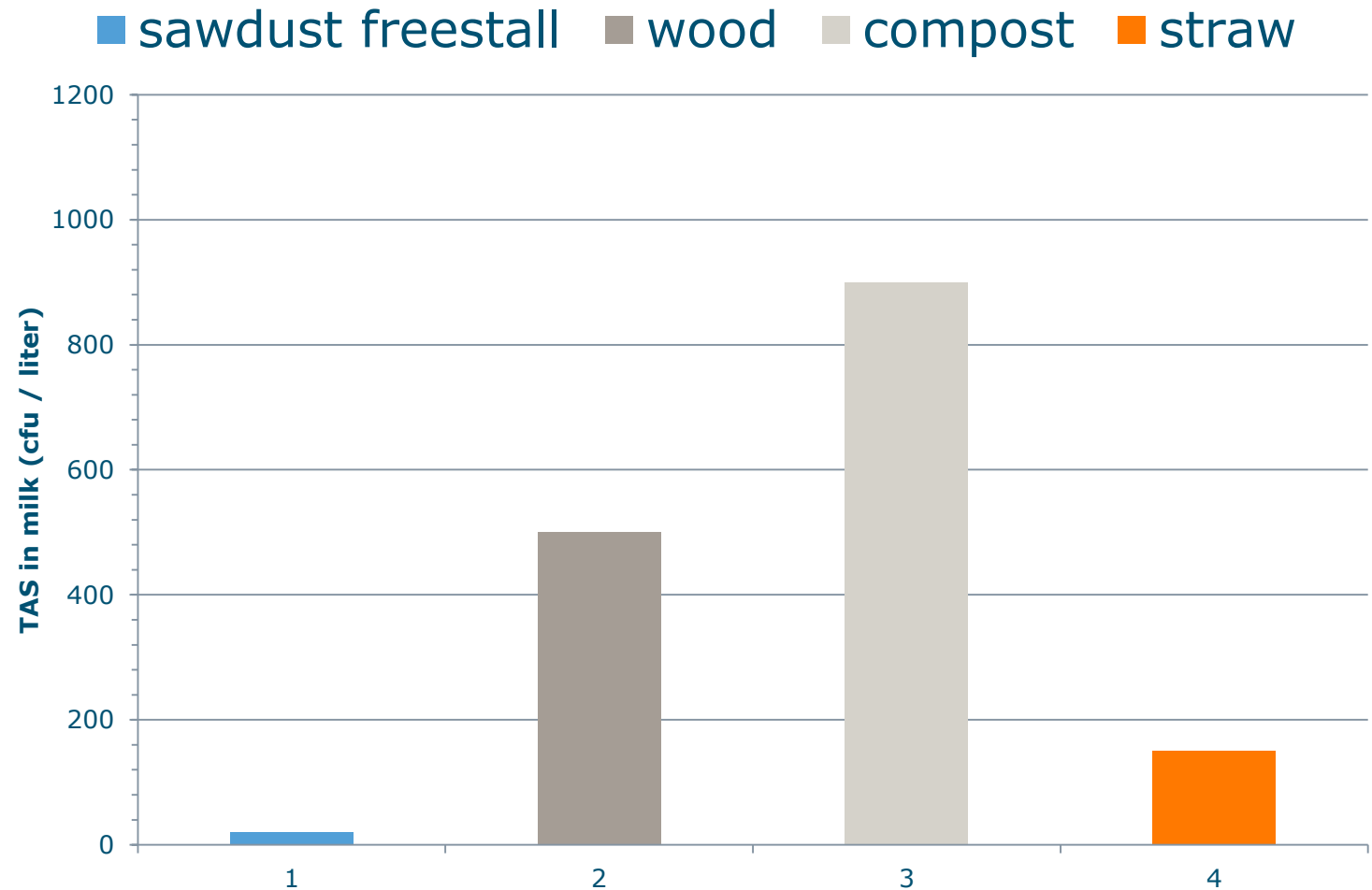
Wood chips



GFT-compost



# TAS in milk (Source NIZO)



# Overall sustainability

Sustainability aspect	Criteria	Wood chips 5 farms	Compost 4 farms	Straw 1 farm
Economics	investment	Yellow	Yellow	Yellow
	Yearly costs	Yellow	Yellow	Yellow
	longevity	Green	Green	Green
Cow	Production, health	Green	Green	Green
	Welfare	Green	Green	Green
Milk quality	XTAS	Yellow	Red	Green
Environment	N losses stable	Yellow	Red	Yellow
	N losses land	Green	Green	Green
	Ammonia emission stable	Yellow	Red	Yellow
	Nitrous oxide emission	Yellow	Yellow	Yellow
Manure Quality	Soil Improver	Green	Green	Green
	N mineralisation	Yellow	Yellow	Yellow

Green	better
Yellow	attention needed
Red	worse



## Change of bedding

Use of compost is prohibited, now straw



# Points to continue

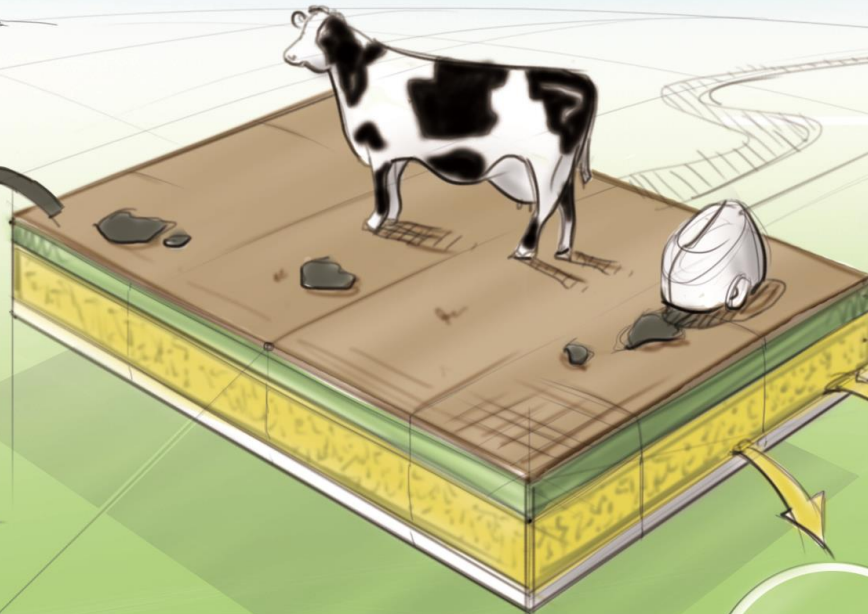
- Bedding material and management
  - Alternative for compost
  - Control composting process of wood chips
- Synthetic floors
- Sustainability of whole farming system





# Draining artificial floor

Feces



MESTROBOT

DOORLATENDE TOPLAAG

ZACHTE DOORLATENDE TUSSENLAAG

DOORLATENDE ONDERLAAG

A: SLEUVENVLOER LANGS VOERHEK

KUNSTSTOF VLOER

GIER

B: TOT AAN VOERHEK

KUNSTSTOF VLOER

OPTIES



"KRAT"



"GOOT"

Urine



# Seperating feces and urine on rubber floor

Feces

MESTSCHUIF

DICHTE RUBBEREN TOPLAAG

ZACHTE TUSSENLAAG

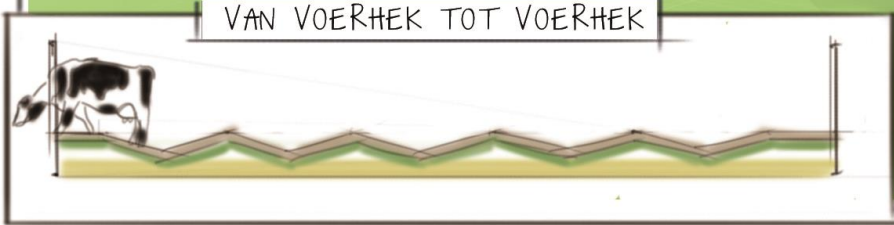
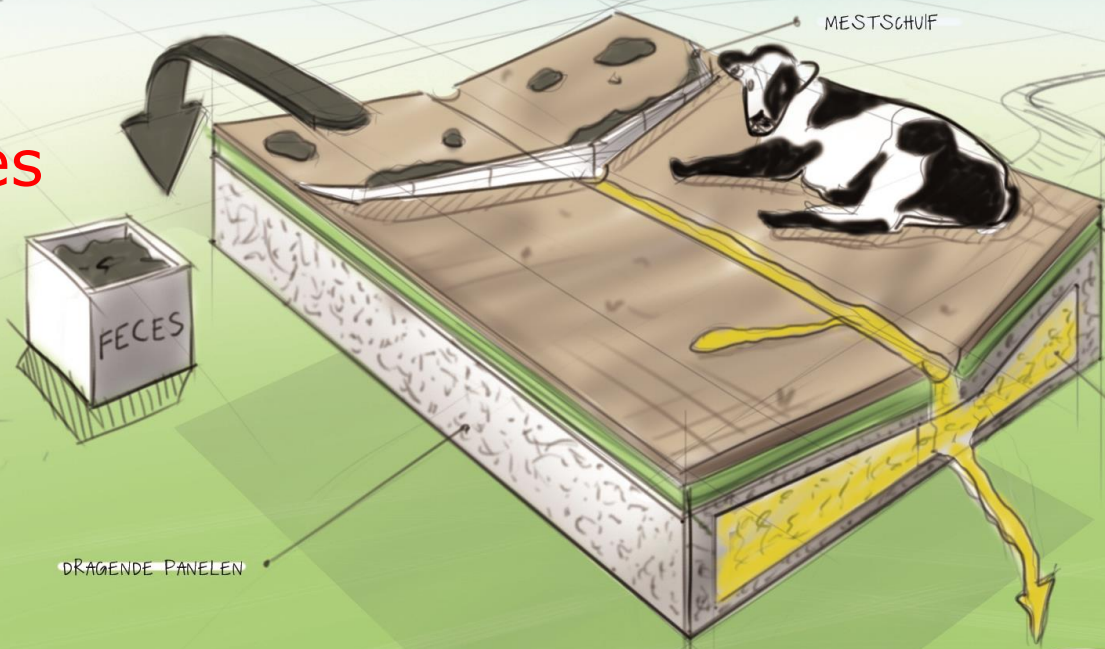
GIEROPSLAG

DRAGENDE PANELEN

Urine

URINE

VAN VOERHEK TOT VOERHEK





...artificial floor...

# “Cowgarden” and floor cleaning robot



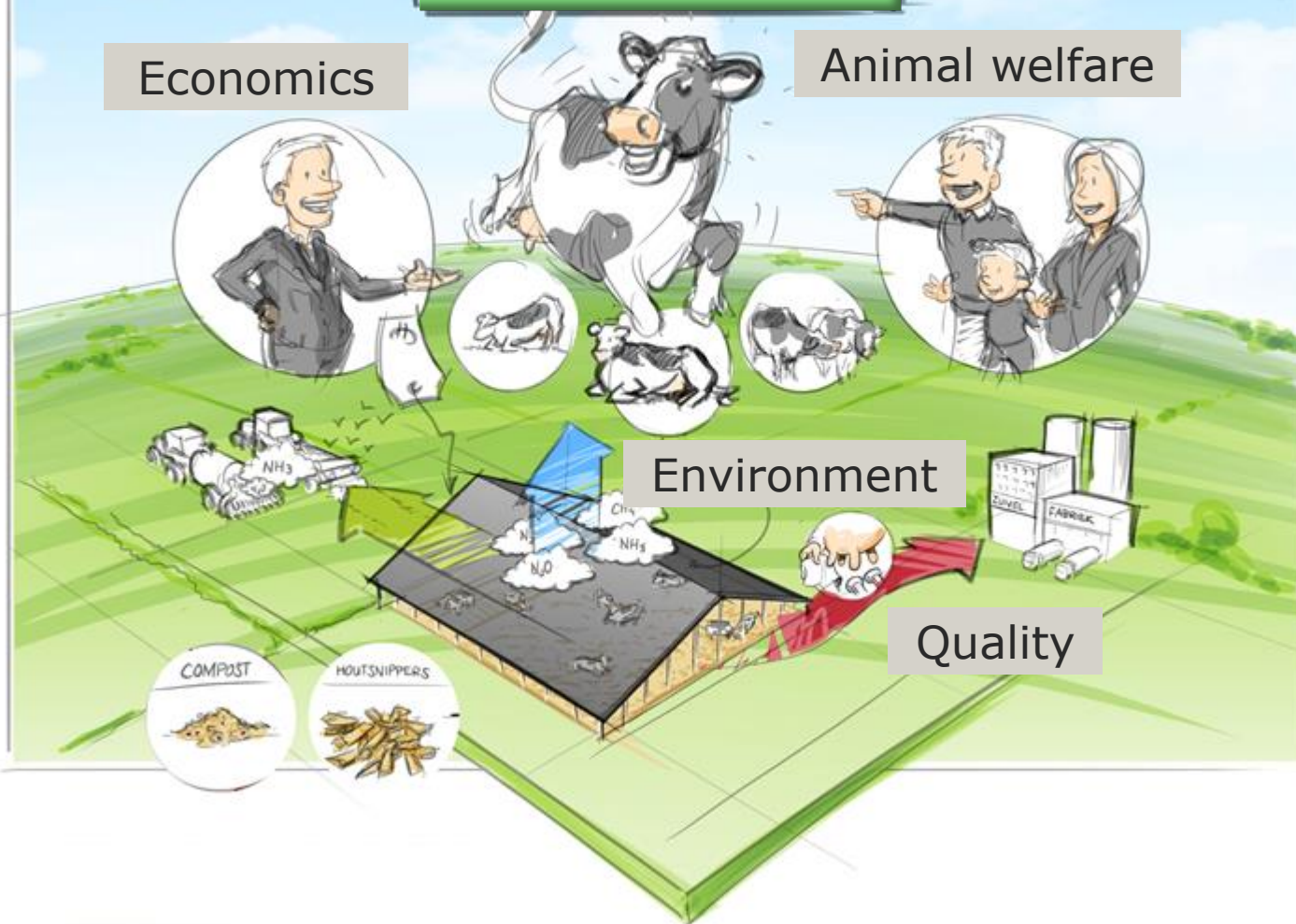
# Sustainability

Economics

Animal welfare

Environment

Quality



# Free Walk Holistic View

Economics

Animal welfare

Society

Markets

One health perspective

Environment

Quality

Bio-diversity

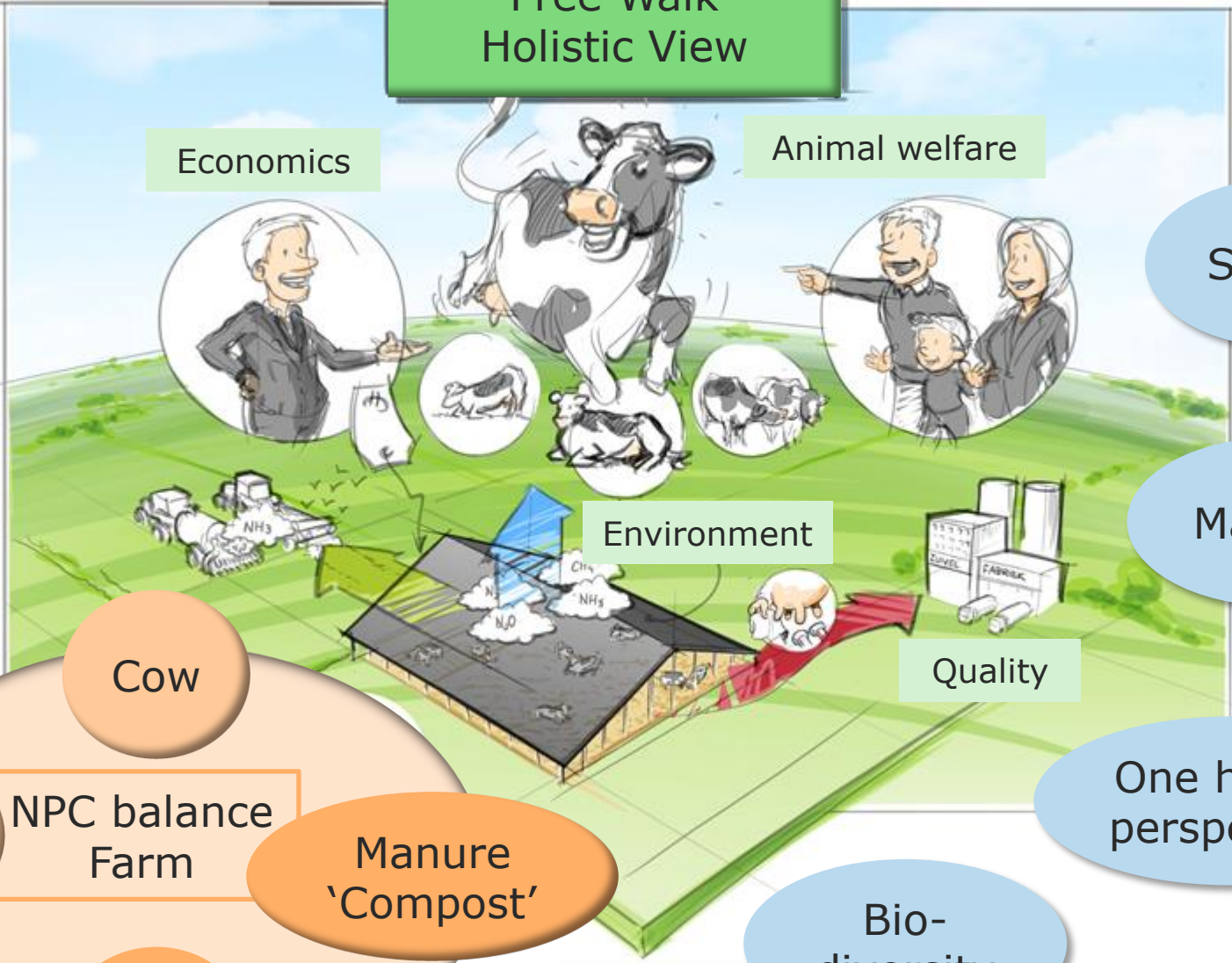
Cow

Crop

Soil

NPC balance Farm

Manure 'Compost'





Thank you

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More information: [www.vrijloopstallen.nl](http://www.vrijloopstallen.nl)



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