Developments in the Netherlands

Bedded pack barns (loose housing)
Regional feed centre

Paul Galama

Research Dairy farm systems

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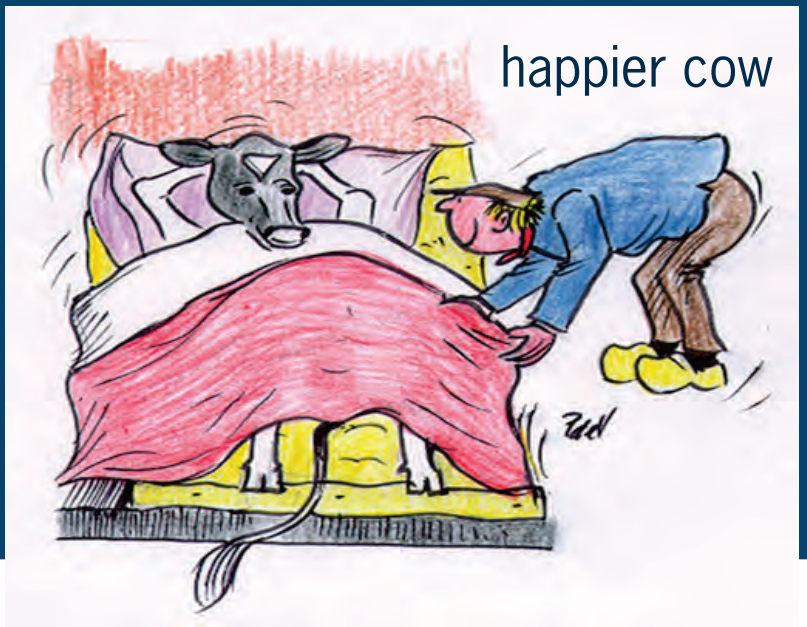
Bedded pack barns

- Why
- Experiences Amerika and Israel
- Research experimental farms
- Experiences practical farms
- Economics



Example cubicle stable with matress as bedding

Bedding with straw

Bedding with sand
23 12:32 PM

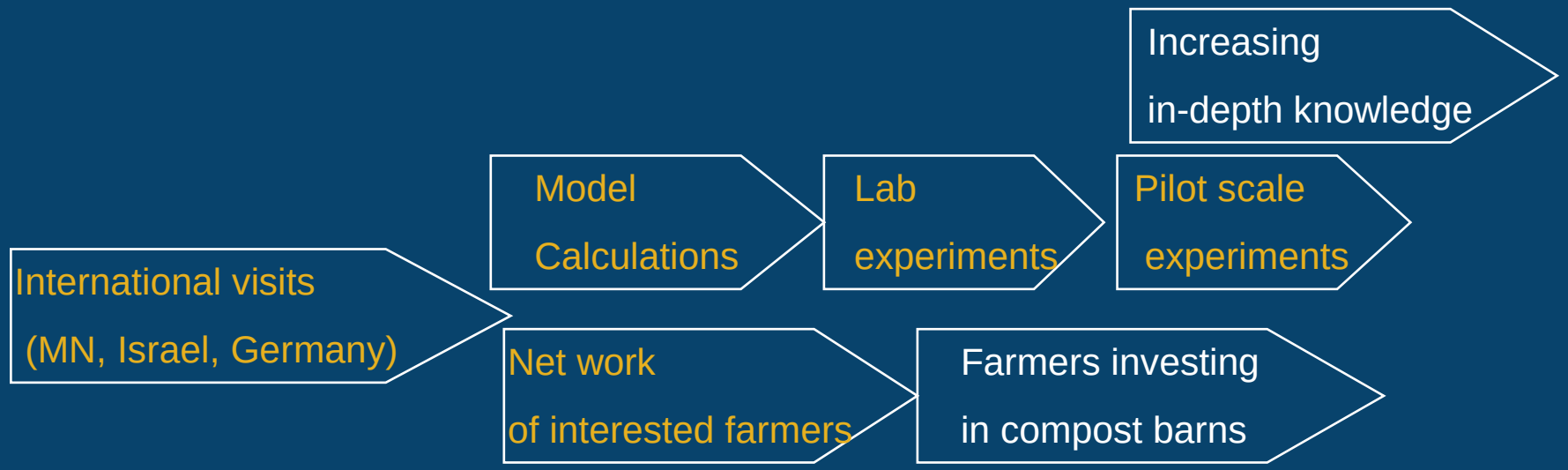
Why towards free walk (“Loose”) housing?

- Better animal welfare and health
- Better quality manure
- Less volume manure

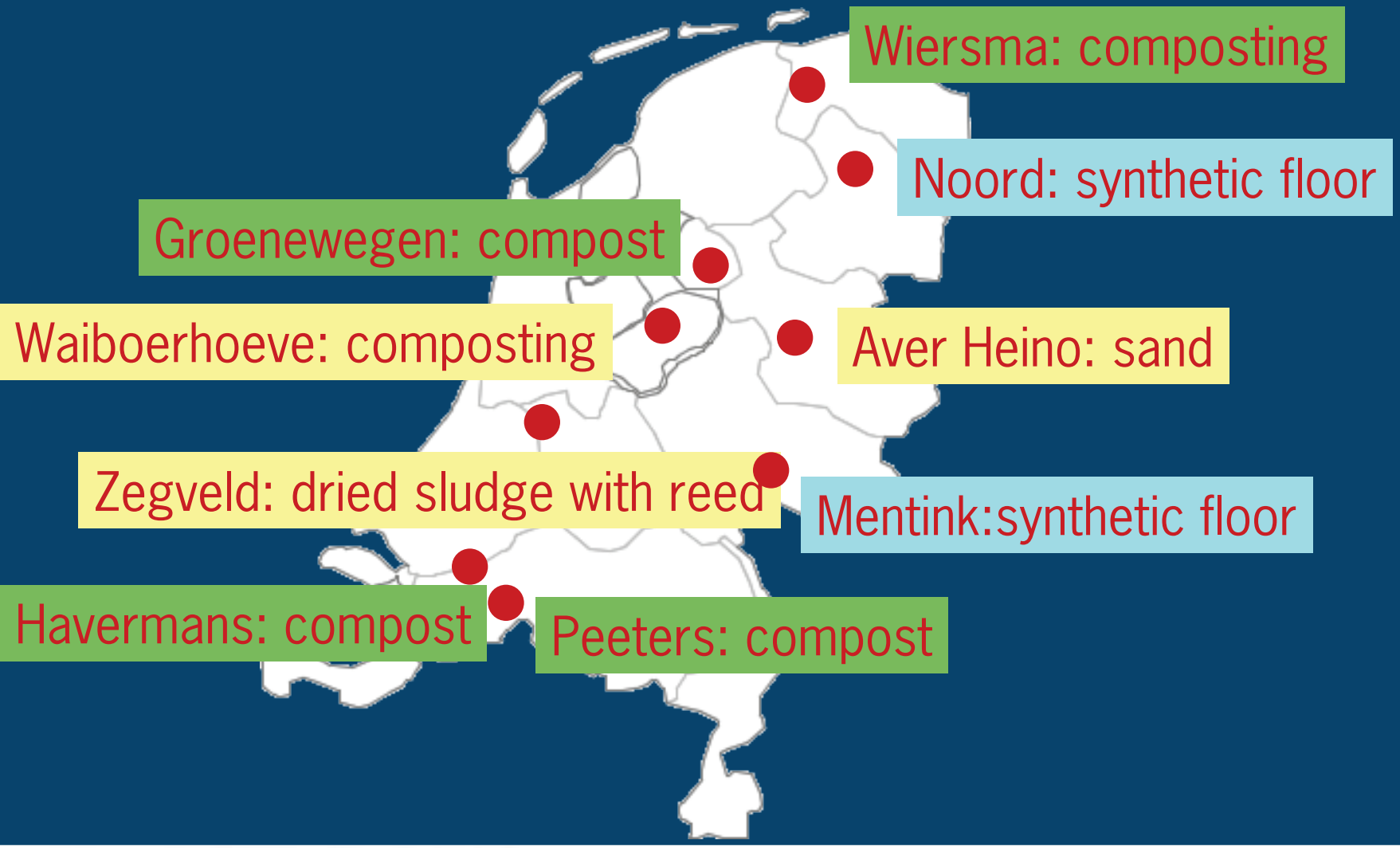
Emmision of ammonia

must be low

Overview loose housing research Netherlands



Experiences with loose housing



First compost dairy barn in Minnesota in 2001(USA)

Compost Dairy Barns in Minnesota (USA)

First compost barn in 2001in Minnesota (USA)

Twice a day cultivate the bedding
7 m2 per cow bedding

Good ventilation is important

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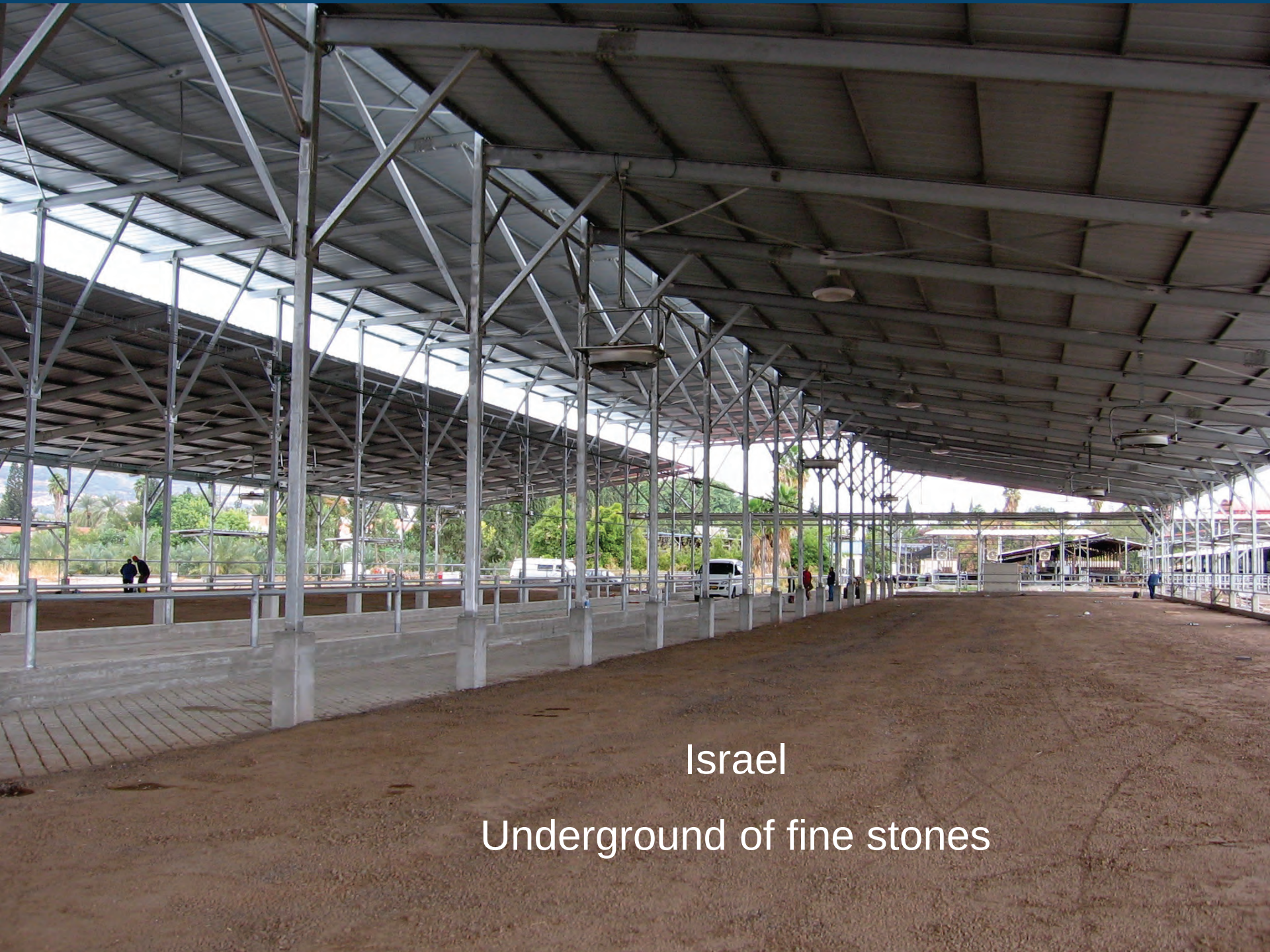
60% of manure on bedding
40% manure

Movie Israel general

Example of loose housing in Israel

Open side, front and roof

Cows walk on bedding of dried manure


Israel
Underground of fine stones

20 m2 per cow

Different ways of cultivating

Israel: with milking robots

Farm with 4 milking robots

After cultivating

Movie the secret of Harduff

Special organic farm Harduff:

Composting with manure, 40 degrees celcius

Just enough C: N with a little bit feed residues

Not too dry

Good cultivating with big tractor is important

Other countries

Der Kompoststall -

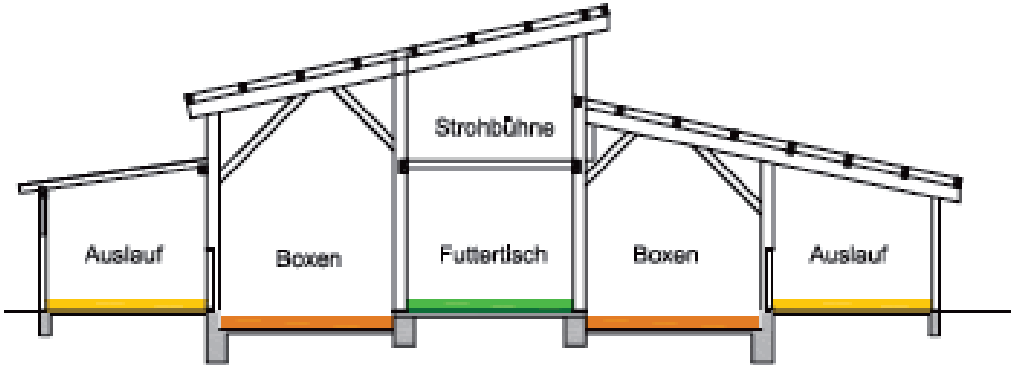
Erfahrungen in Oberösterreich

„21. Giessener Rindergesundheitstag“
Lustus-Liebig-Universität Gießen
12. Februar 2011

Siegfried Holzeder MSc

landwirtschaftskammer
oberösterreich

tiergerechter und innovativer kompoststall



Schnitt A-A

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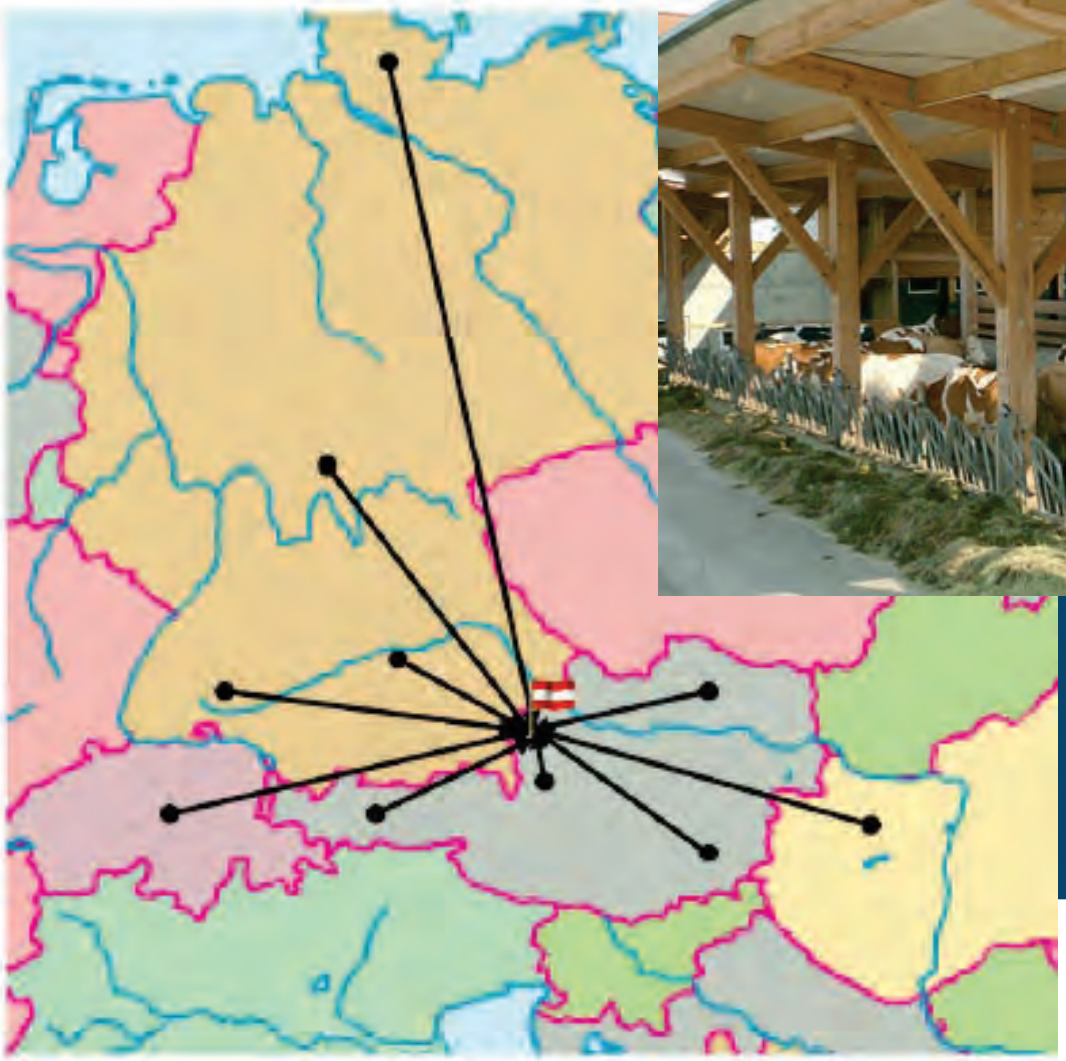
Anfragen und Interessenten aus dem In- und Ausland



WHAT IS POSSIBLE IN OUR AND YOUR CLIMATE?

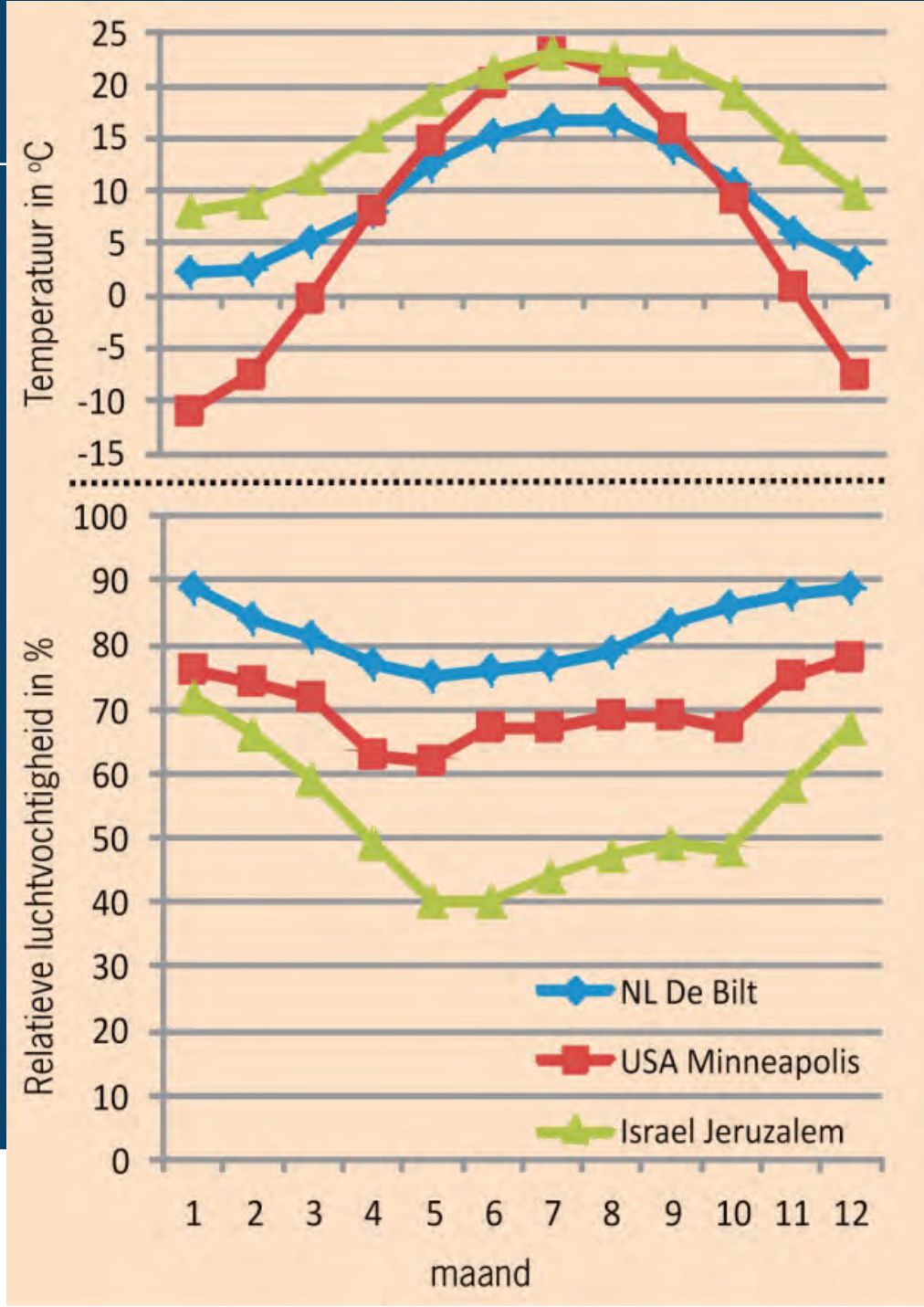
Evaporation moisture

Temperature and humidity

- Netherlands
- USA
- Israel

A cow produces

65 liter liter urine and moisture of faeces



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Background choices of bedding on research farms

	Material	Moisture	Nitrogen
Sand	Lavalith and sand	Draining	Seperate
Composting	Wooden chips and sawdust	Evaporation	Fixing on Carbon
Clay	Clay and reed	Absorb	Fixing on Carbon

Remark: synthetic floor same principle as sand bedding

Emission

Emission	Formule	Effect on environment
Nitrogen (N)	N2	No effect
Ammonia	NH3	Acid rain, nature
Laugh gass	N2O	Green house gas, global warming
Koolstof (C)		
Carbon dioyde	CO2	Green house gas, global warming
Methane	CH4	Green house gas, global warming

Experimental farms

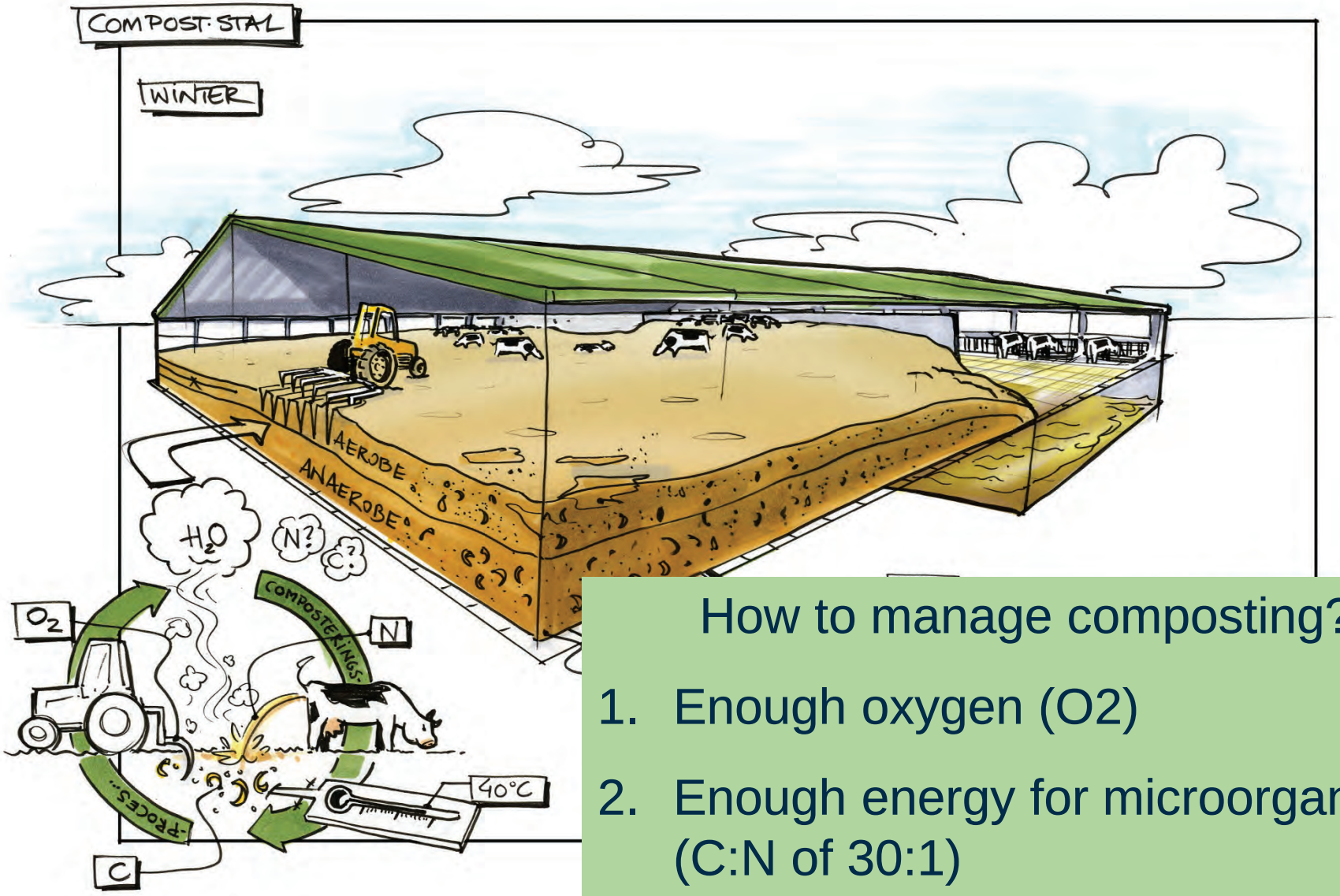
Sand on Aver Heino

Sand on Aver Heino

Sand on Aver Heino

Sand Aver Heino

Composting Waiboerhoeve (wooden chips and sawdust)



How to manage composting?

1. Enough oxygen (O2)
2. Enough energy for microorganism (C:N of 30:1)
3. Not too dry, not too wet

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Composting Waiboerhoeve

Extra ventilation

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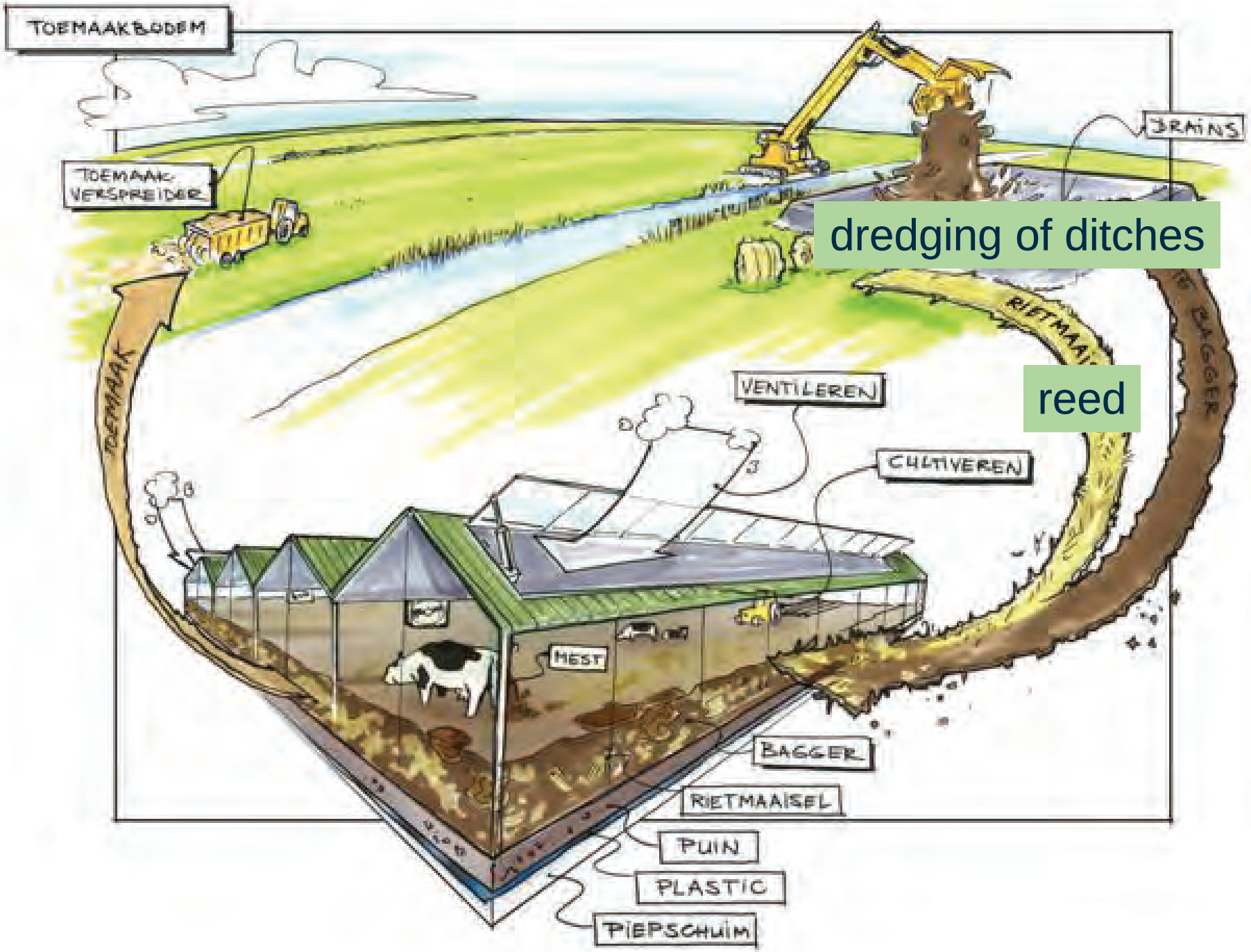
Sludge (dried soil from ditches) and reed

Zegveld


TOEMAAKBODEM
TOEMAAK-VERSPREIDER
DRAINS
dredging of ditches
TOEMAAK
RIETMAAI
BAGGER
reed
VENTILEREN
CULTIVEREN
MEST
BAGGER
RIETMAAISEL
PUIN
PLASTIC
PIEPSCHUIM

Zegveld: cows in greenhouse

Greenhouse

Zegveld
Bedding of clay ground and reed
Cows are too dirty

Experiment lab scale: emission of ammonia

Sand highest

Than compost

Sludge (soil) lowest

More fluffy

Less ammonia

Measuring ammonia and green house gasses

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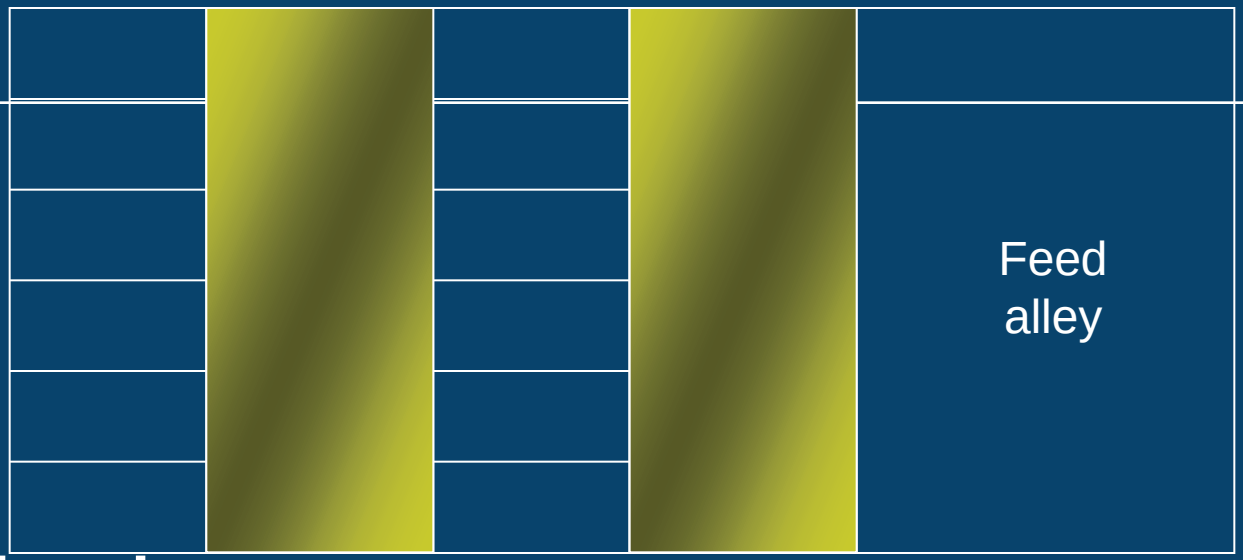
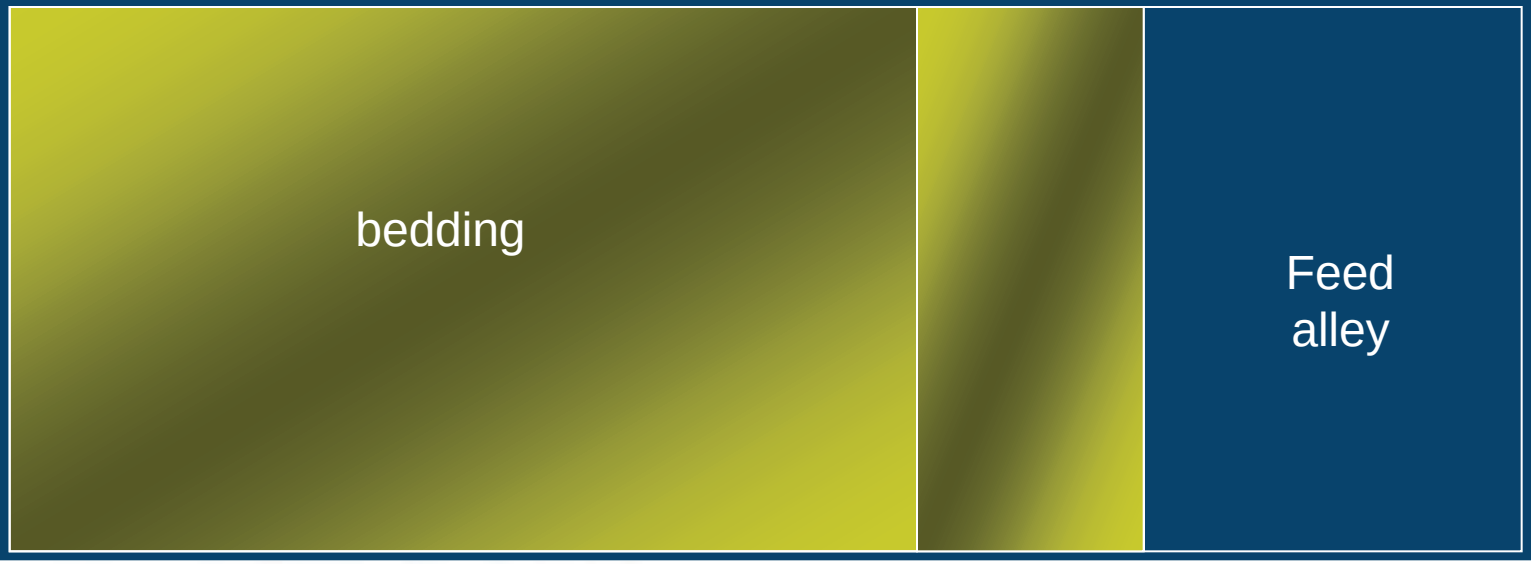
Freestall with cubicles



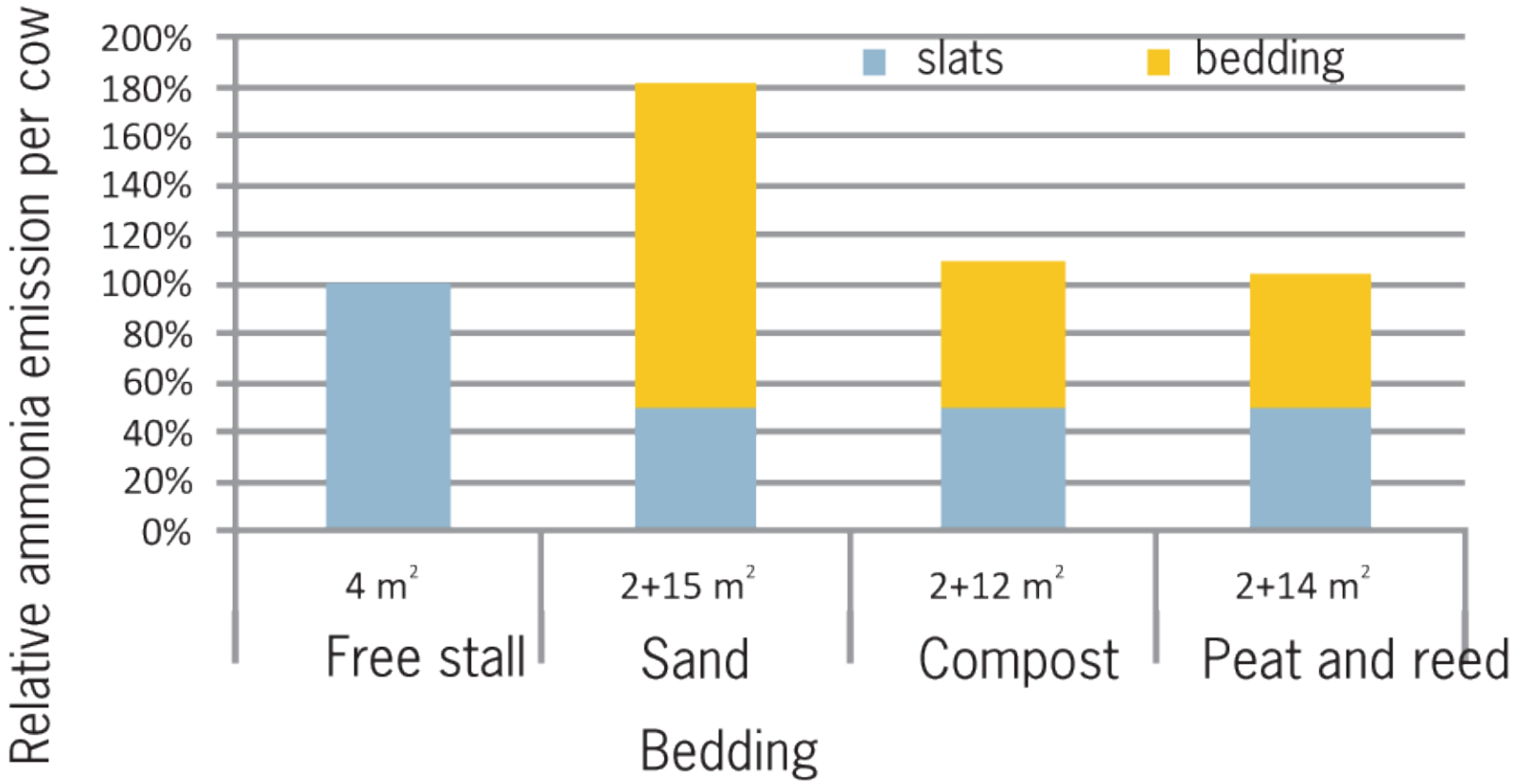
2 + 2 = 4 m^2
Emission area

Loose housing



2 + 12 = 14 m^2
Emission area

Ammonia emission per cow (compared to freestall)



Ammonia emission per cow of area in the bedded pack barn against the free stall barn.

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2009

Many dairy farmers are interested…

Practical farms

…first compost dairy barn in Netherlands
(Farm: Peeters)

No slats along feed alley makes it wet

Young cattle on compost bedding

Second “compost barn” Wiersma (Midwolde)

1100 m2 with wooden chips and aerating system
For 70 cows
15 m2 per cow

Aerating system

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First day……..

Movie cultivating Wiersma

Once a day mill the bedding

Enough capacity to walk on?

After one month....

50 to 55 degrees celsius inside bedding
Whole bedding is mostly aerobe
15 m2 per cow, 8 m2 per cow is possible

Cows are clean
11000 kg milk per year
Low somatic cell count

Machine to spread compost

with manure on the field

Why composting?

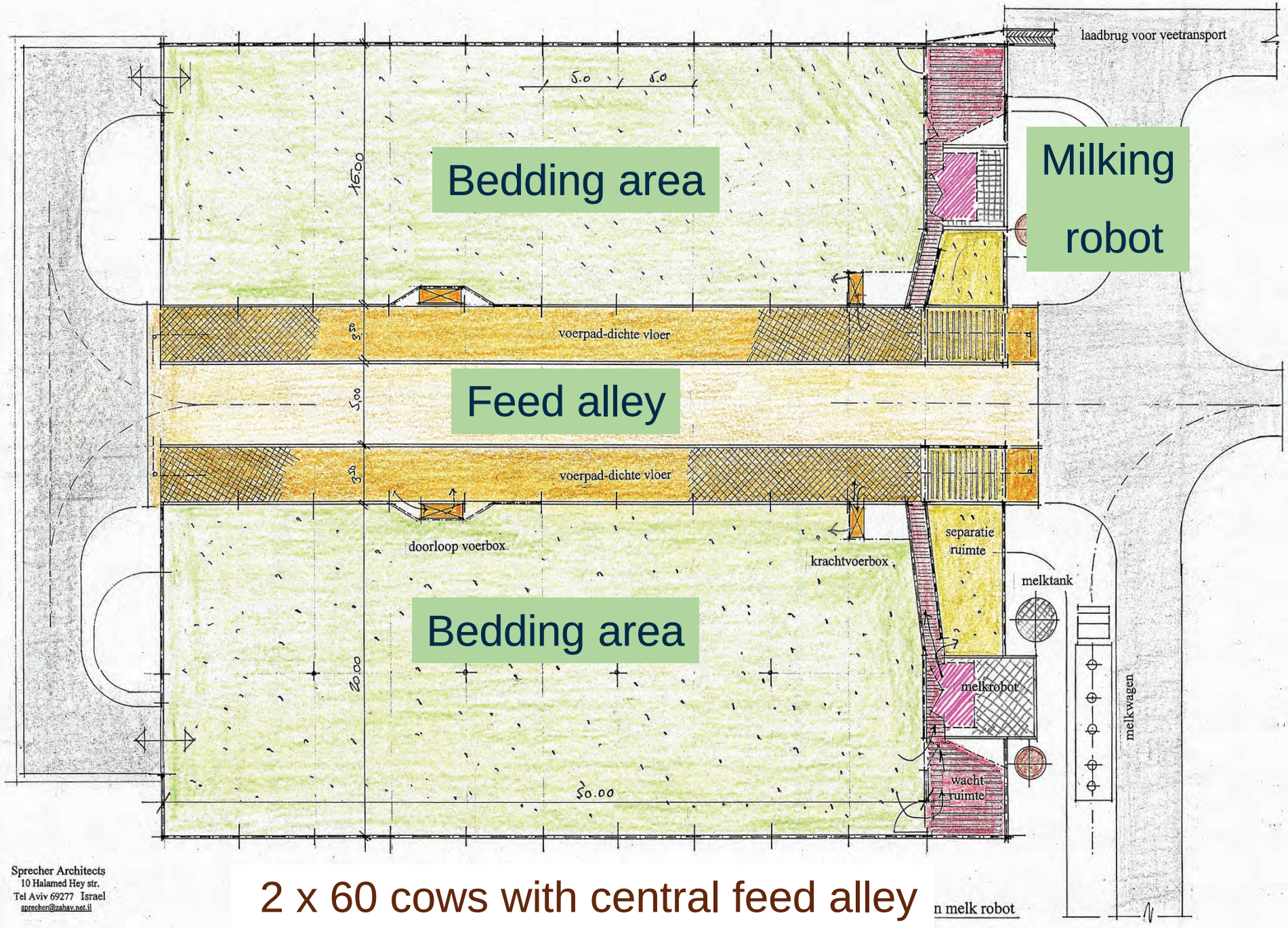
- Less volume of manure
- Less odour
- Less pathogenes
- Less weed seeds
- Stabilise organic mater
- Good fertiliser

- Less m2 per cow with composting than with compost, because more evaporation of water

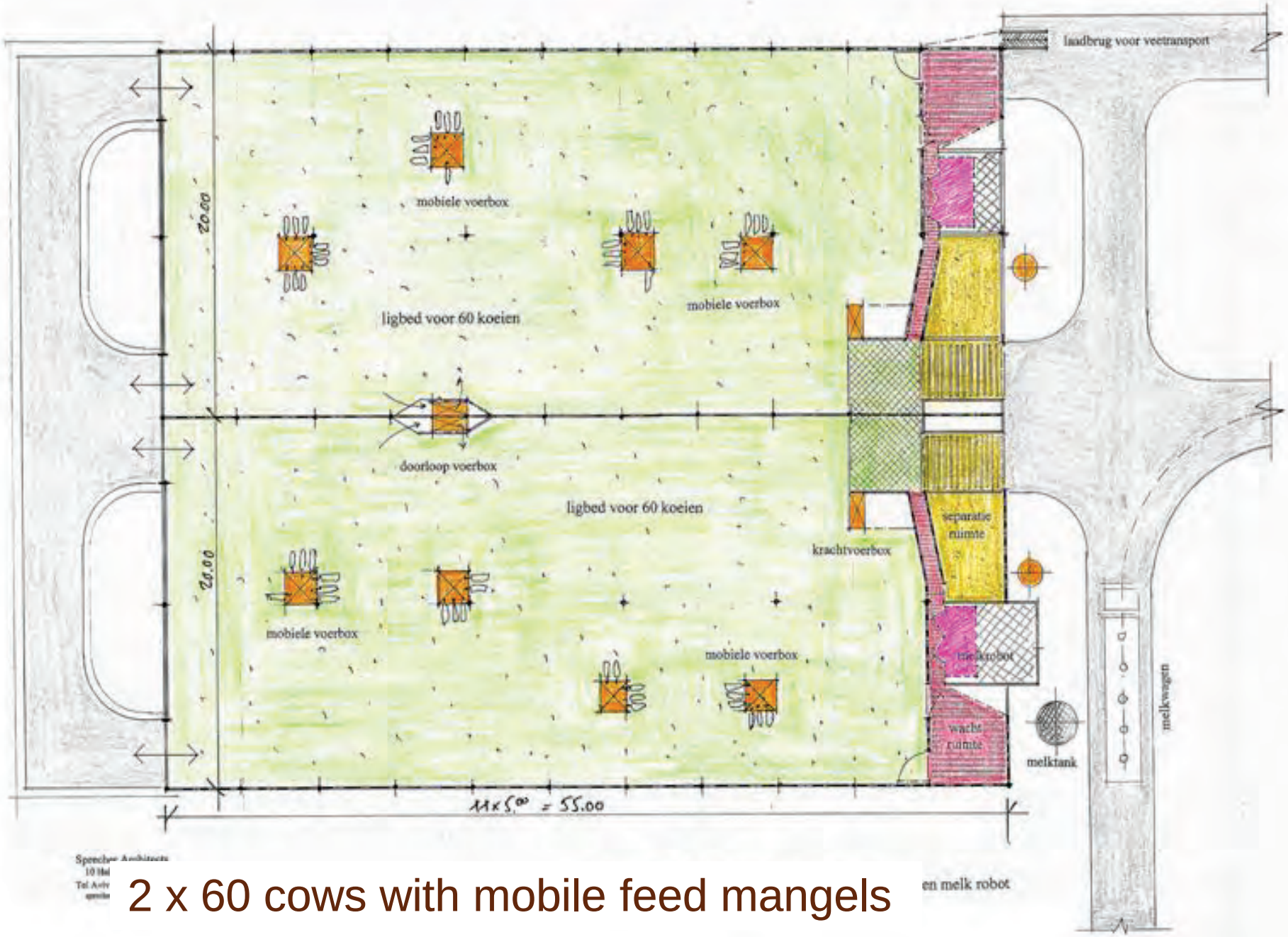
Groenewegen ,
Bedding of compost material
(household waste (vegetables, fruit, garden))
15 m2 per cow
2 milking robots

Slats

How to feed in loose housing?

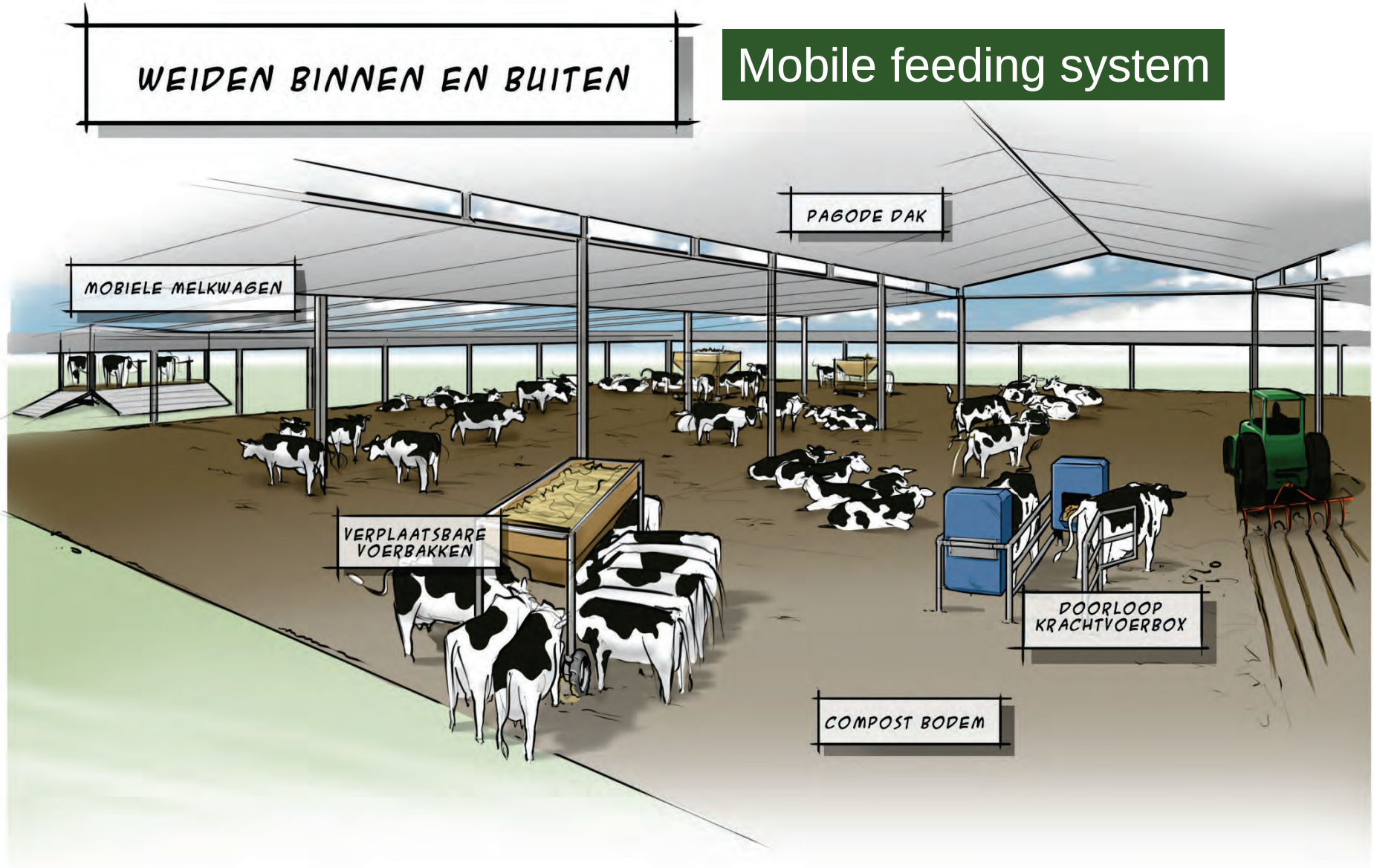


2 x 60 cows with central feed alley



2 x 60 cows with mobile feed mangels

Mobile feeding system



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Havermans
Green house, mobile feed mangels
25 m2 per cow
no feed alley

Havermans, mobile feeding

Havermans
1/3 shadow is possible

Havermans
Very open stable

... I am learning every day.....

All feed mangels
today on left side

Calving on compost

Movie Havermans

Cultivating once a day makes compost enriched with manure

What is the quality of the compost as fertiliser?

Fertilizer pellets
NIET STERIEL
NON STERILE
UNSTERIL

How much is emission of ammonia and green house gasses?
(on practical farms)

Economics bedded pack barns

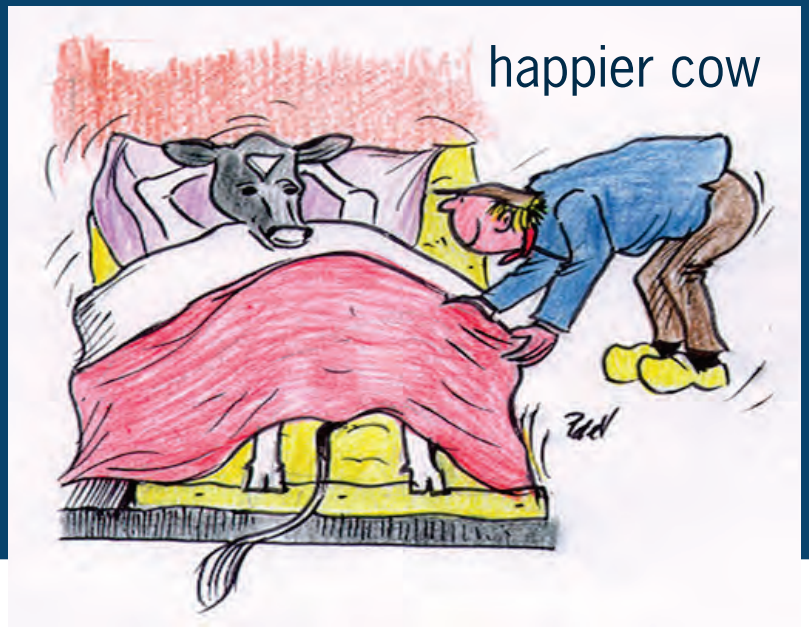
	Free stal	compost	composting
Bedding area per cow (m2)	3	15	8
M2 per cow stable	9.3	19.3	`12.2
Investment per cow	€ 3000	€ 3100	€ 2580
Yearly cost per cow	€ 385	€ 472	€ 371
Difference		€ + 91	€ -14
Bedding material (€)	€ 20	€ 75	€ 40
Bedding material (m)		0,5	1,0
Price bedding material (€/m3)		€10	€ 5

Challenge

Increase sustainability of dairy farms

- Animal welfare and health?
- Environment
  - Emission of ammonia and green house gasses?
  - Soil fertility?
- Landscape?
- Food safety?
- Economics?

Bedded pack barns, QUESTIONS?



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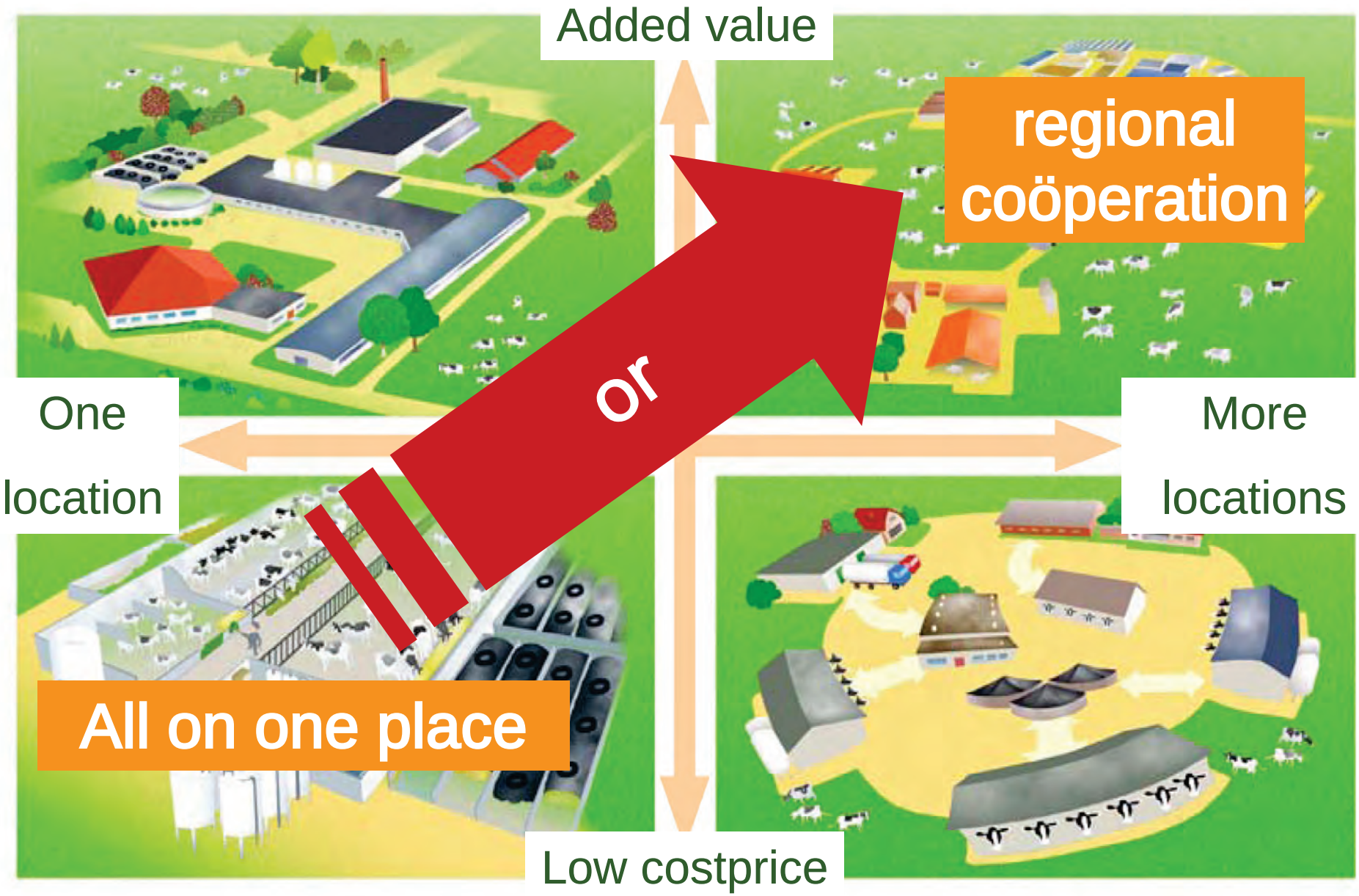
Regional feed centre

1. Why?
2. Pilot Fryslân
3. Coöperation dairy farmer and arable farmer



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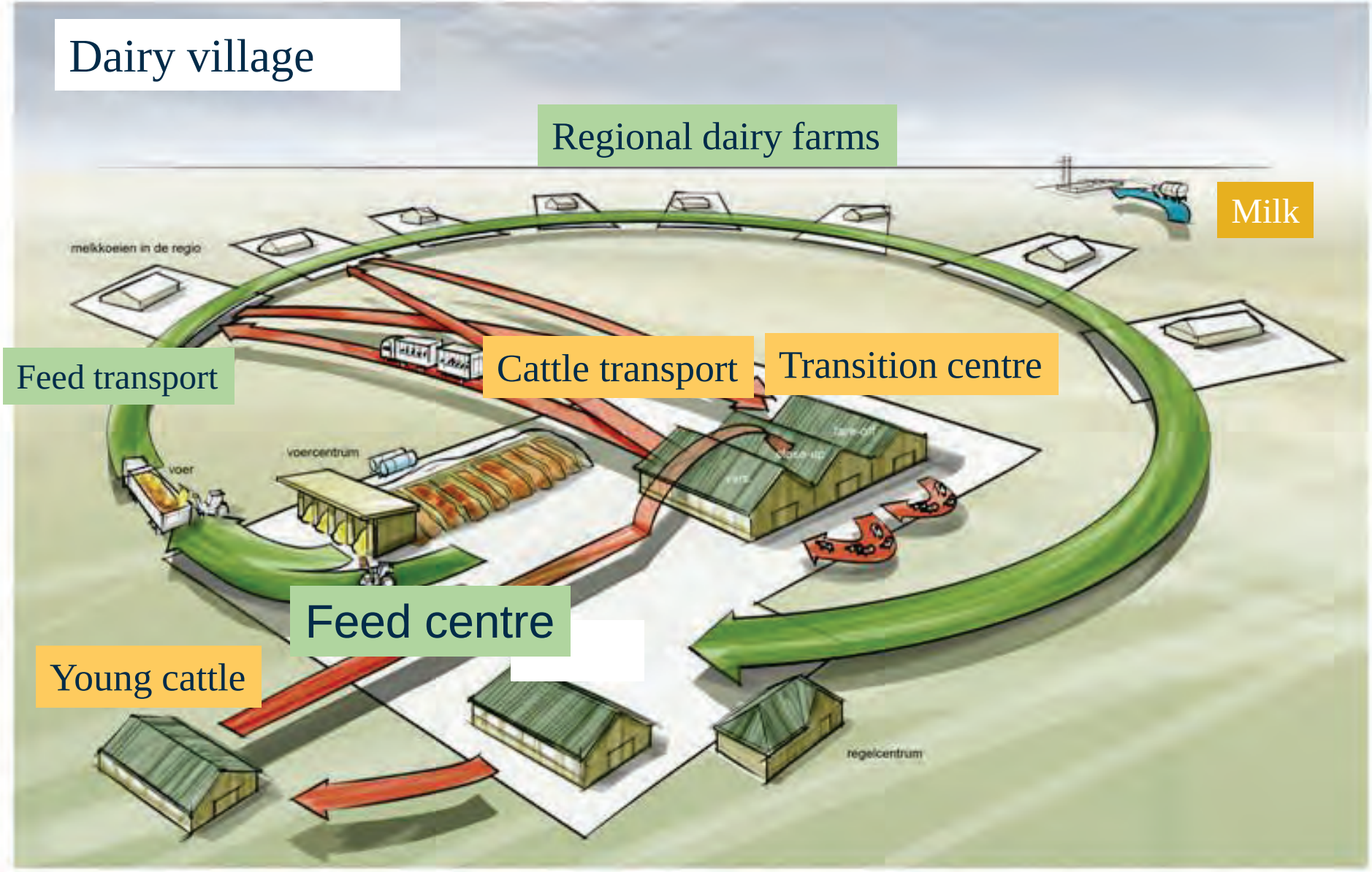
Example Italië; regional coöperation

Combination Dairy village and specialised centre



Feed storage is messy

Example feed centre Israel

Pilot regional feed centre Fryslân

Grass into container

Central feed storage at industry area

Central storage of feed components

grain, etc...

Making total mixed ration

Feeding 3000 cows on 30 farms:

1. Milking cows
2. “robot” cows
3. Dry cows
4. Young cattle older than one year

Example

Buy total mixed ration € 16,70 per kg dry matter

Feed efficiency 1,3 kg milk per kg dry matter

Feed cost 12,8 per 100 kg milk

Sell grass € 8,0 per kg dry matter

Sell maize € 10,0 per kg dry matter

Advantage feed centre:

Feed cost components (concentrates) € 20 per 100 kg

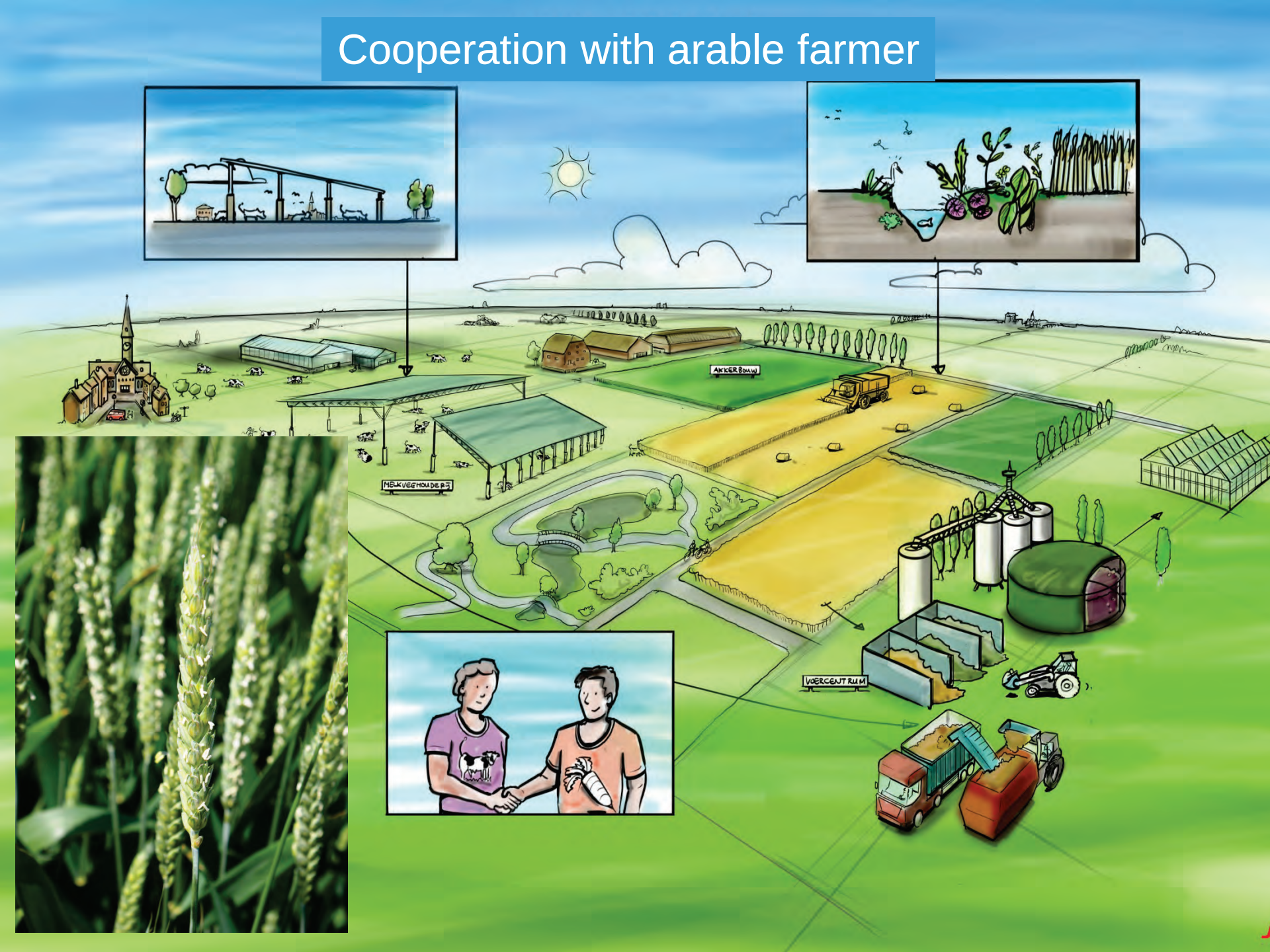
Concentrates from feed company € 25 per 100 kg

(cost of feed centre € 3,50 per 100 kg dry matter)

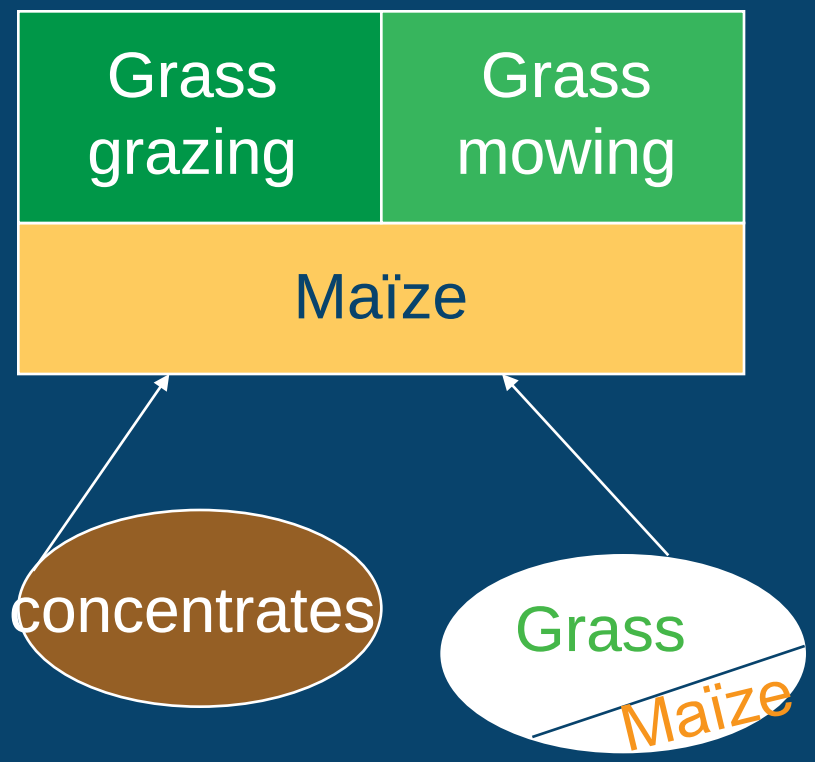
Advantages dairy farmer

- Lower costprice: € 1,8 to 3,3 per 100 kg milk
  - Less feed storage
  - Less machinary
  - Less labour
- Insight in:
  - Land productivity
  - Feed efficiency

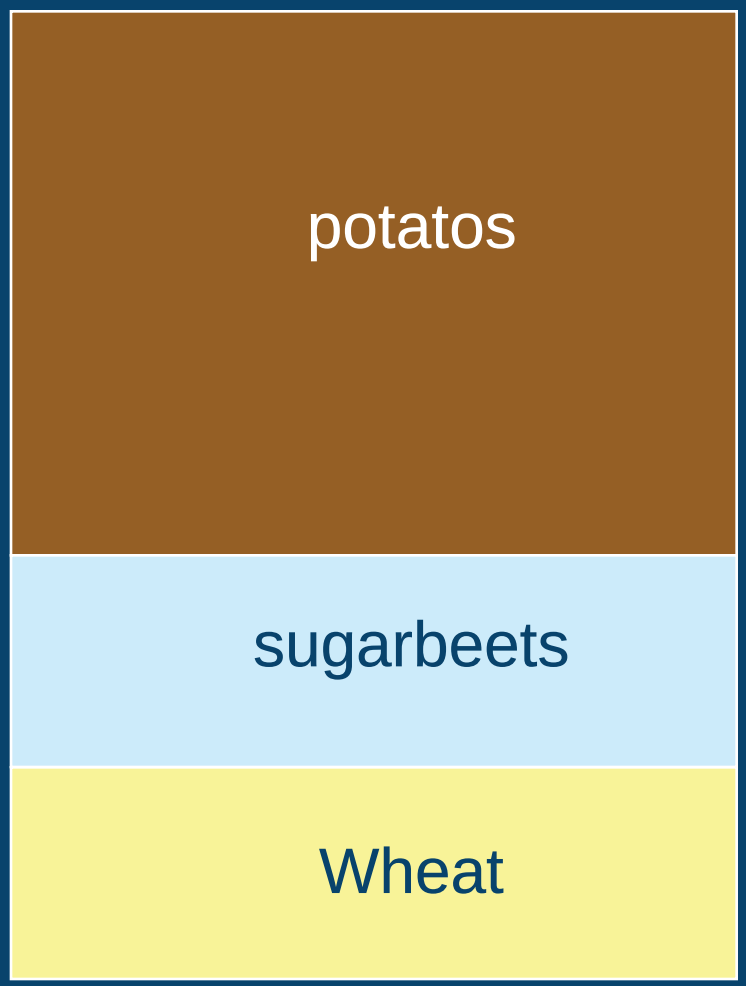
Cooperation with arable farmer



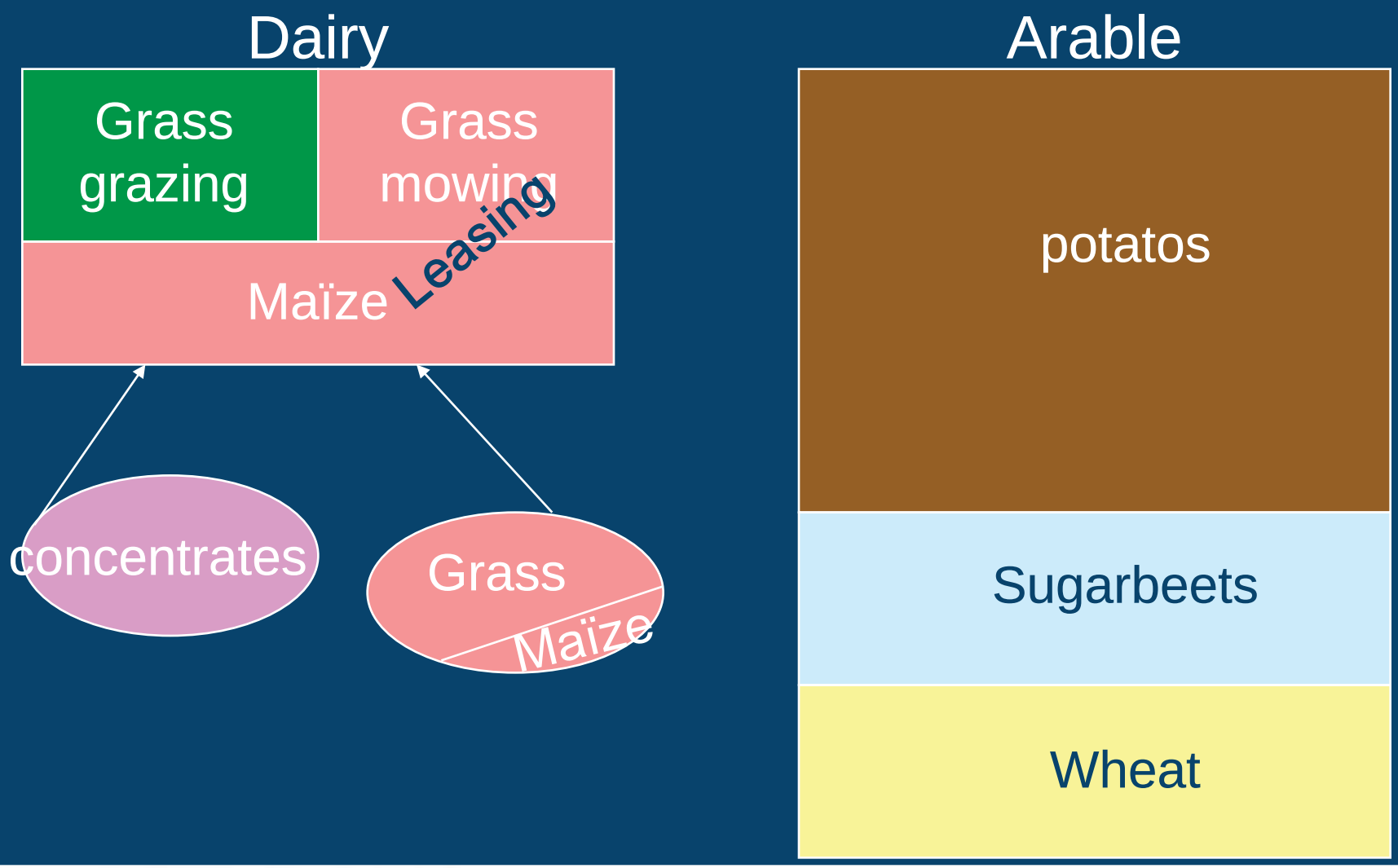
Dairy



Arable



Extra land for arable farmer



Coöperation between dairy and arable farmers

Dairy	Arable
Grass grazing	Potatos
	Sugarbeets
	Grain, Maïze / MKS
	Grass, luzerne

Advantages arable farmer

- More land for crops with high margin
- Better soil fertility due to crop rotation

Disadvantages

- Outsourcing feeding cows
- More traffic

Regional coöperation

Thanks for attention....

Paul Galama

Wageningen UR

Livestock research

More information on

www.vrijloopstallen.wur.nl