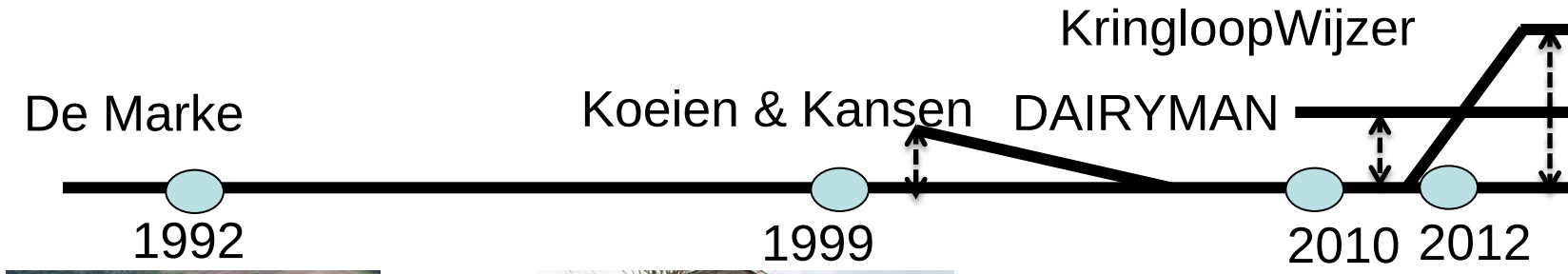
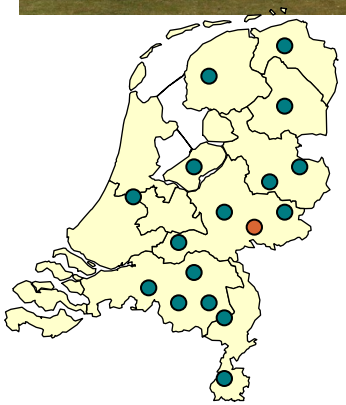
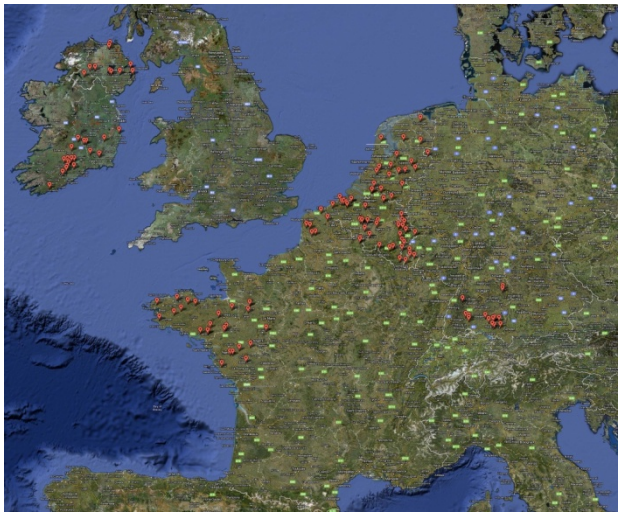
Kringloopwijs!

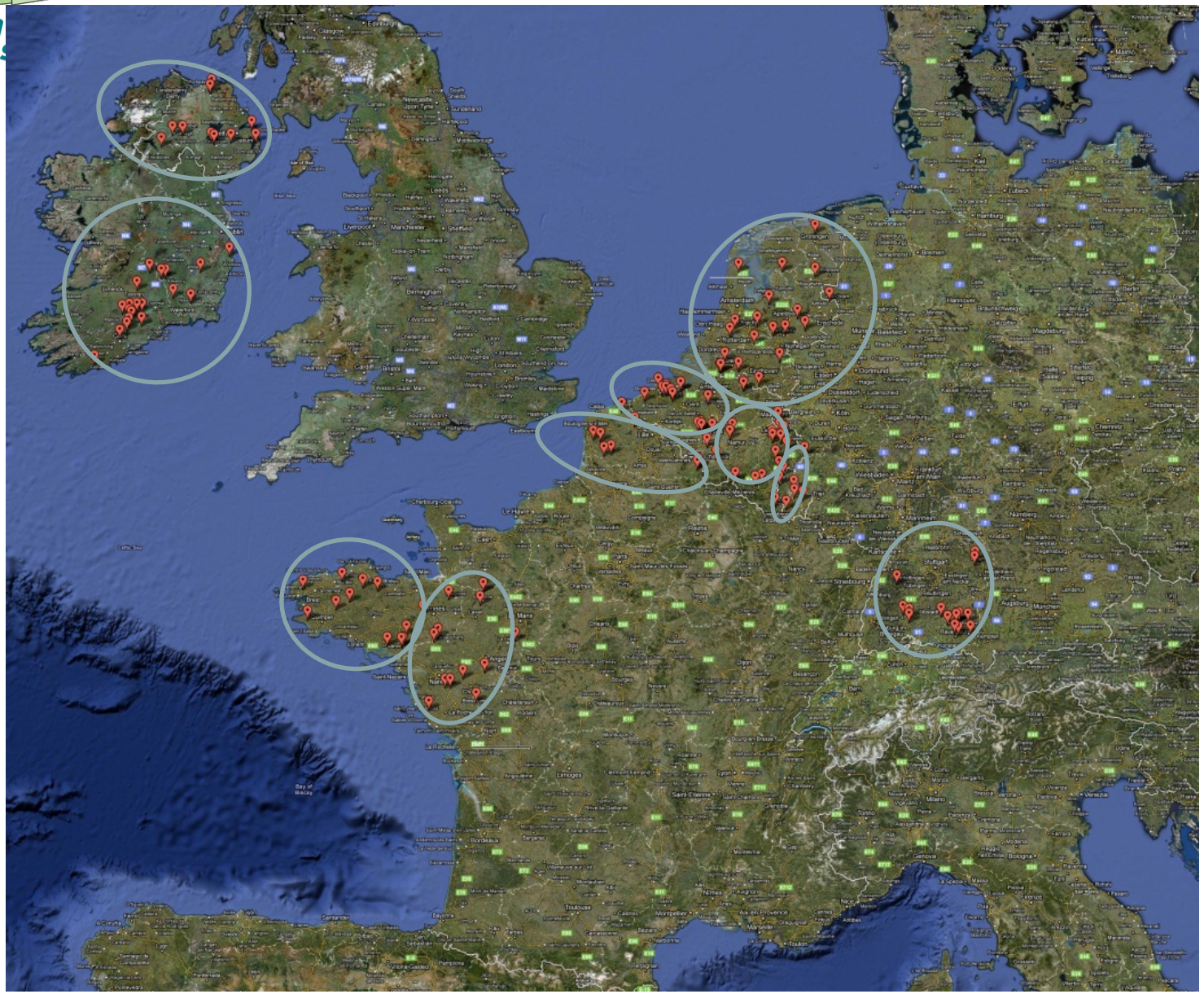
PZ studiedag, 27 november 2012

Frans Aarts (Wageningen-UR)


KringloopWijzer
De Marke
Koeien & Kansen
DAIRYMAN
1992
1999
2010
2012






Dublin
Cork
Manchester
Liverpool
Leeds
Sheffield
Birmingham
Nottingham
Bristol
Cardiff
London
Amsterdam
Rotterdam
Utrecht
Eindhoven
Groningen
Arnhem
Köln
Düsseldorf
Dortmund
Essen
Bremen
Hamburg
Berlin
Hannover
Magdeburg
Leipzig
Dresden
Nürnberg
Stuttgart
Mannheim
Frankfurt
Wiesbaden
Kassel
Kiel
Lübeck
Rostock
Brest
Nantes
Le Mans
Tours
Caen
Cherbourg
Rennes
Paris
Reims
Metz
Nancy
Strasbourg
Dijon
Besançon
Bern
Zürich
Basel
Milano
Genève
Lyon
Grenoble
Limoges
Bordeaux
Toulouse
Montpellier
Nîmes
Marseille
Toulon
Bayonne
Pamplona
Santander
Bilbao
Vitoria-Gasteiz
Bay of Biscay

National Emissions Ceilings Directive

Climate Change Programme

Verlies ammoniak, stikstofoxide, methaan

Verlies N,P en C uit kringloop

Nitrate Directive

Water Framework Directive

Verlies nitraat en fosfaat

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= onbenut deel voer en meststoffen

Nitrate Directive

Water Framework Directive

Verlies nitraat en fosfaat

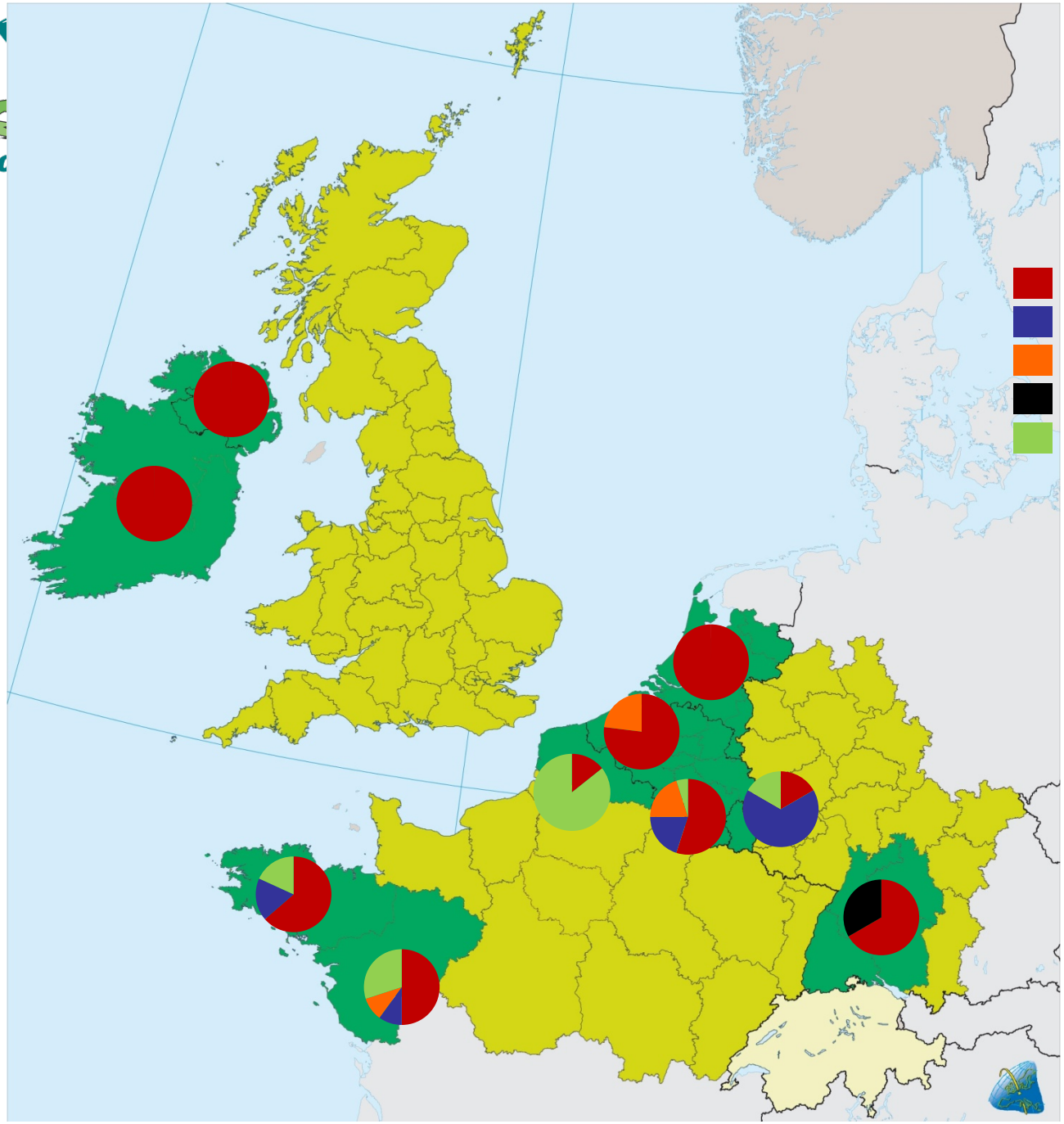
Beter functioneren kringlopen

- Betere milieukwaliteit
- Minder voer en meststoffen nodig
- Efficient boeren voelt prettig
- 25% beter moet mogelijk zijn

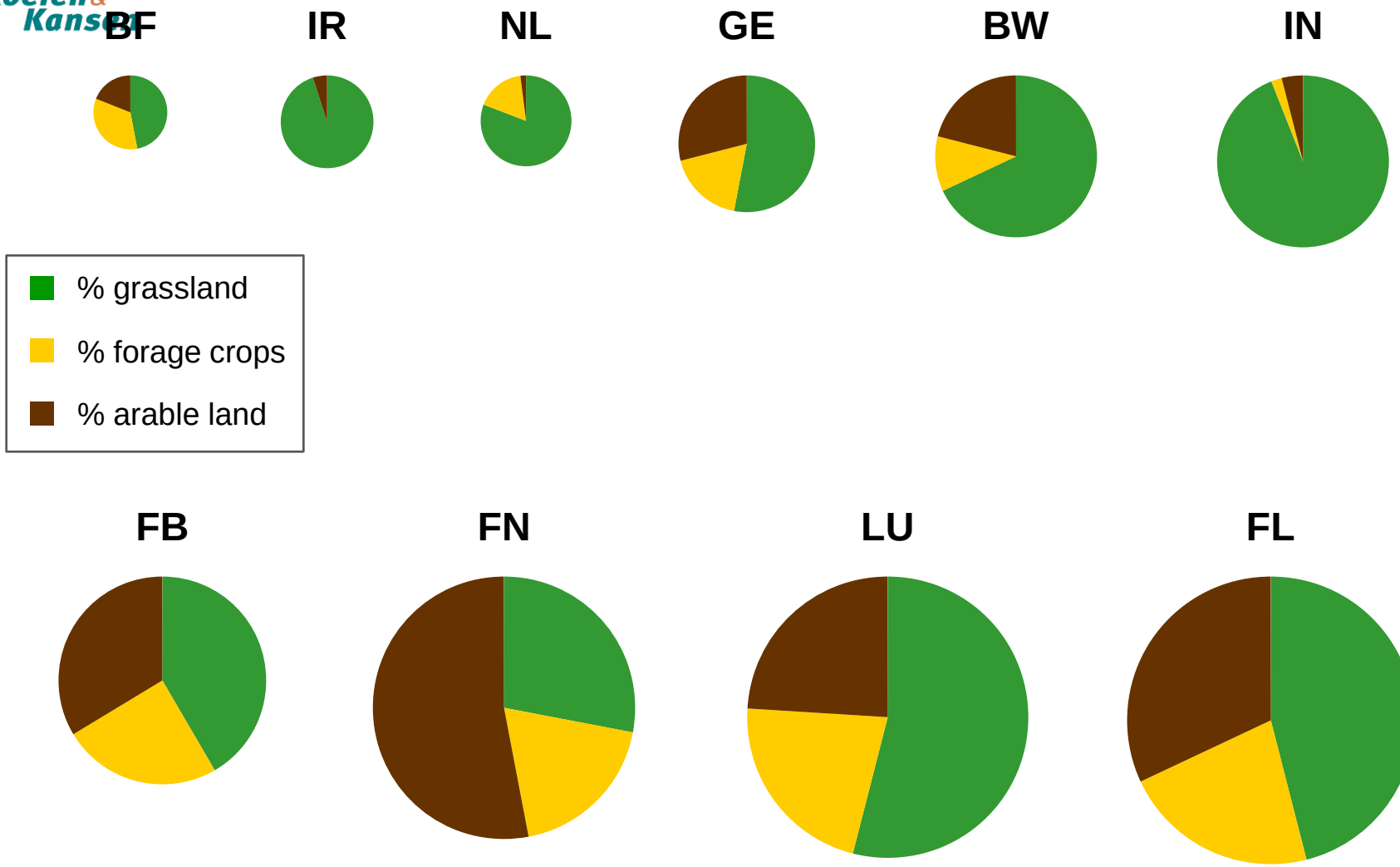
- Nodig: kennis, innovaties, zelfvertrouwen, aangepaste wetgeving, beloning

Melkveehouderij

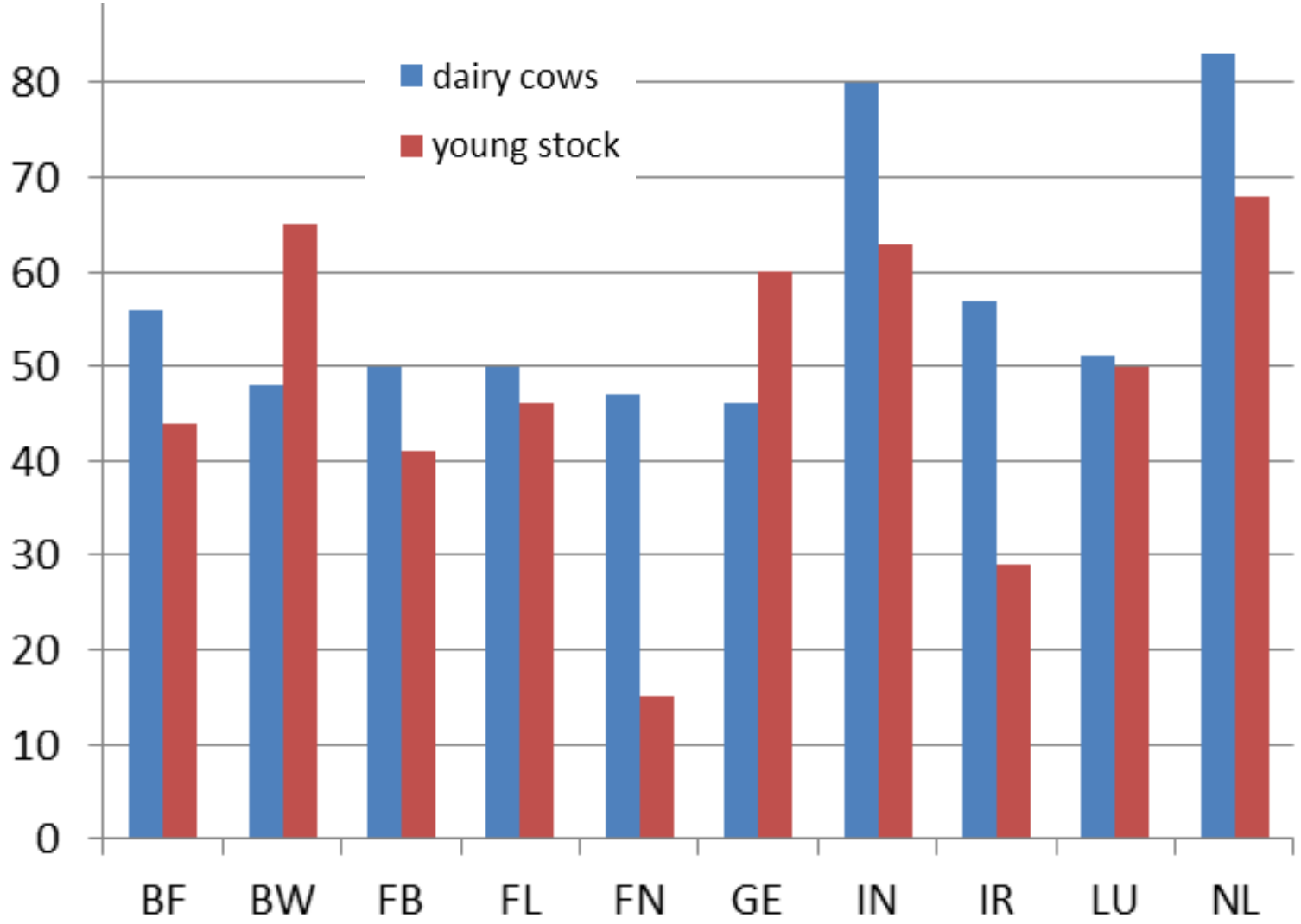
- Kringloop-landbouw:
  - In NL 75% eigen voer, 70 – 100 % eigen N- en P-meststof
- Typisch NL:
  - Gespecialiseerd
  - Weing grond, veel melk (= weinig grond per kg melk)
  - Daardoor milieu-risico groot (veel mest)
  - Milieuschade voorkomen door uitstekend kringloop-management


Dairy farm specialized
Dairy farm with beef cattle
Dairy farm with arable crops
Dairy farm with energy production
Dairy farm with at least two other productions

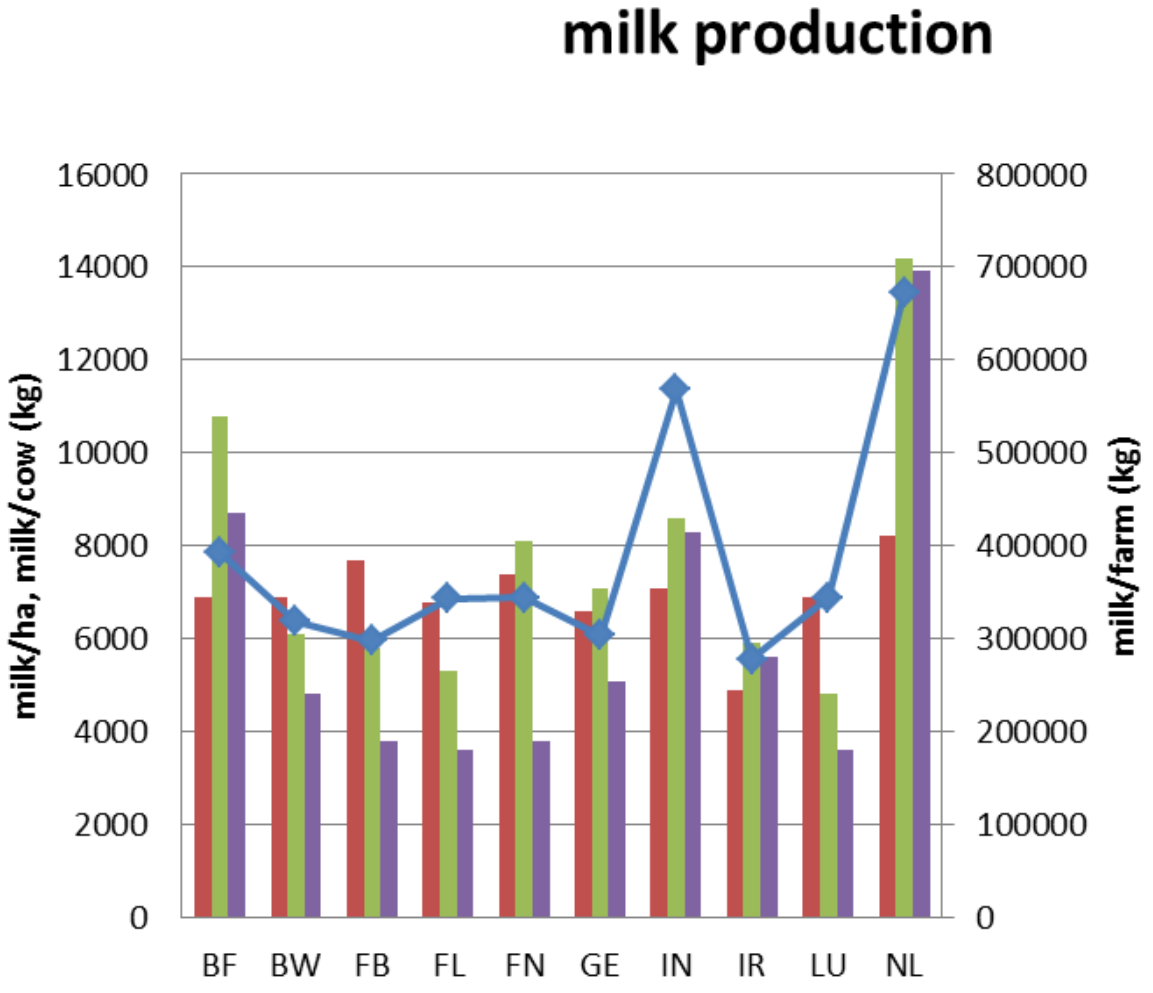
Area average dairy farm



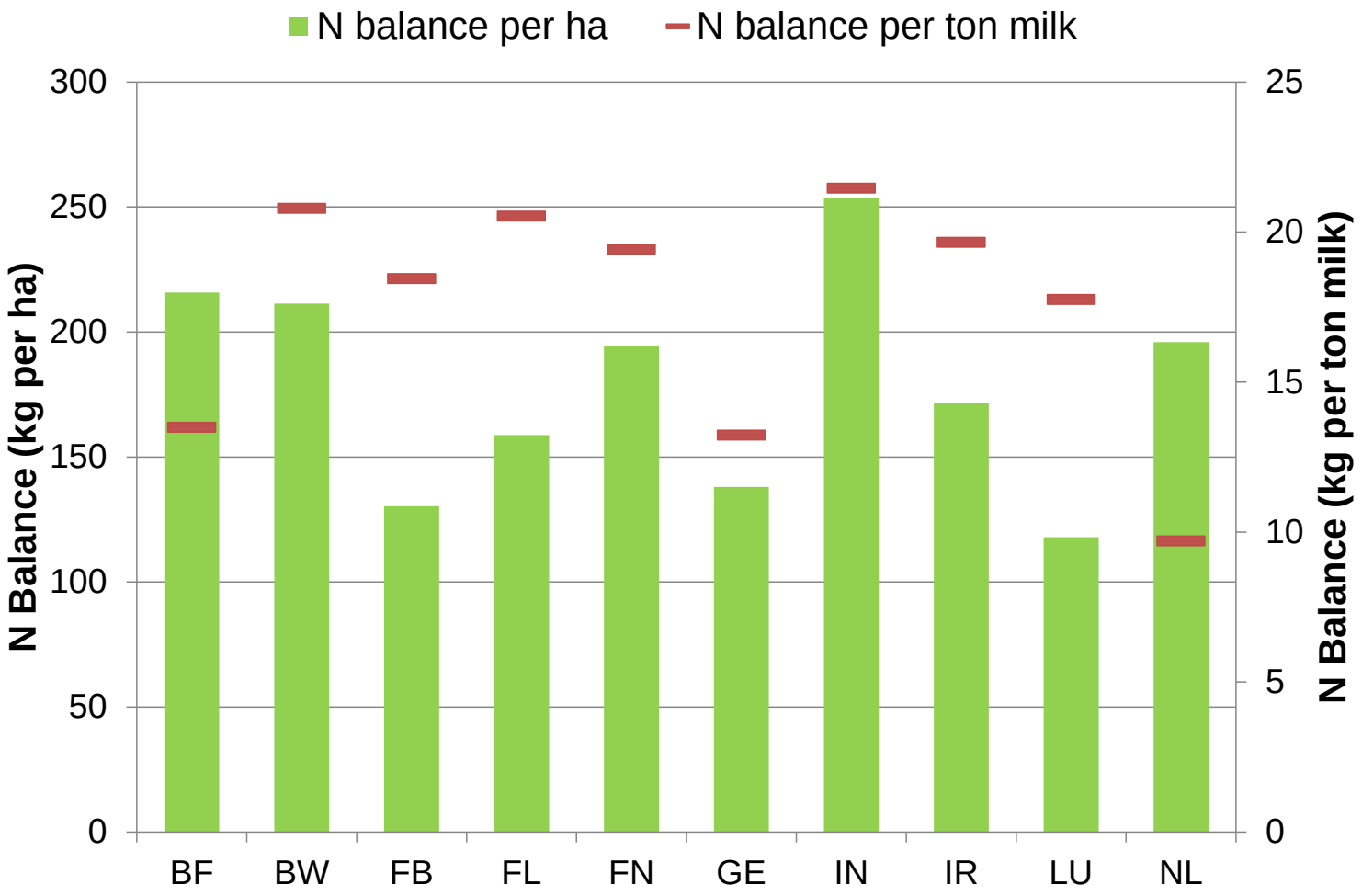
Herd average dairy farm



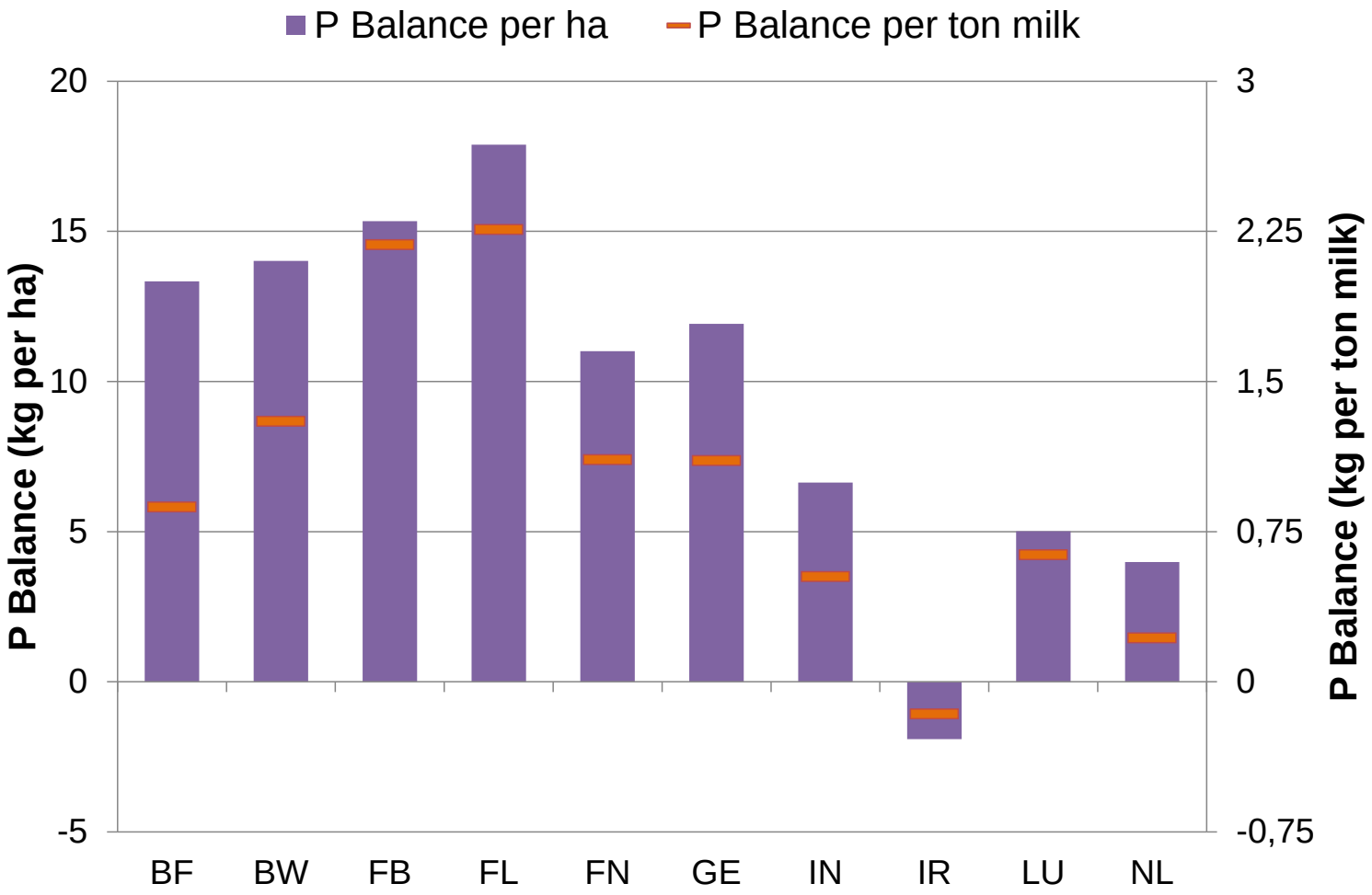
Milk production average dairy



Nitrogen

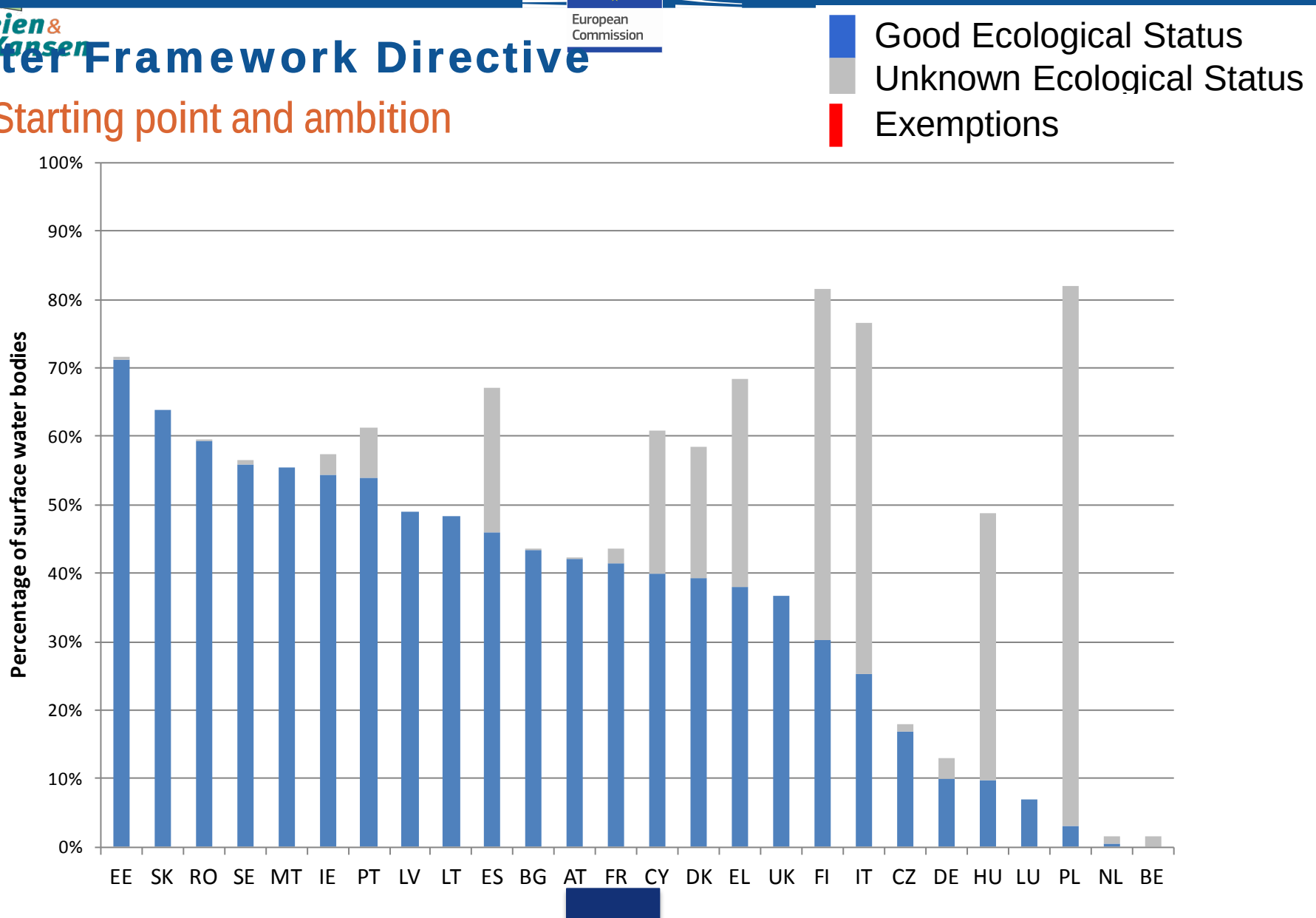

N balance per ha
N balance per ton milk
N Balance (kg per ha)
N Balance (kg per ton milk)
300
250
200
150
100
50
0
25
20
15
10
5
0
BF
BW
FB
FL
FN
GE
IN
IR
LU
NL

Phosphorous

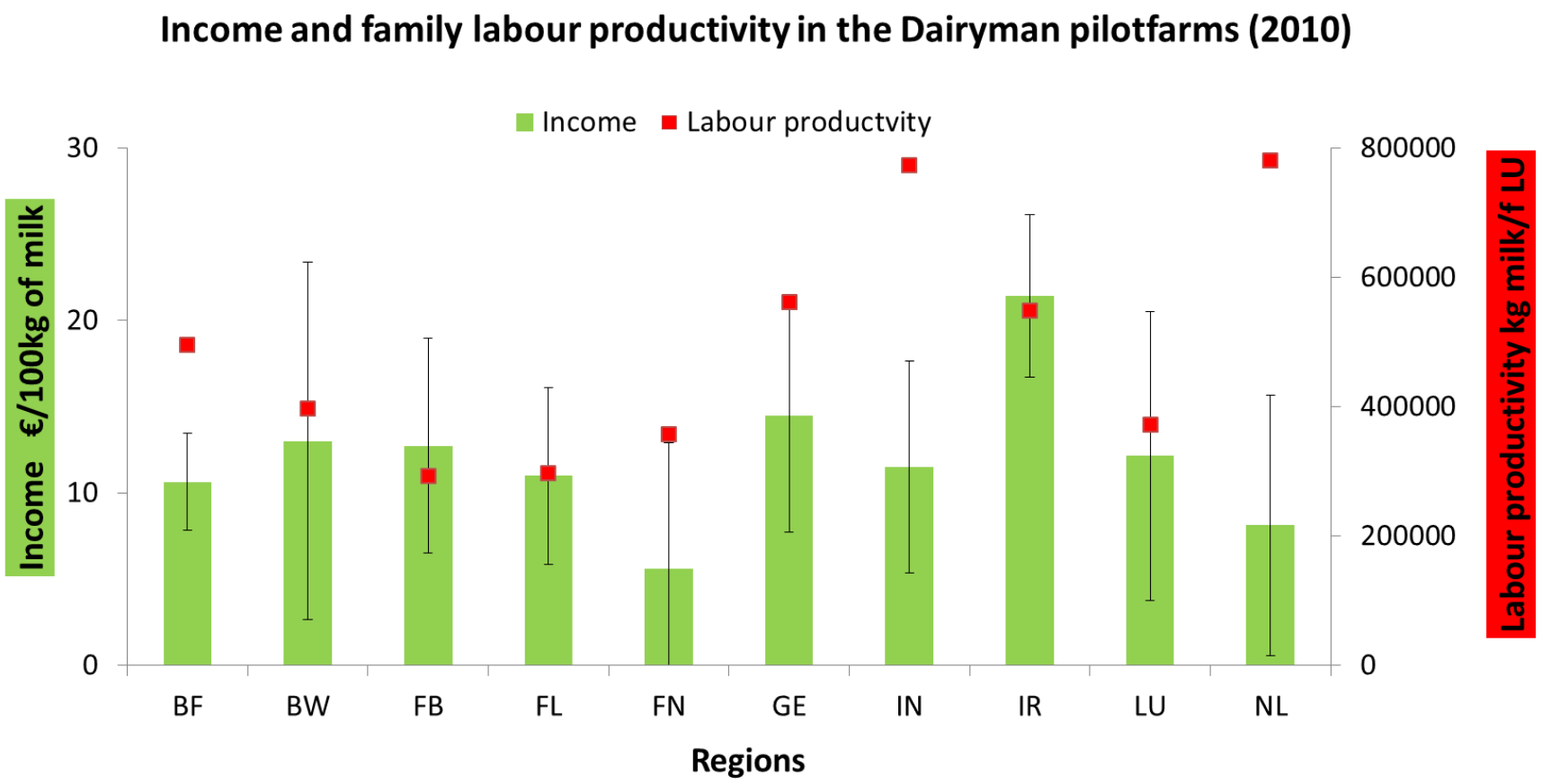


Water Framework Directive

Starting point and ambition



Dairy Economics – Costs and revenues (4)



N.B. With this income the farmer has to pay:
Family labour, income taxes, own capital (opportunity costs), quota costs

Wat te verbeteren: de zorgen van de veehouder

	BF	BW	FB	FL	FN	GE	IN	IR	LU	NL
High land prices	H	M	M	M	M	H	M	H	H	H
Low income	M	H	H	M	H	H	H	H	M	M
Costs manure surplus	H	M	L	L	L	L	L	L	L	H
Price fluctuations (input/output)	H	H	H	H	H	M	H	H	M	M
High workload/lack of free time	H	M	H	M	H	H	H	M	H	M
Administrative burden related to regulations	H	M	H	H	H	H	M	H	H	M
Lack of education/skills to use innovations	L	M	L	L	L	L	M	M	M	M
Lack of farm successors	L	L	M	M	H	M	M	M	L	M

Wat te verbeteren: de zorgen van het milieu

	BF	BW	FB	FL	FN	GE	IN	IR	LU	NL
Air quality										
Ammonia	4	3	3	3	2	3	2	2	1	5
GHG	4	5	3	3	1	2	5	5	2	3
Water quality										
nitrate	5	5	5	4	4	3	2	1	4	3
phosphate	4	2	3	2	1	2	5	3	3	5
pesticides	3	4	4	4	3	1	1	1	2	3
Soil quality										
Erosion	3	3	2	1	5	2	1	1	3	1
Fertility	3	4	1	1	1	1	2	1	2	2
Biodiversity	2	3	3	4	3	4	3	1	4	2

Op naar de top

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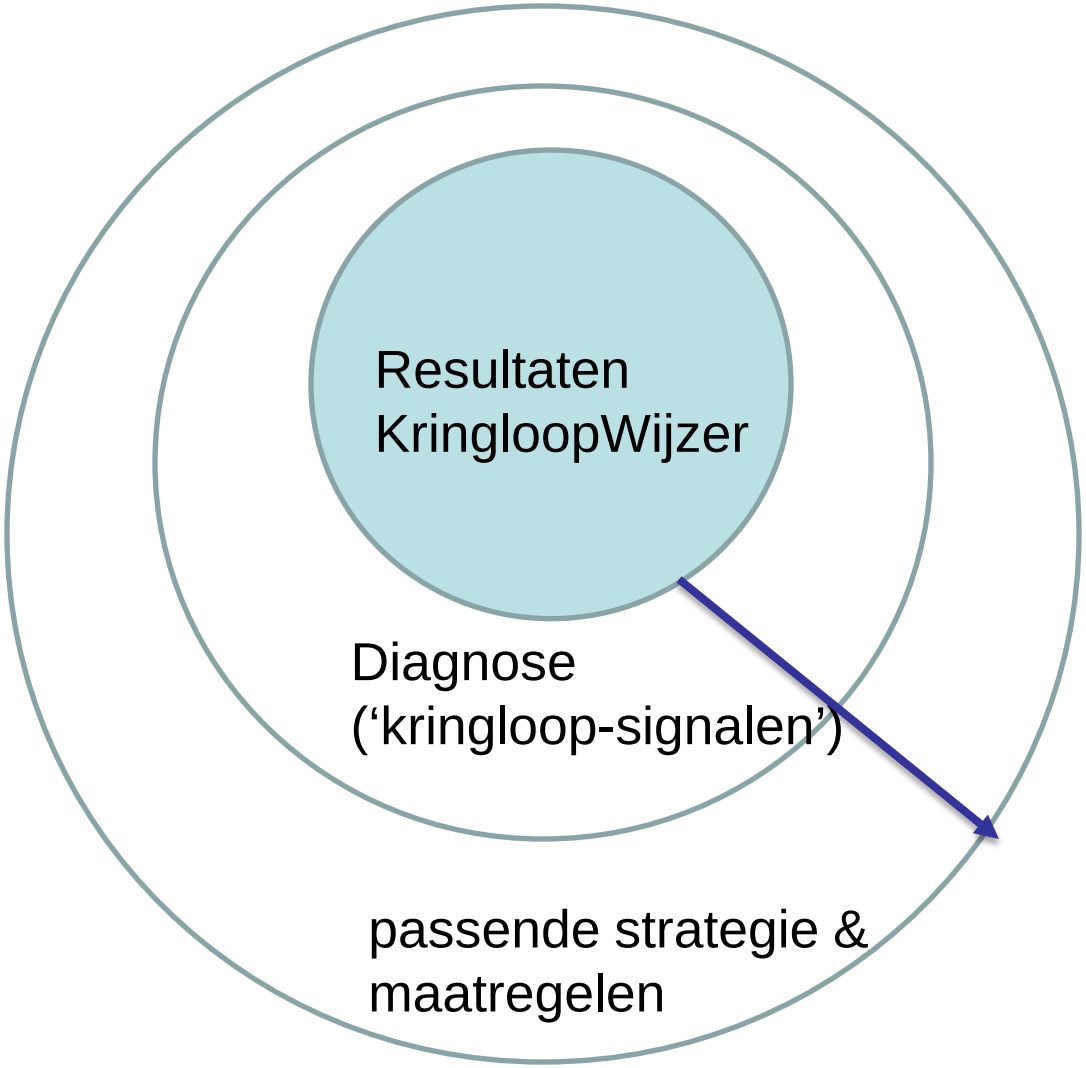
Optimaliseren bedrijf



Grondstof voor een zinnig onderhoud met uw adviseur

Geen kennis van kringloop:
= dwalen in het donker!

passende strategie &
maatregelen

Geen kennis van kringloop:
= dwalen in het donker!

passende strategie &
maatregelen

Als je niet weet waar je naar toe wilt is elke weg goed.

Wetgeving

- De overheid als boer: voorschrijven maatregelen om daarmee kringlopen te sturen (zonder nauwkeurige kennis daarvan)

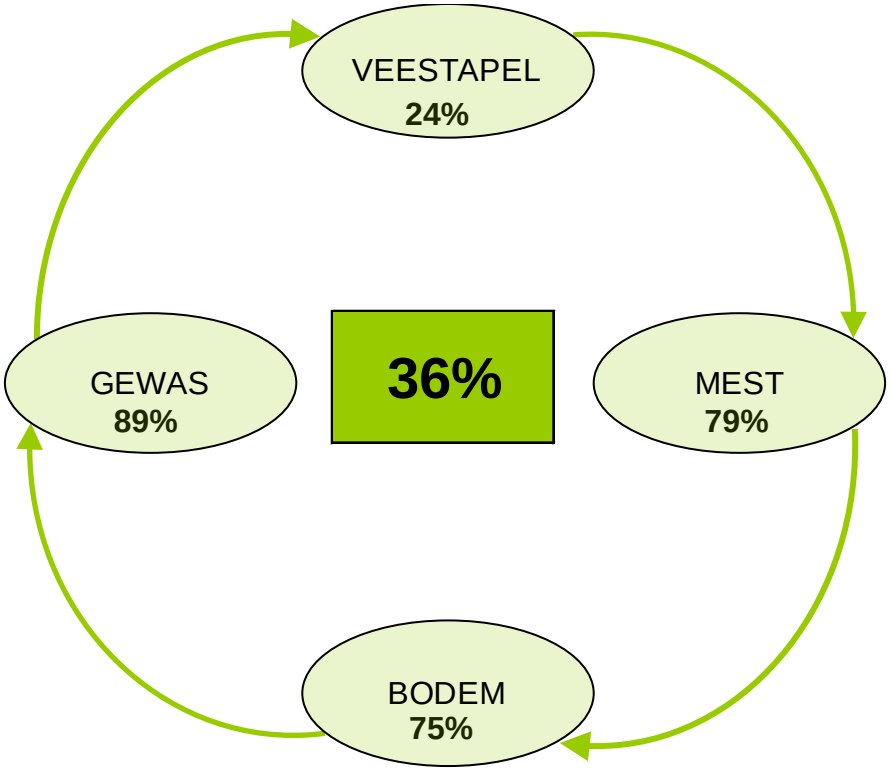
- De overheid als controleur: boer moet duurzaam produceren kunnen verantwoorden (kiest zelf de maatregelen)

Nut KringloopWijzer

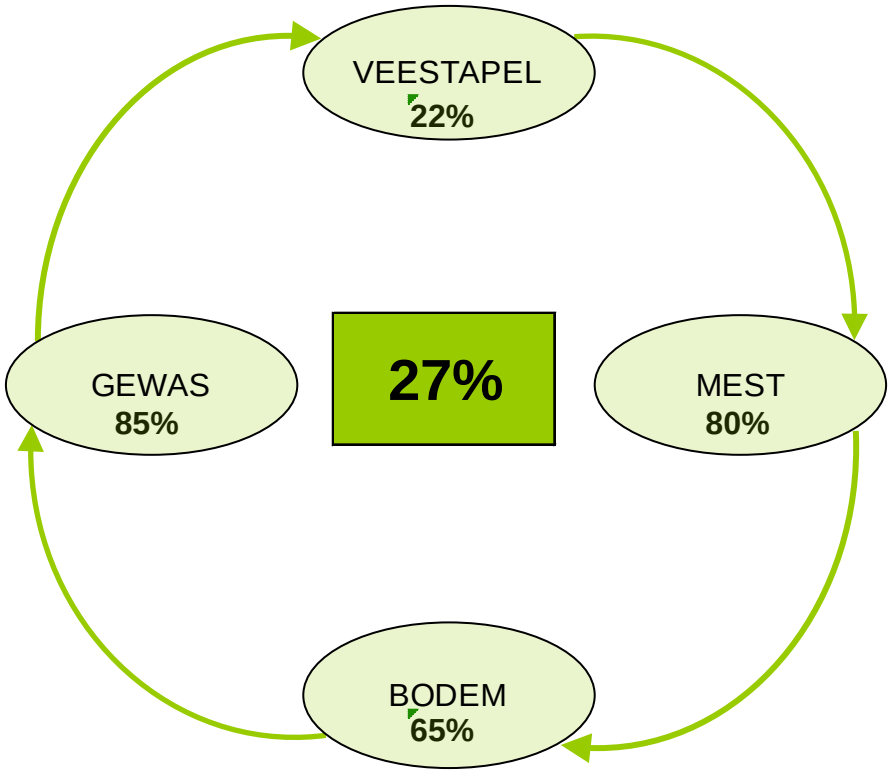
- Brengt jaarlijks de N-, P- en C-kringloop in beeld, waardoor:
  - Verantwoording kan worden afgelegd (overheden, zuivel)
  - Inzicht wordt geboden in efficiëntie van benutting voer en meststoffen (bedrijfsoptimalisatie)
- Biedt alternatief voor generiek wettelijk voorgeschreven handelings-voorschriften
- Standaard die door alle partijen wordt gebruikt

Kringloopscore: benuttingen (met als voorbeeld N)

Kuks 2011



Gemiddelde NL



Toelichting & verdieping: ‘voer’ voor analyse

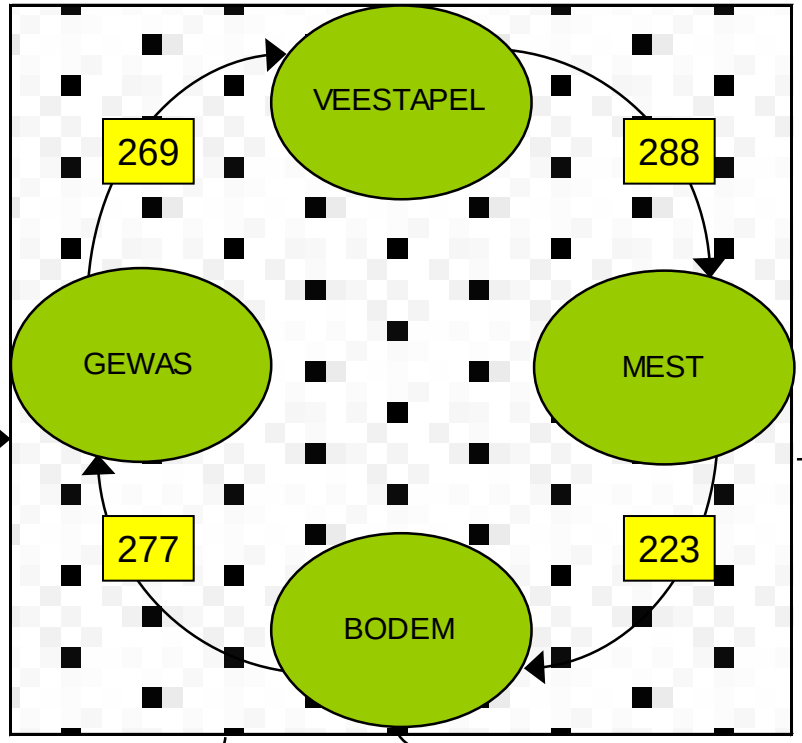
AANVOER: 167

- 101 krachtvoer
- 22 ruwvoer
- 8 kunstmest
- 0 dierlijke mest
- 0 dieren
- 0 klaver
- 36 depositie

MUTATIE: -104

- -7 krachtvoer
- 13 ruwvoer
- -108 kunstmest
- 0 dierlijke mest
- -2 dieren

BEDRIJFSBALANS STIKSTOF (KG N/HA)



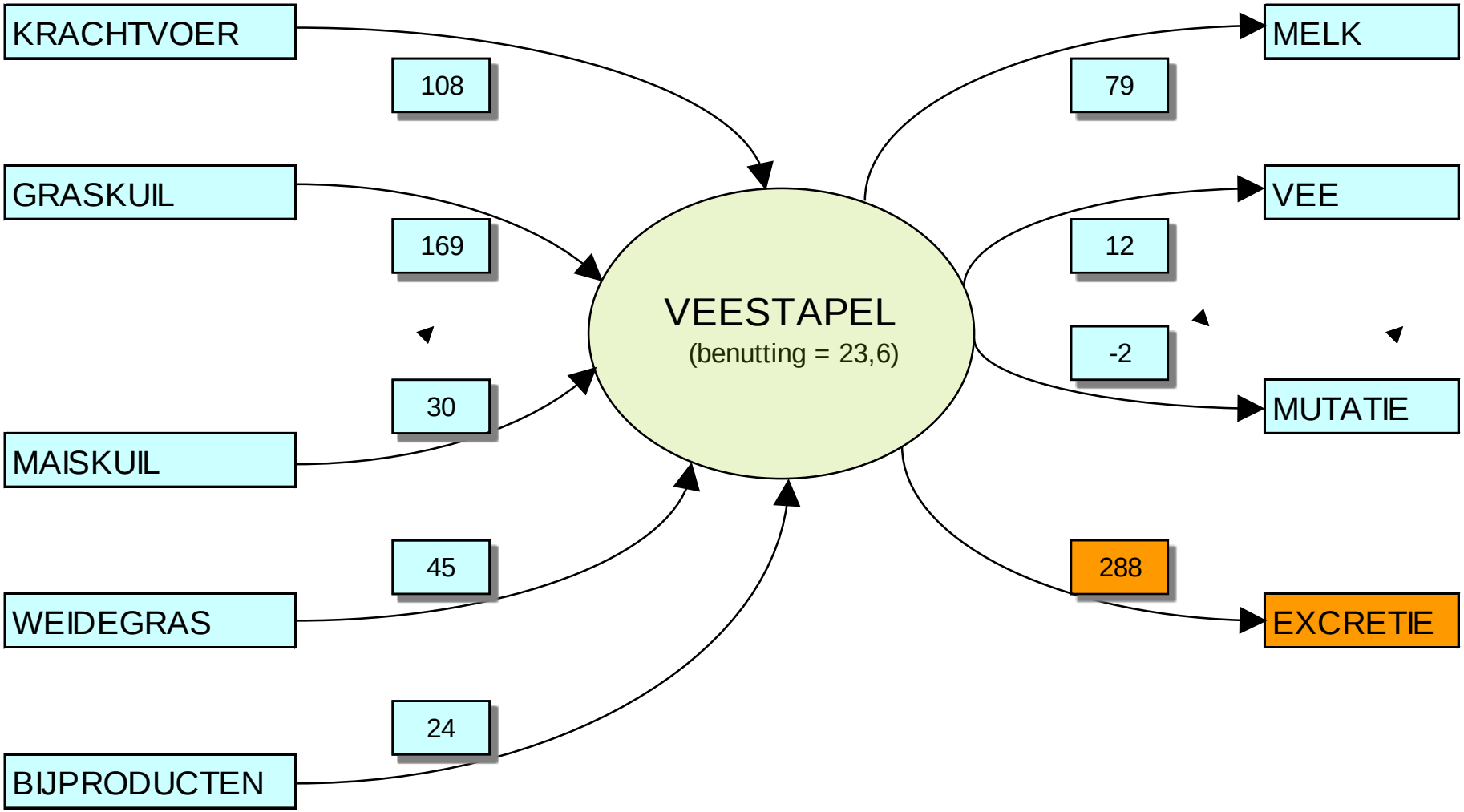
AFVOER: 113

- 79 melk
- 12 dieren
- 0 ruwvoer
- 22 dierlijke mest

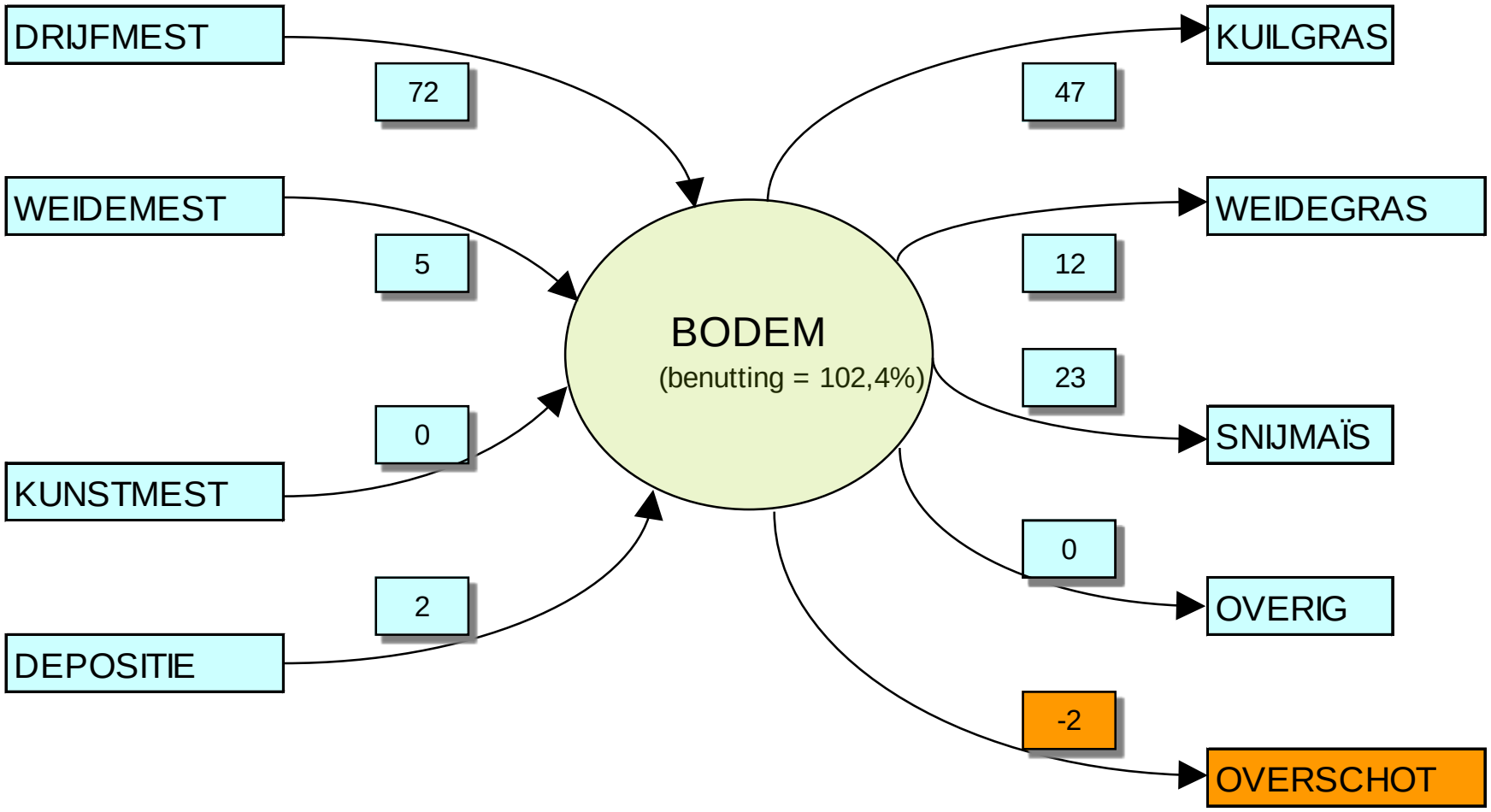
OVERSCHOT: 158

- 61 N_NH3
- 97 bodem

Uitvergroting veestapel (kg N/ha)



Uitvergroting bodem (kg P_2O_5/ha)



Eisen aan KringloopWijzer

- Wetenschappelijk ‘state of the art’
- Fraudebestendig
- (Borging BEX)
- Beperkte administratieve lasten en andere kosten

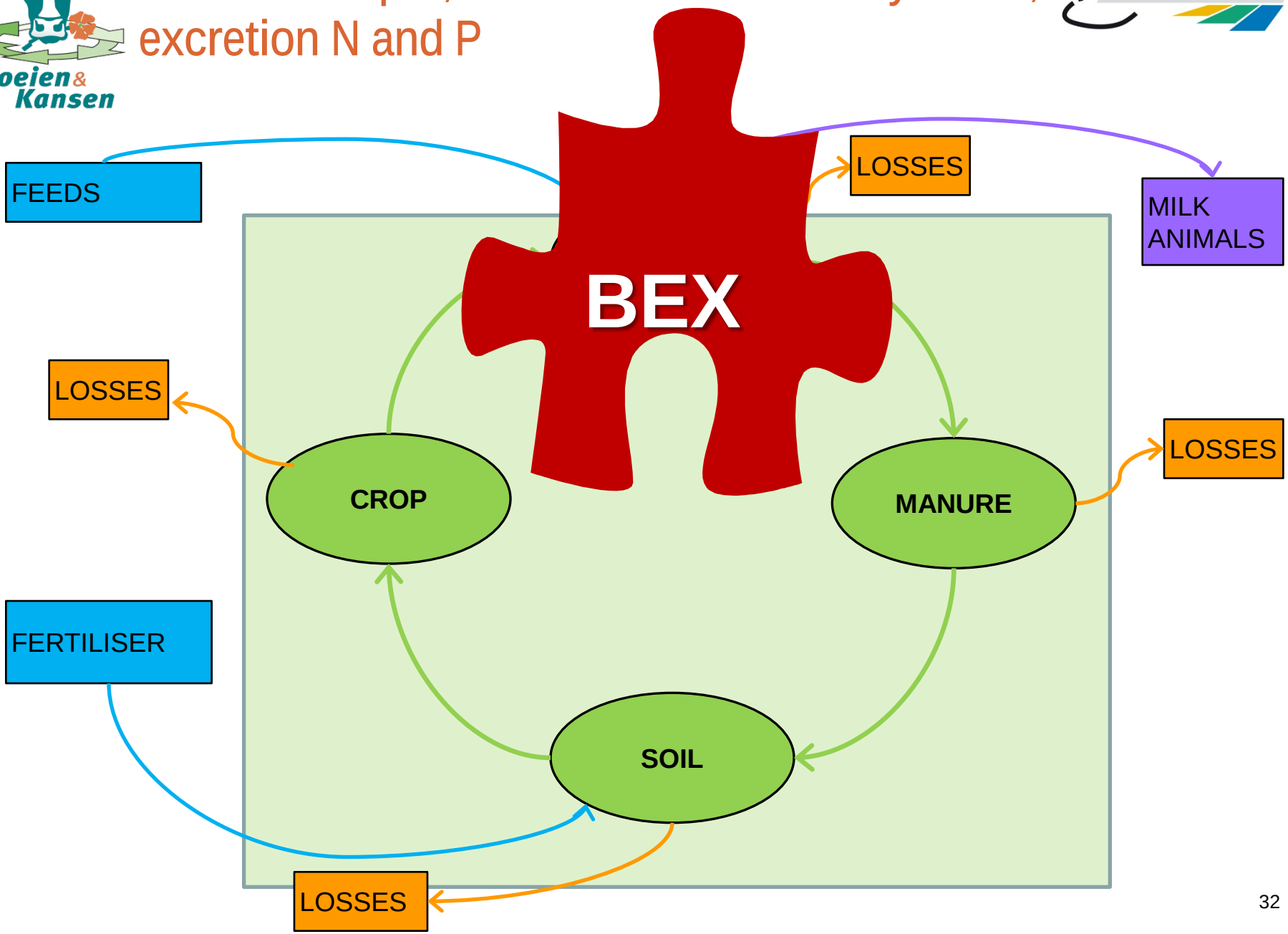
Voorwaarde: fraudebestendig!

- Berekeningen met gegevens die digitaal zijn vastgelegd (voerleverancier, melkafnemer, overheden, etc.)
- Inlezen van deze gegevens, dus zonder dat er vingers tussen zitten
- Resultaten centraal digitaal opslaan en controleren

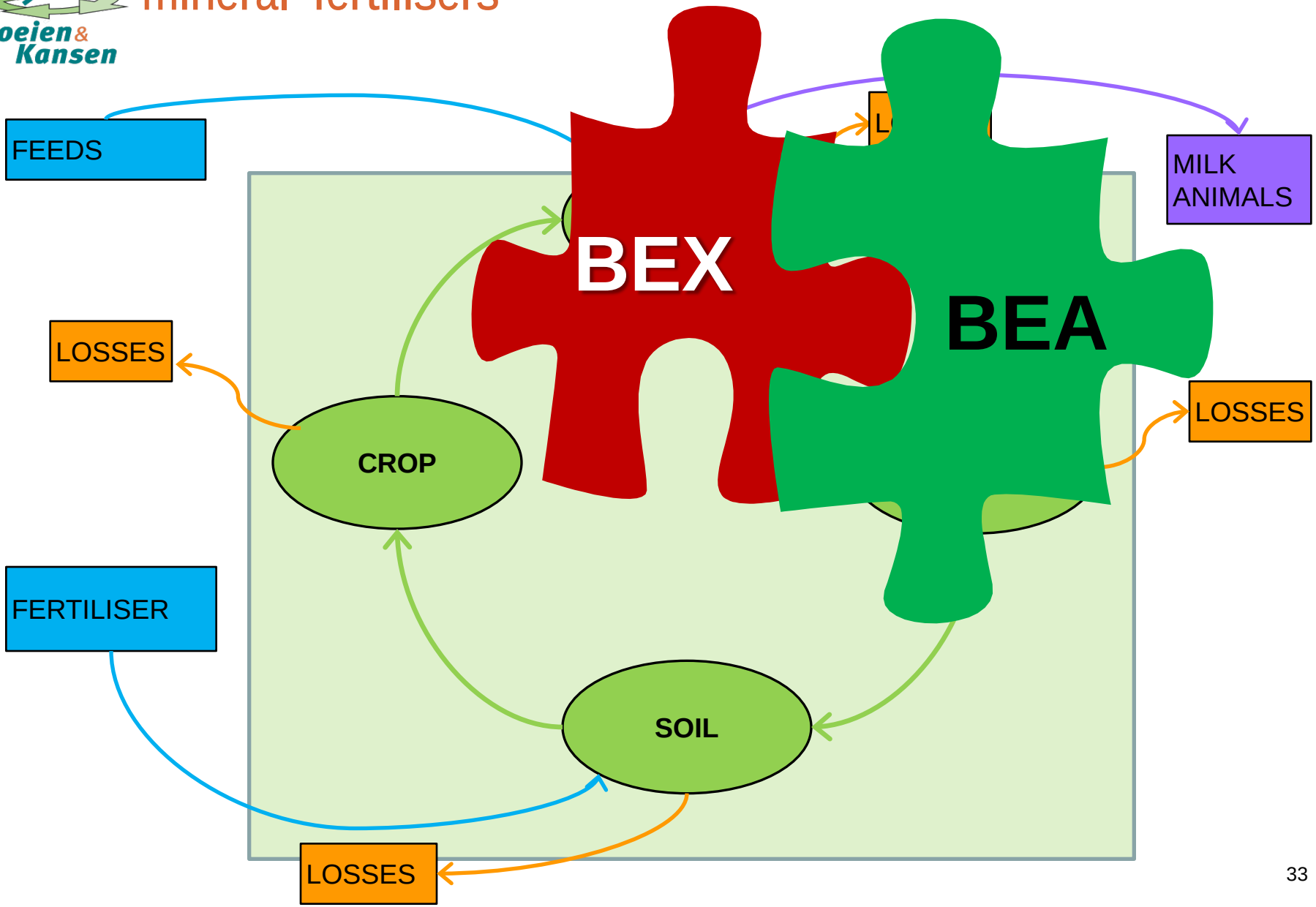
Samenwerking

- Alle landbouworganisaties
- Overheden
- Alle melkverwerkers
- Voerleveranciers, accountants
- Wageningen-UR, Boerenverstand, PPP-agro Advies
- CRV
- BLGG

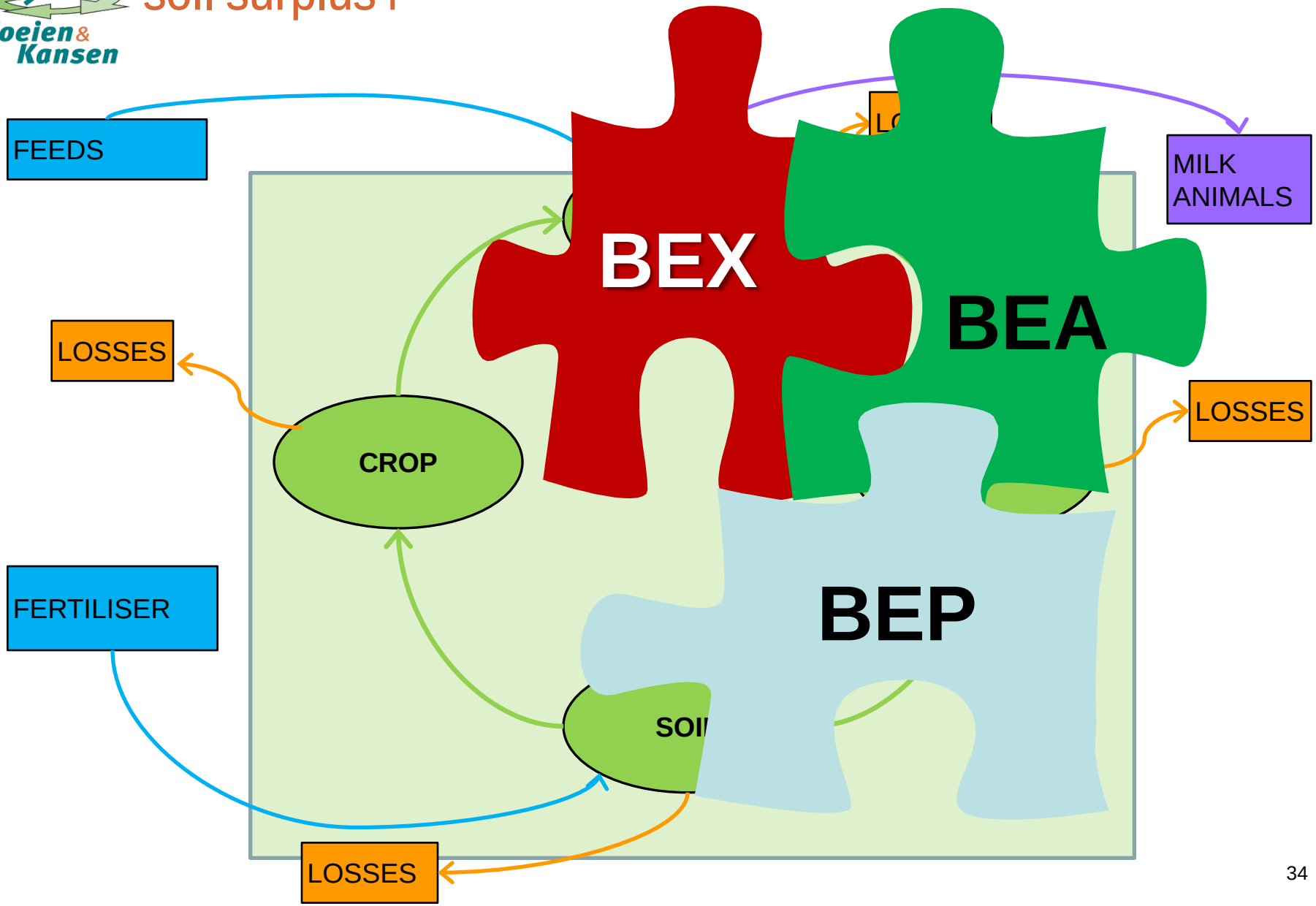
BEX: feed input, turn over of N and P by cattle, excretion N and P



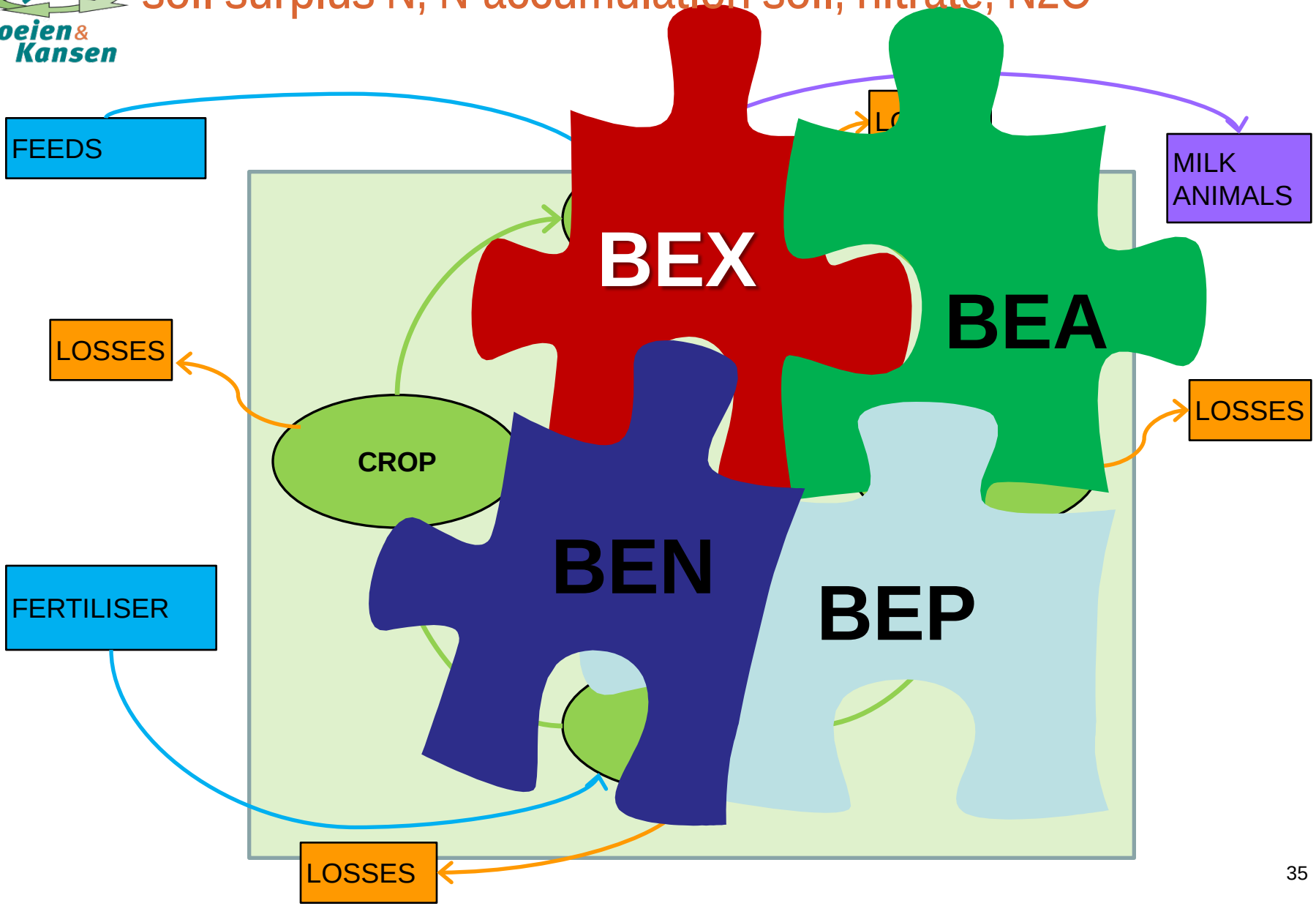
BEA: ammonia losses from excrements and mineral fertilisers



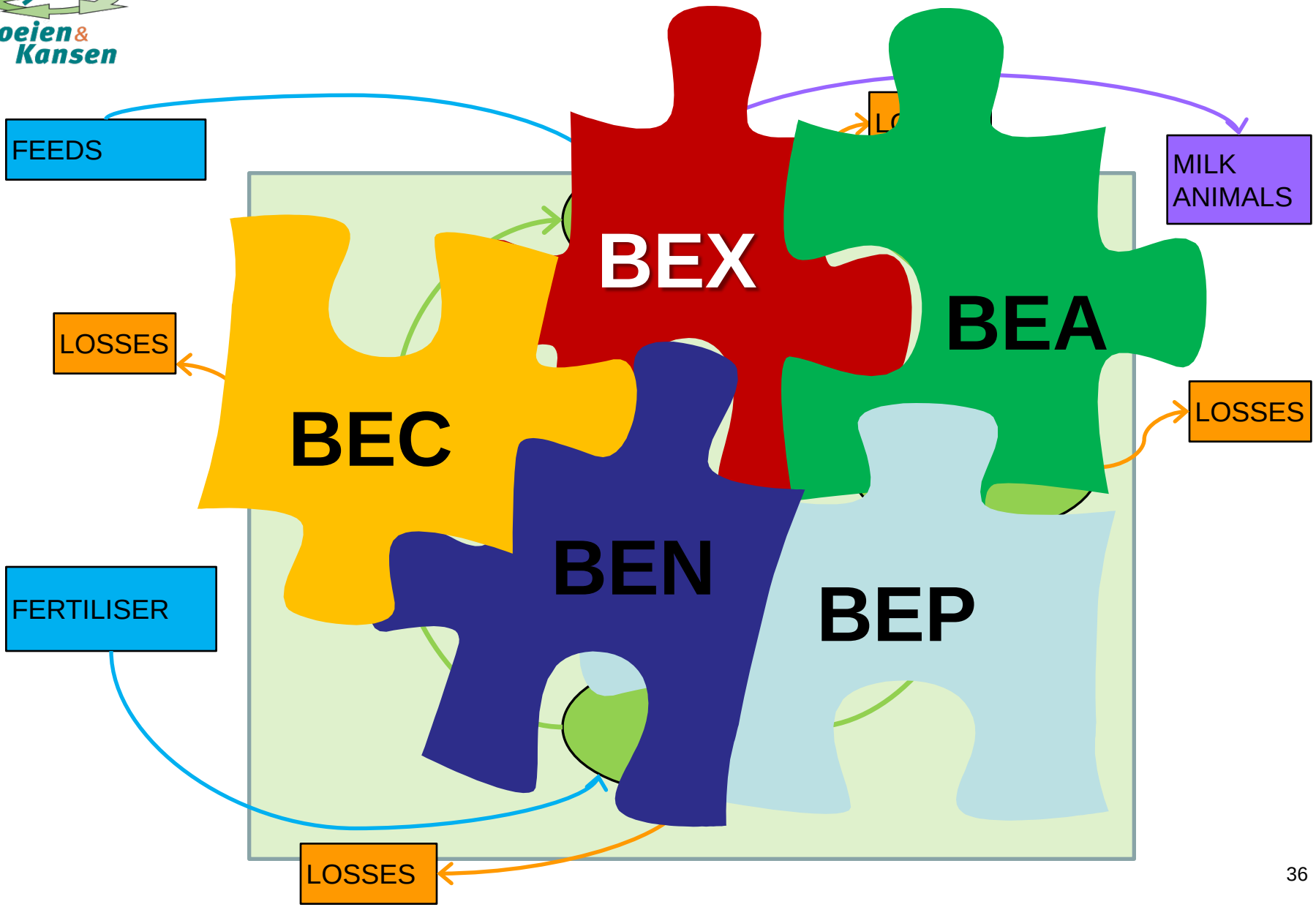
BEP: crop yields (DM, P), utilisation P-fertilisers, soil surplus P

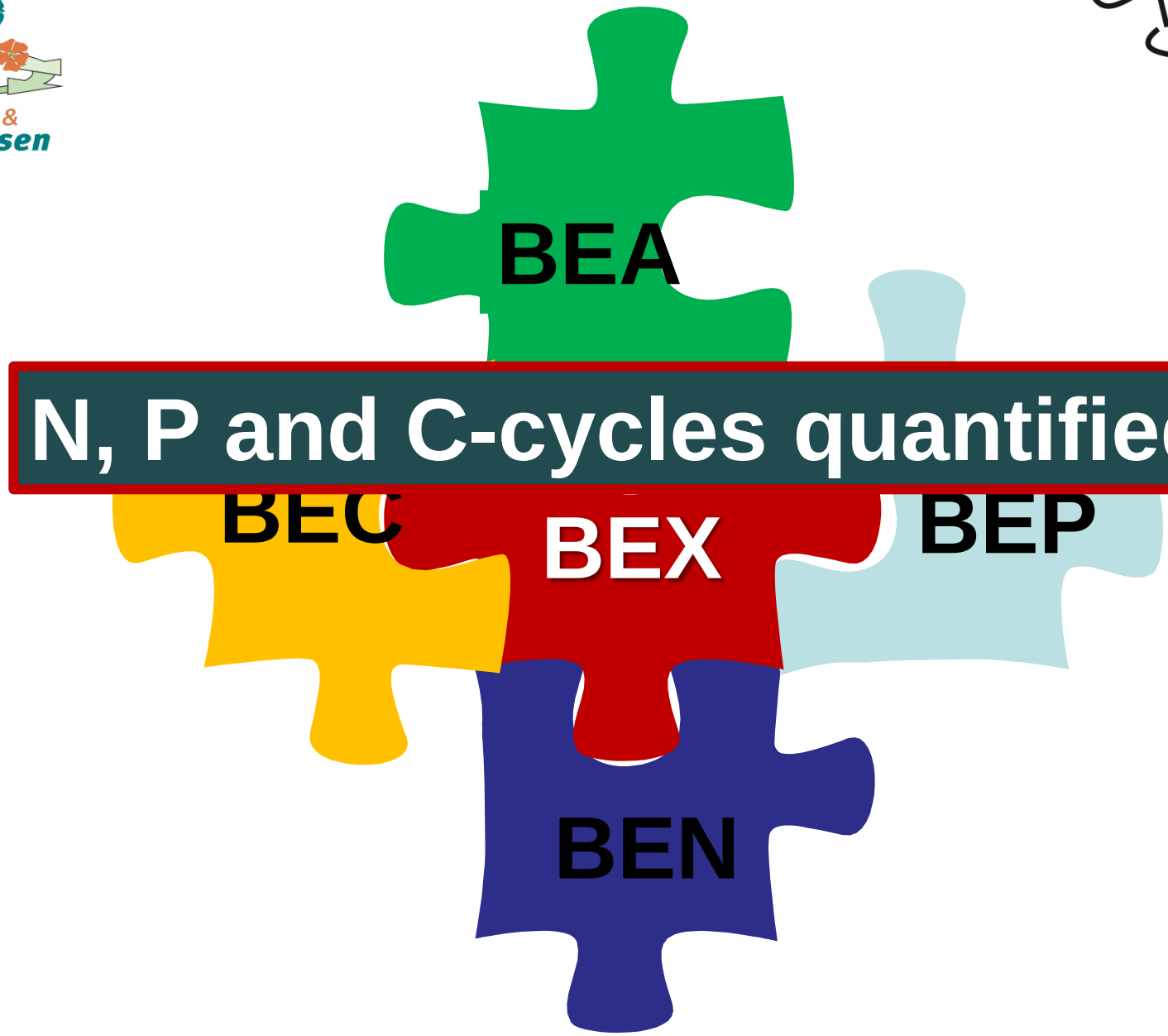


BEN: crop yields (N), utilisation N-fertilisers, soil surplus N, N-accumulation soil, nitrate, N2O

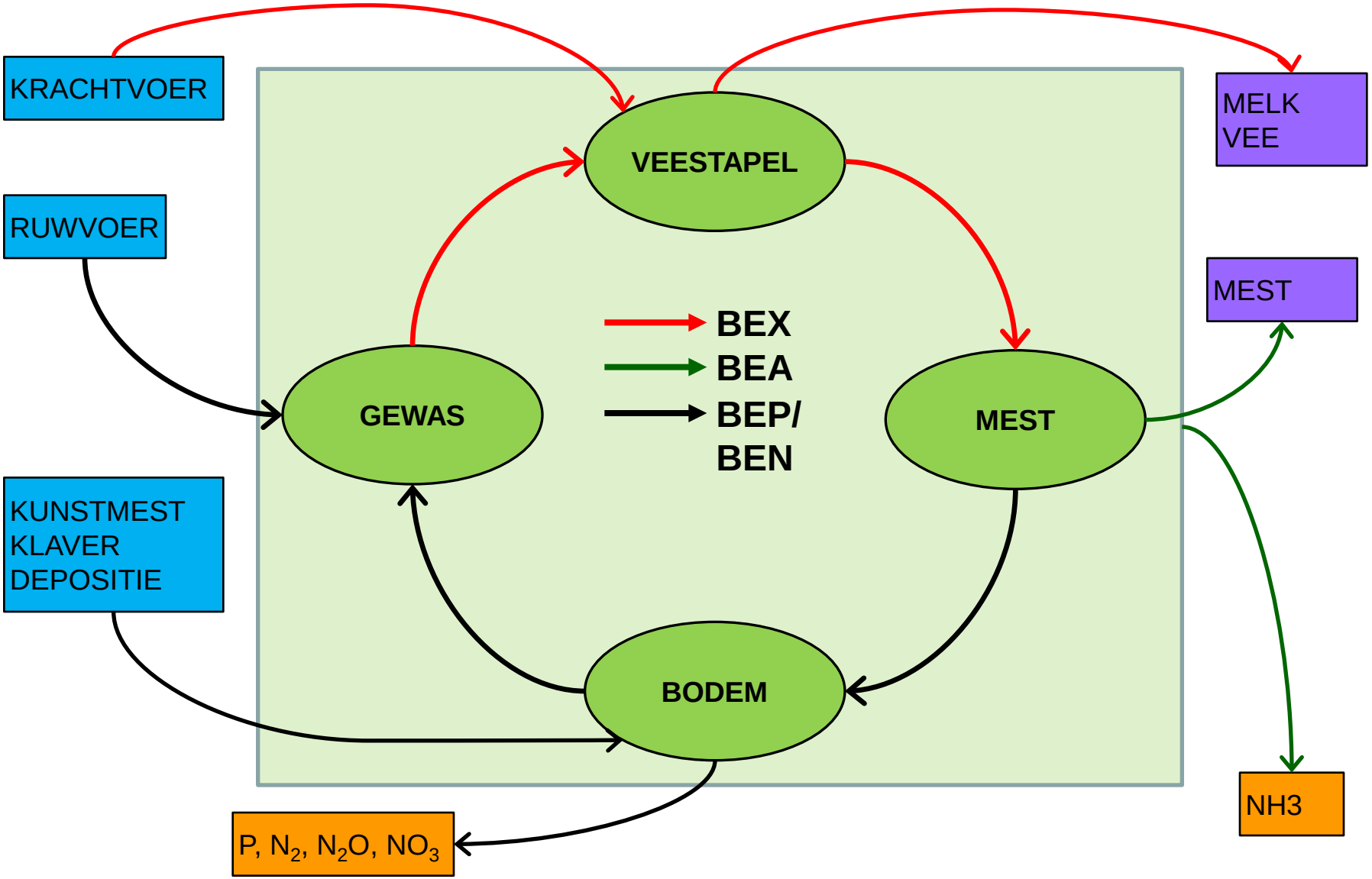


BEC: CH4, CO2, C content soil



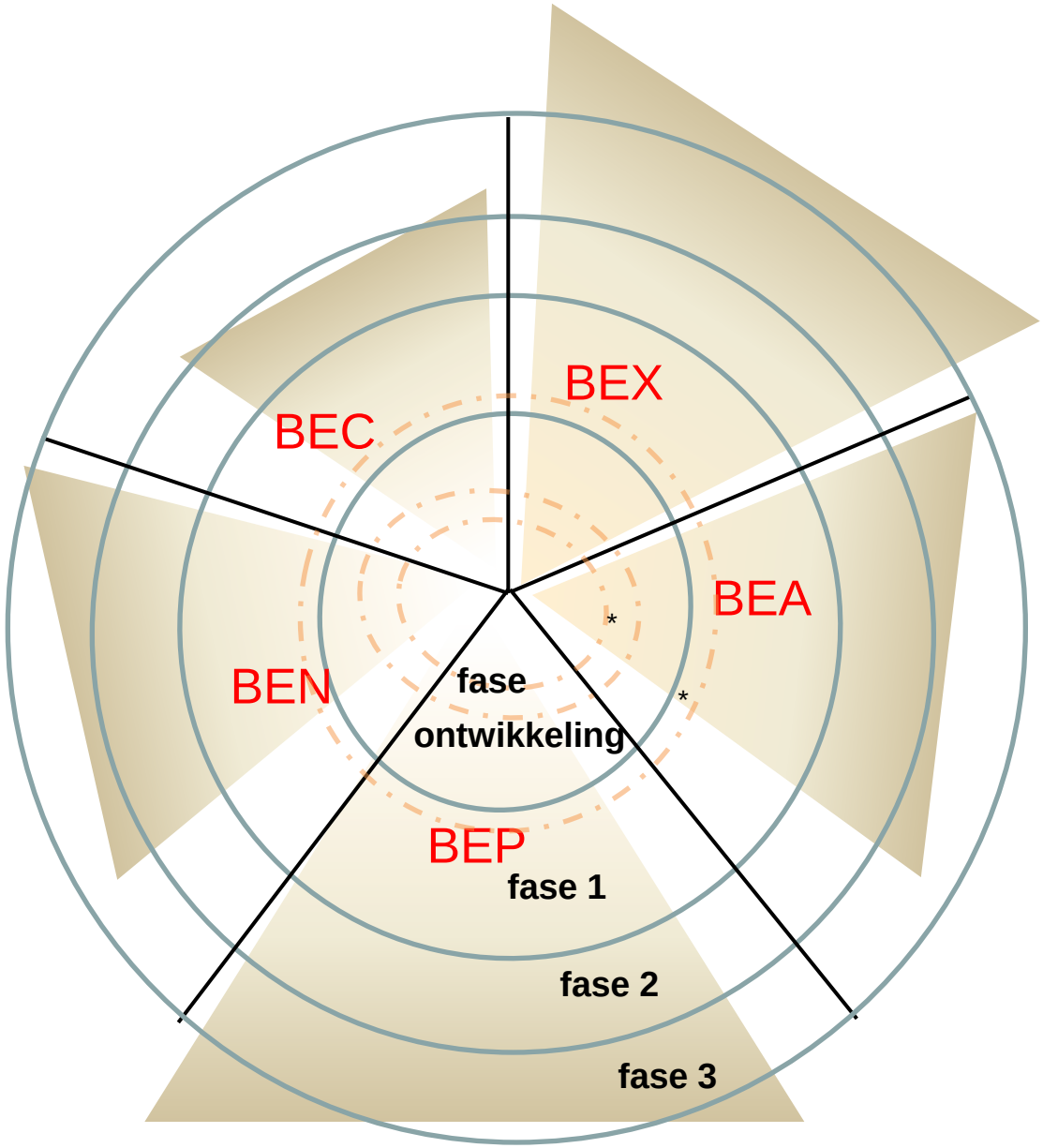

BEA
N, P and C-cycles quantified!
BEC
BEX
BEP
BEN

Opbouw kringloop

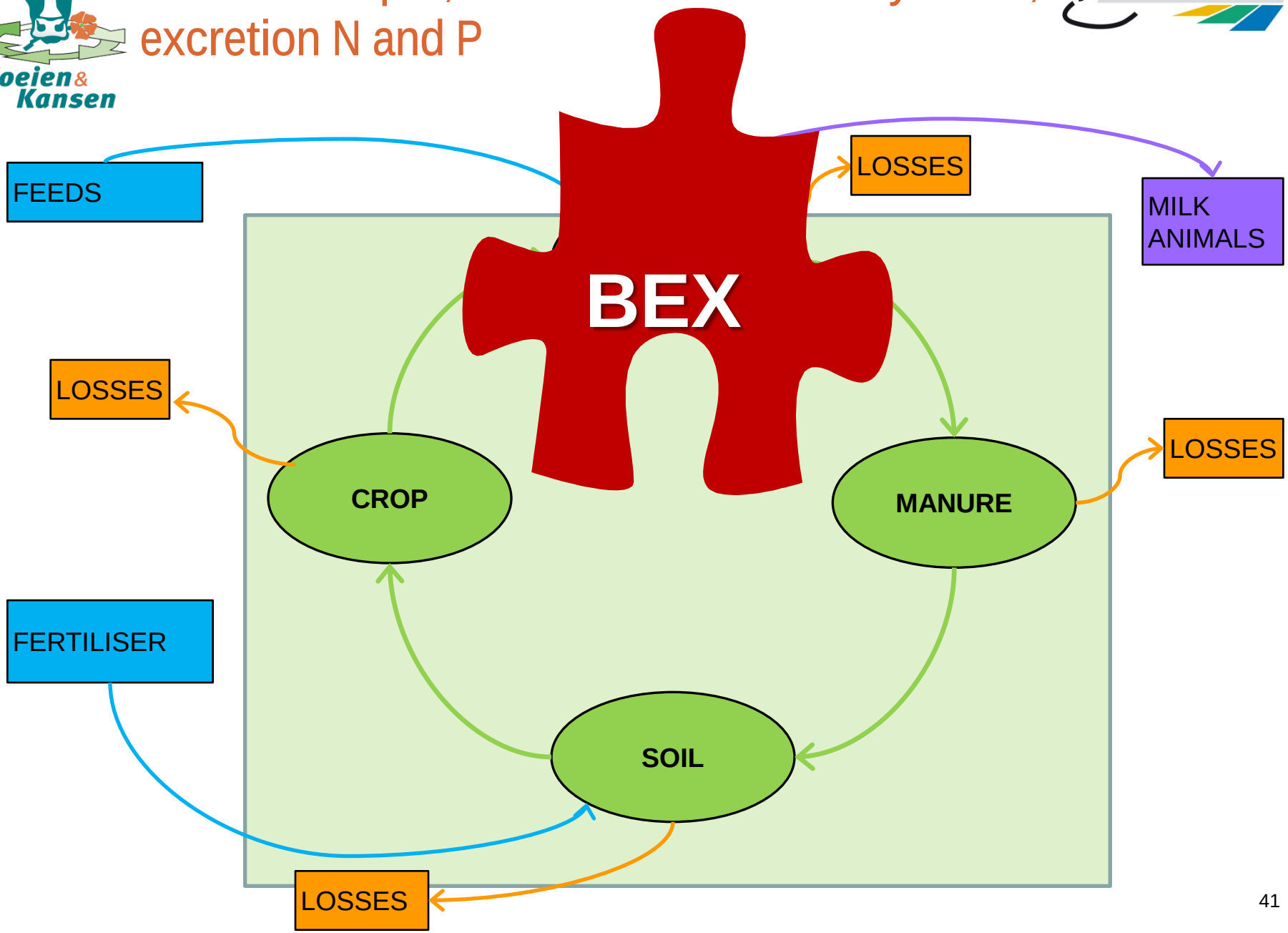


Performances to be presented

1. - Feed consumption and efficiency of turn over of N and P into milk + bodyweight
2. - Excretion of N and P
3. - Ammonia losses from excrements and mineral fertilisers
4. - Crop yields: N, P, C, energy (kVEM)
5. - Fertiliser applications and efficiency of turn over of fertilisers into crops
6. - Surpluses of N, P and C on farm balance
7. - Surpluses of N, P and C on soil balance
8. - Nitrate content groundwater (model calculated based on N-soil surplus and soil characteristics
9. - Dynamics C-content soil (C- sequestration)
10. - Green House Gas emissions (model calculated with farm specific data)


BEX
BEC
BEA
BEN
BEP
fase
ontwikkeling
fase 1
fase 2
fase 3

BEX: feed input, turn over of N and P by cattle, excretion N and P



Principe norm excretie: balans dier-deel kringloop

Voeropname

Melkproductie

Vastlegging

Excretie

Gemiddeld NL

Principe BEX
balans dier-deel kringloop

Voeropname

Melkproductie

Vastlegging

Excretie

Bedrijfspecifiek

N flow (kg/year) of the standard Dutch dairy cow

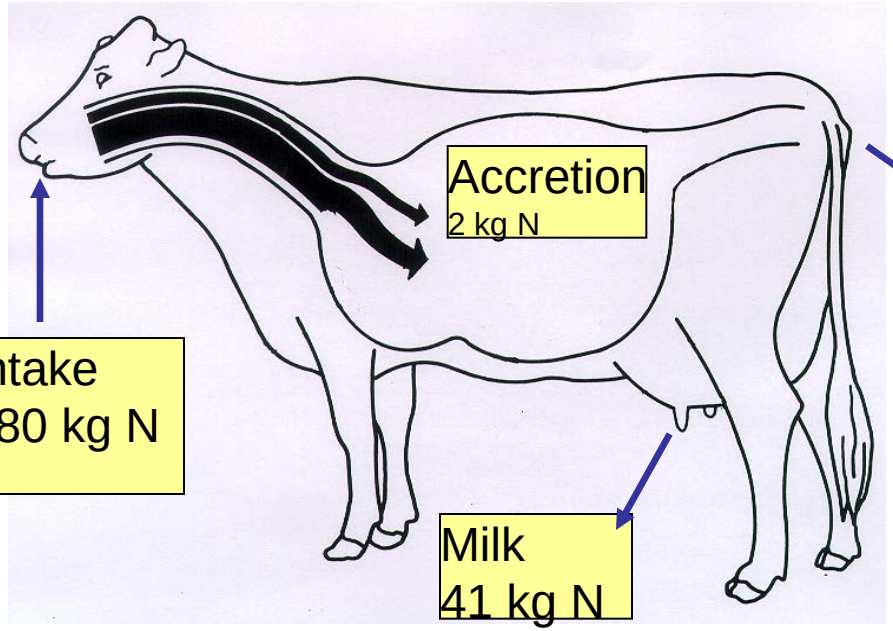
Live weight
600 kg

Pasture grass	
Kg dm	1445
g N/kg dm	34.6

Grass silage	
Kg dm	2160
g N/kg dm	29.0

Corn silage	
Kg dm	1200
g N/kg dm	12.5

Concentrates	
Kg dm	1895
g N/kg dm	27.5



Volatilisation
17 kg N

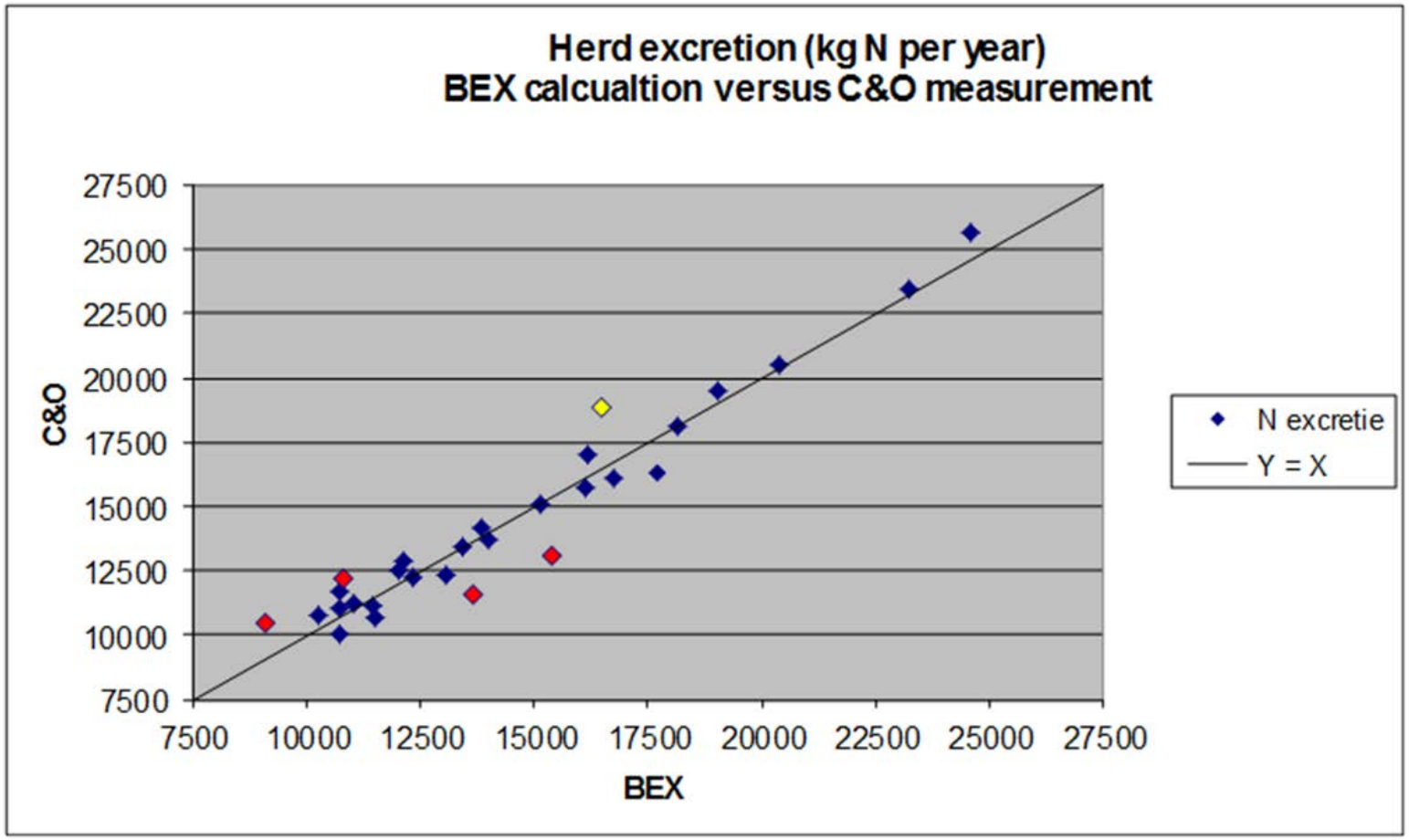
Gross excretion
137 kg N
(180 - 41 – 2)

Milk	
kg	7482
%protein	3.5
urea (mg/100 g)	26

N-manure
(137-17) x 0.95 =
114 kg N

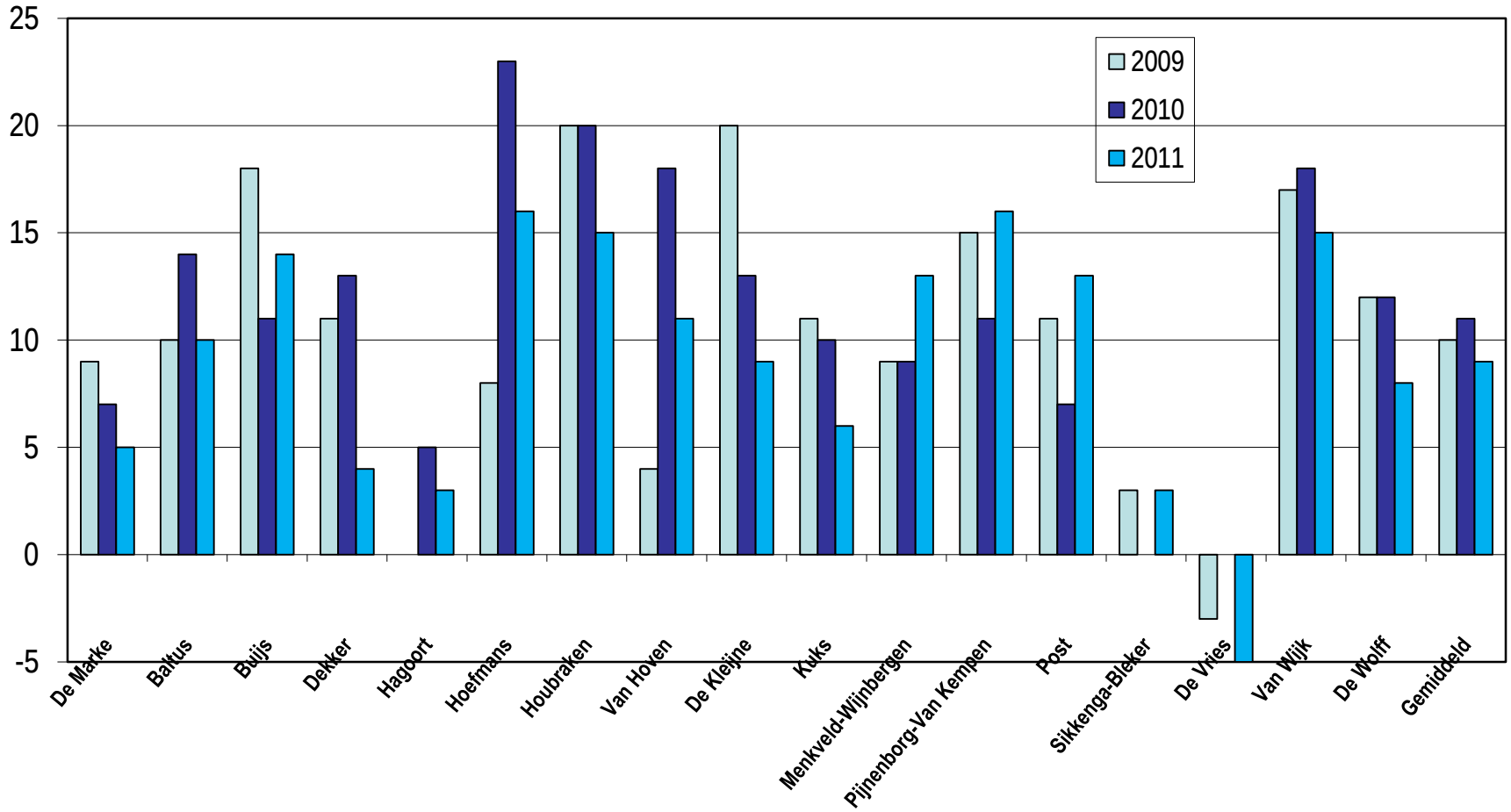
Young stock<1	Young stock>1
Kg N 31	Kg N 66

Comparison N excretion

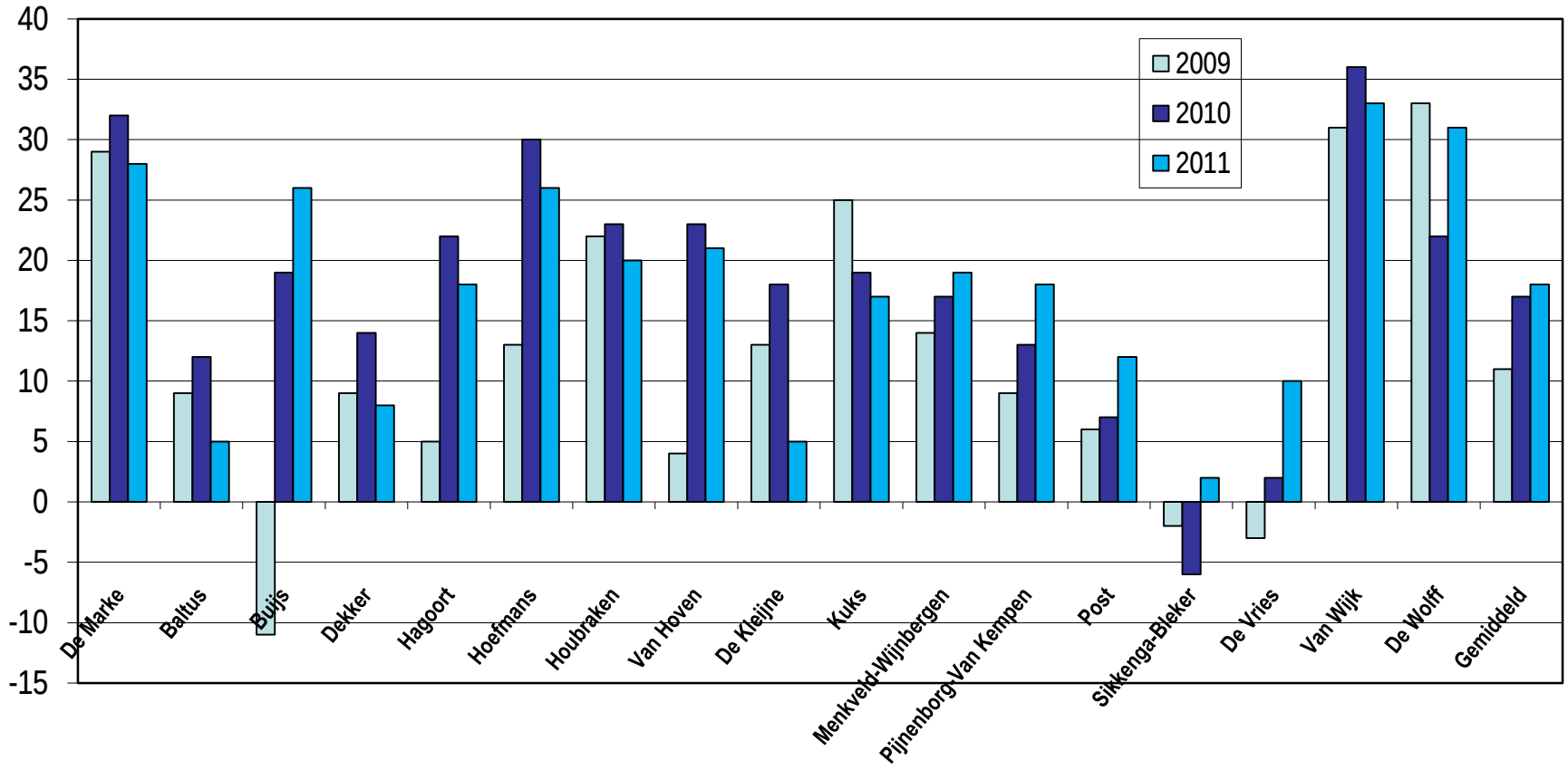


Above line y =x …. C&O excretion higher than BEX

Stikstofvoordeel t.o.v. van de forfaitaire norm (%)

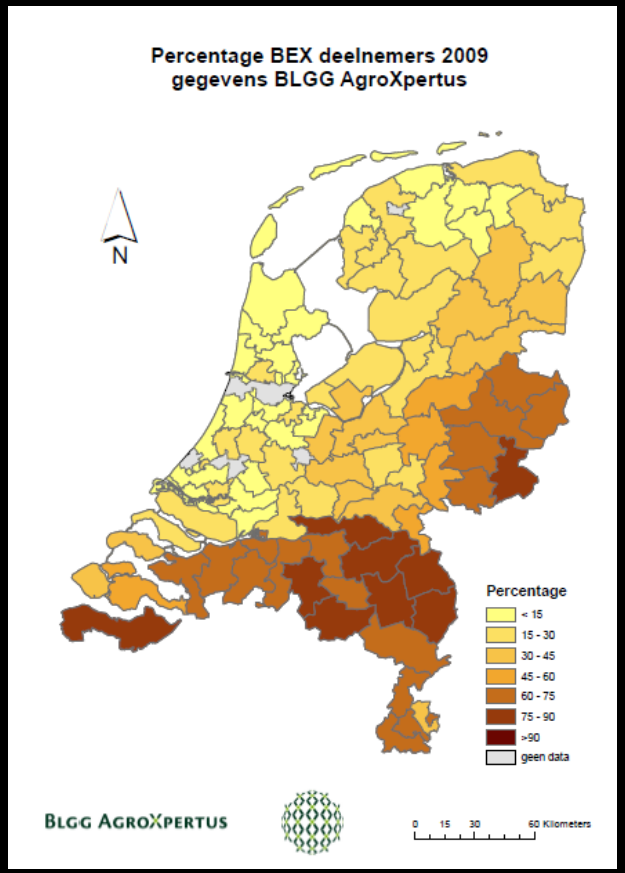


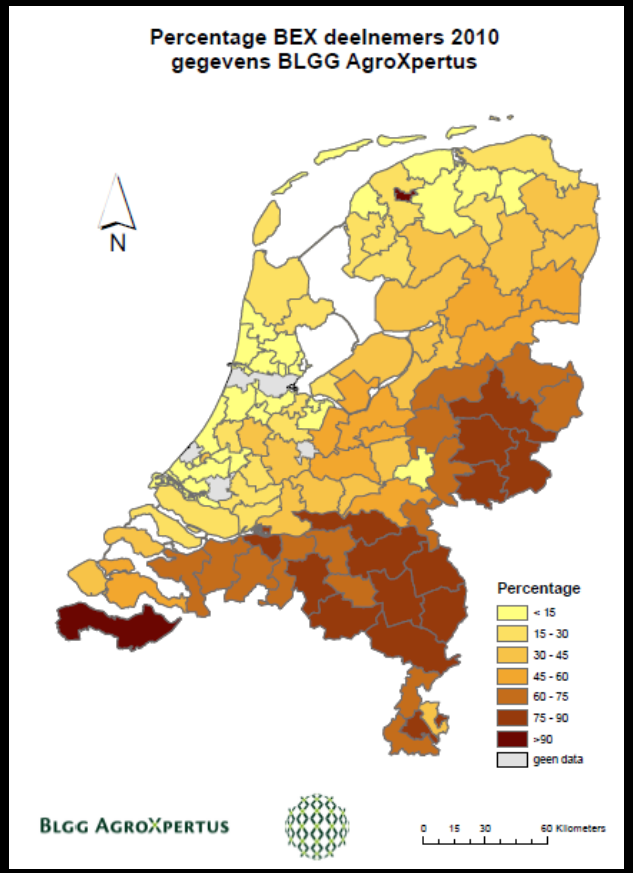
Fosfaatvoordeel t.o.v. van de forfaitaire norm (%)



Besparing mestafzet KK-bedrijven

- Periode 2009 – 2011:
  - gemiddeld: 375 m3
  - hoogste: 700 m3


Percentage BEX deelnemers 2009
gegevens BLGG AgroXpertus
N
Percentage
< 15
15 - 30
30 - 45
45 - 60
60 - 75
75 - 90
>90
geen data
BLGG AGROXPERTUS
0 15 30 60 Kilometers


Percentage BEX deelnemers 2010
gegevens BLGG AgroXpertus
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< 15
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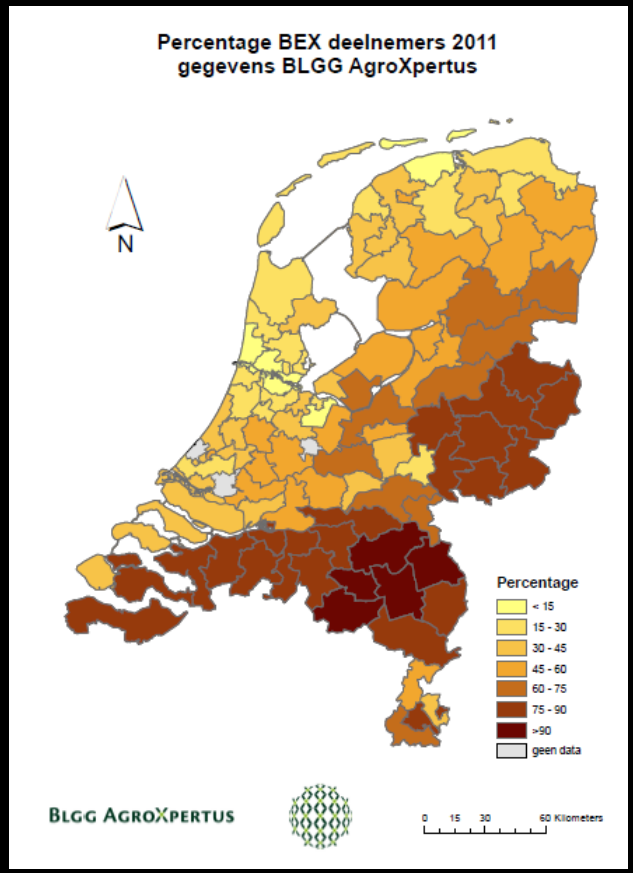
>90
geen data
BLGG AGROXPERTUS
0 15 30 60 Kilometers


Percentage BEX deelnemers 2011
gegevens BLGG AgroXpertus
N
Percentage
< 15
15 - 30
30 - 45
45 - 60
60 - 75
75 - 90
>90
geen data
BLGG AGROXPERTUS
0 15 30 60 Kilometers

NEMA/BEA

Average N excretion X %TAN

Total Ammonia N

N-excretion

average

%TAN

Manure storage

Coëff

average

%TAN

TAN in manure storage

N-fertilizer

slurry + solid manure

pasturing

N-fertilizer

Coëff

Coëff

Coëff

Coëff

Coëff

Arable land

Grass land

Characteristics example farms

2006	NL average	Hoefmans	Van Hoven
Utilization digested feed protein cows (%)	37.2	40.8	36.5
N efficiëncy cows (%)	25.9	28.5	25.6
Number of cows	88	88	102
Milk production (kg)	681472	768394	790811
Milk fat (%)	4.39	4.36	4.56
Milk protein (%)	3.48	3.47	3.42
Grazing in days per year	125	64	192
Grazing in hours per day	7	6	12
Crude protein content ration (g/kg dm)	161.5	152.5	159.5

Results for Dutch farms

2006	NL average	Hoefmans	Van Hoven
Kg NH_3-N per 1000 kg milk	4.21 2.9 [1)]	3.66 2.8	3.34 2.6
Stable and storage	35.2	34.2	35.6
Slurry application grassland	47.3	47.8	39.8
Slurry application arable land	12.8	13.9	15.9
Application N-fertlizers	3.3	3.8	4.2
Pasturing	1.7	0.5	4.8
%TAN			
Year	61.9	57.5	62.8
Grazing period	68.2	62.8	67.8
Stable period	56.0	56.0	51.6

[1)] Total farm emission in tons of **NH_3-N**

BEP
Bodem/gewas-deel kringloop

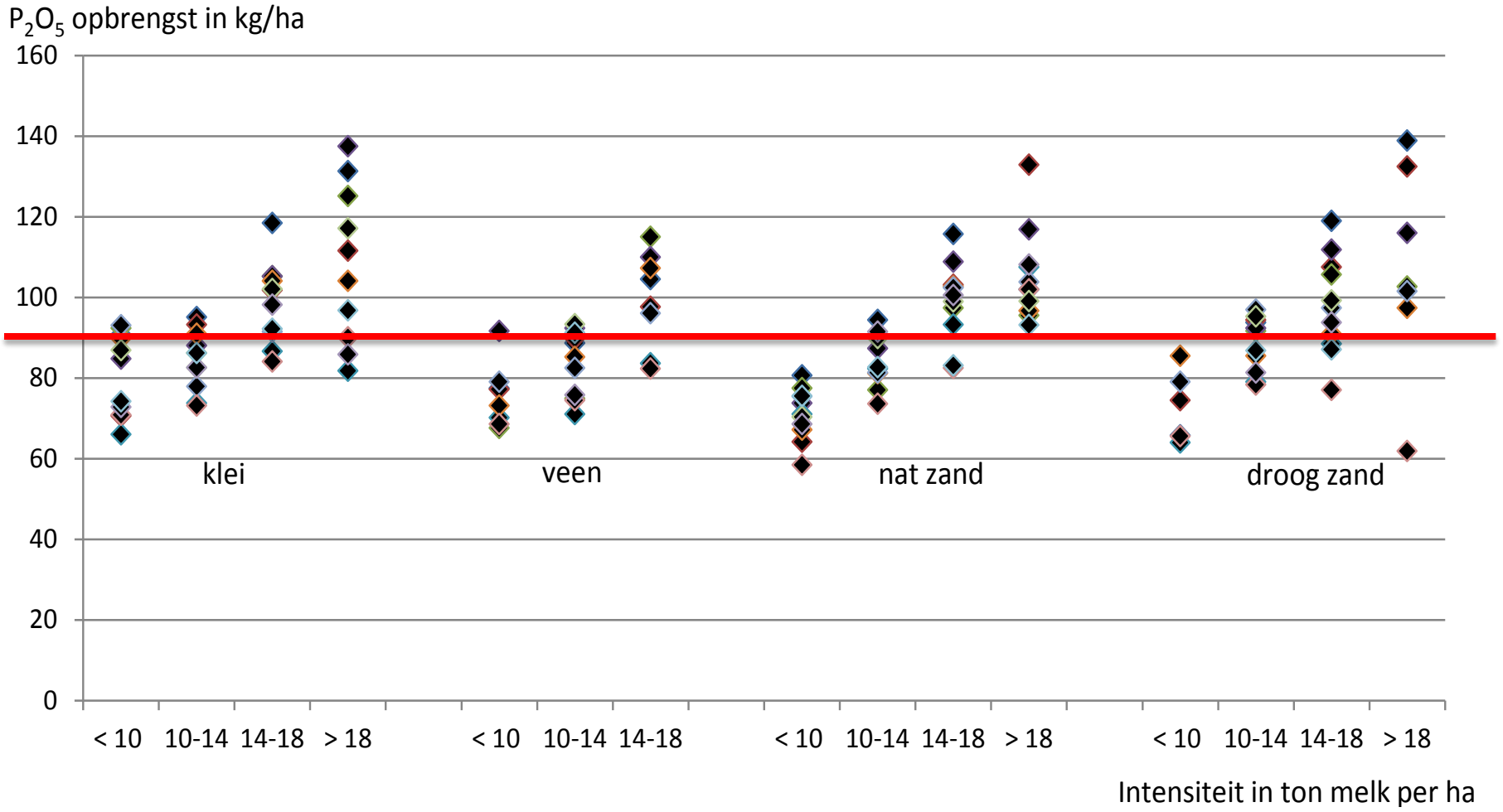
Bemesting-P

Opbrengst gewas-P

Toegestaan overschot P

Bedrijfspecifiek

Fosfaatopbrengst grasland (BIN-bedrijven)



Dank voor de aandacht