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# MINAS

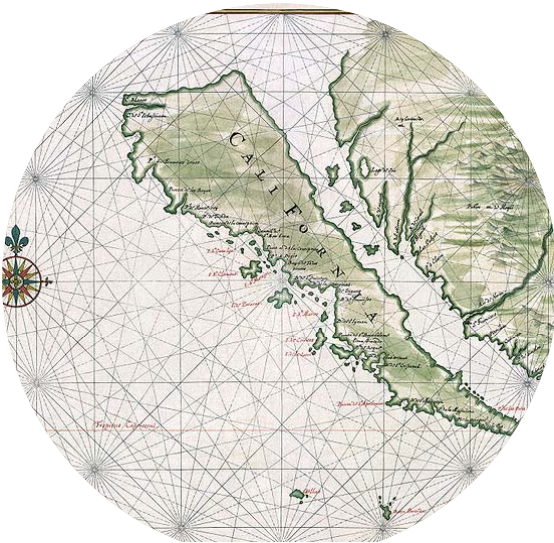
## – the Dutch MINeral Accounting System

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For the California Department of Food and Agriculture

August 2013, Krijn J. Poppe

LEI Wageningen UR



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# Content of the presentation

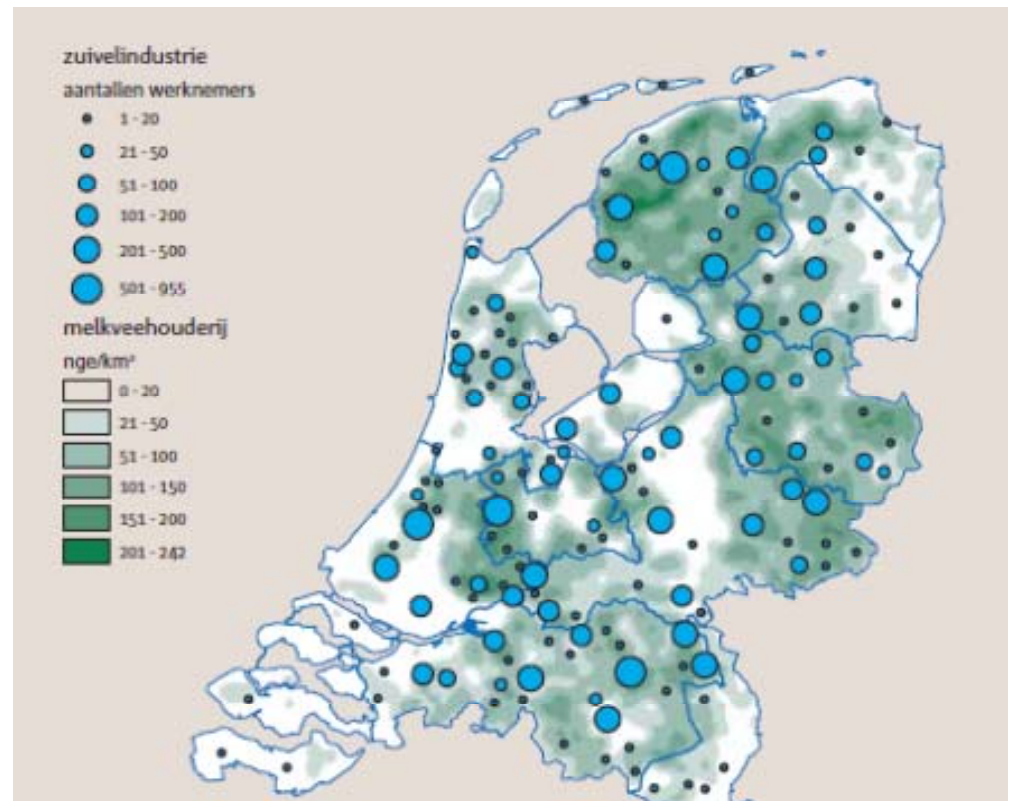
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- A short introduction to Dutch agriculture
- MINAS: a profit and loss account on nutrients
  - That is auditable
- The rise and fall of MINAS as a Dutch policy instrument
- Concluding remarks

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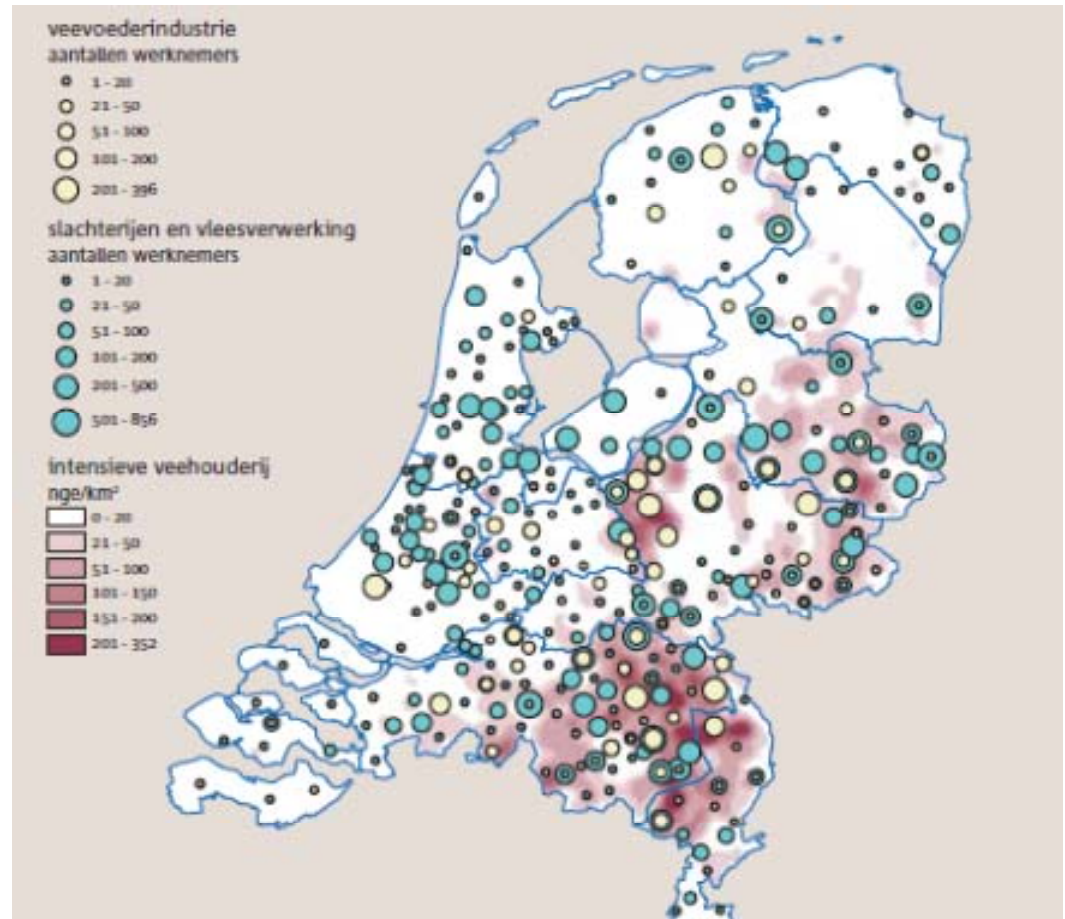
# Location of the dairy farms and industry

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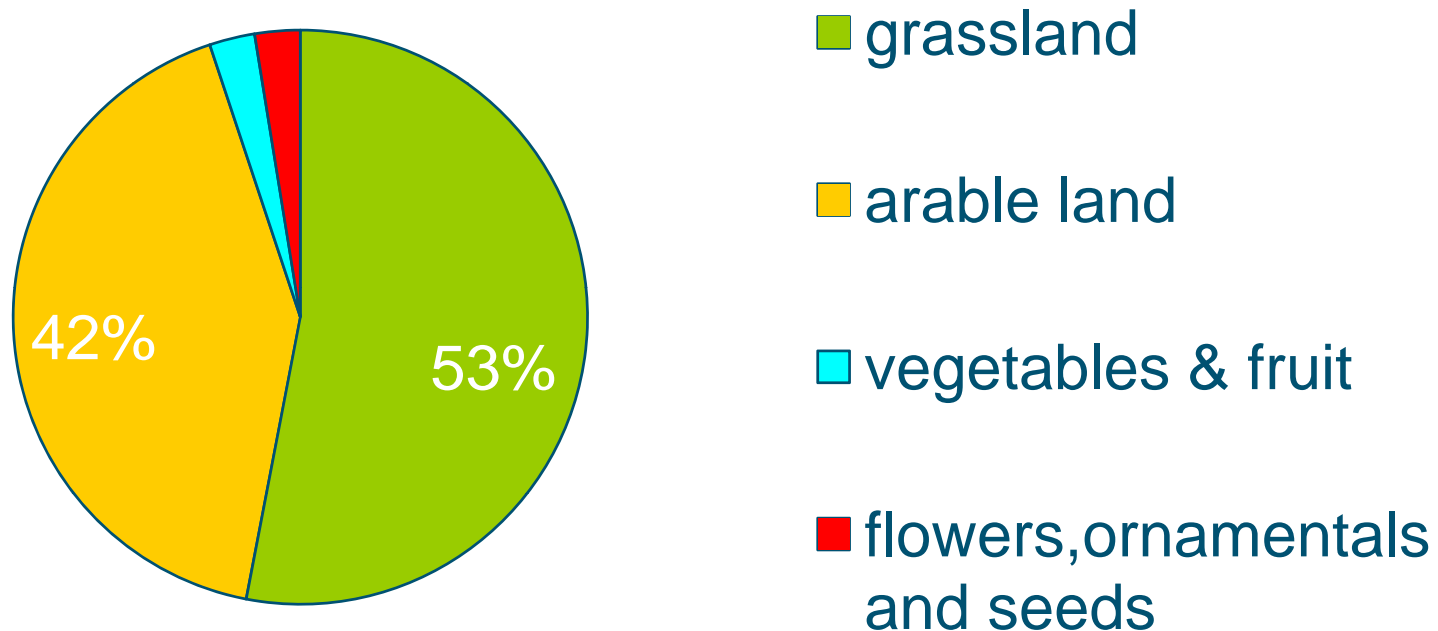




# Location of intensive livestock complex



# Agricultural land use, 1.9 mln. ha.



Overproduction of manure in pigs & poultry (+ some dairy)  
Due to excessive imports of feed from overseas

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# MINAS: P & L in minerals (nutrients)

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- Nitrogen, Phosphate and Potassium can enter a farm in different forms e.g.:
  - Feed
  - Fertilizer
  - Young animals reared elsewhere
- And leave the farm in different forms, e.g.
  - Milk
  - Live or dead animals
  - Manure etc.
- A flow statement (a profit and loss account) gives the full information (“a mineral balance”).

## Example: 55 ha farm (20 ha grass, 50 cows)

USE of Nutrients (kg/year)	N	P	K
Young animals	2281	448	207
Seeds and plants	50	8	62
Compound feed	60545	11350	19369
Roughage	432	75	450
Fertilizer and manure	11810	954	3166
Environmental supply (peat, rain)	2695	50	226
Others (a.o. straw)	98	14	112
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# Example: output and surplus

Output of Nutrients (kg/year)	N	P	K
Animals	24370	4557	1647
Milk	1909	315	525
Plant products	3600	630	5420
Manure	28150	5911	14666
Others (e.g. garbage)	0	0	0
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TOTAL OUTPUT	58029	11413	20258
TOTAL INPUT	77911	12899	23592
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# Calculation methods

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- Like profit and loss account: based on the physical units (kg milk etc.) on invoices (or delivery reports)
- With norms for all types of inputs and outputs
  - set rather high / low to promote use of real laboratory results on N / P content of products
- Feed companies started to provide invoices and yearly delivery reports with the N / P content of the feed for each farm
- Manure often tested (laboratory) on request buyer (arable farms)
- Separate software (excel), or integrated in management information system or (fiscal) accounting system

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# In MINAS the data are auditable

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- Due to integration with the fiscal profit and loss account (that is for tax reasons obliged on every farm)
- An input you want to cheat with and not declare in your Mineral Account (e.g. fertilizer), you would like to include in your P&L as a deductible cost.
- This principle does not work if manure prices are very negative (extreme surplus in the region)
  - And you have to make sure the manure is really transported (e.g. by obligation to register / announce manure transport)
- Therefor the agricultural accounting offices integrated the calculation in their work and signed the accounts off.

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# The rise and fall of MINAS

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- 1984: Interim law that made new (extra) buildings illegal: stop the growth
- 1987: Mandate on maximum application rates of manure in kg Phosphate ( $P_2O_5$ ) per ha
  - “Manure bookkeeping”
  - Decreasing from 350 to 90 (silage maize) between 1997 and 1996
- MINAS developed as a management tool around 1990 by an agri-environmental consultancy of farmers (CLM)
  - Big advantage: full substitution between different inputs (or outputs) gives insight in management options and farm comparison (benchmarking) supported

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# The rise and fall of MINAS

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- 1993: consensus between government and farmers to base the environmental policy on an economic instrument in stead of physical mandates: MINAS as a policy instrument
- Large project on introduction:
  - Map data flows, add new ones for audit reasons or to make accounting easier
  - Develop and test audit-procedures
  - Adapt software
  - Extension: introduction with farmers, farm study groups

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# The rise and fall of MINAS

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- Large project on introduction:
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  - Extension: introduction with farmers, farm study groups
- 1998: full scale introduction (after 2 years political



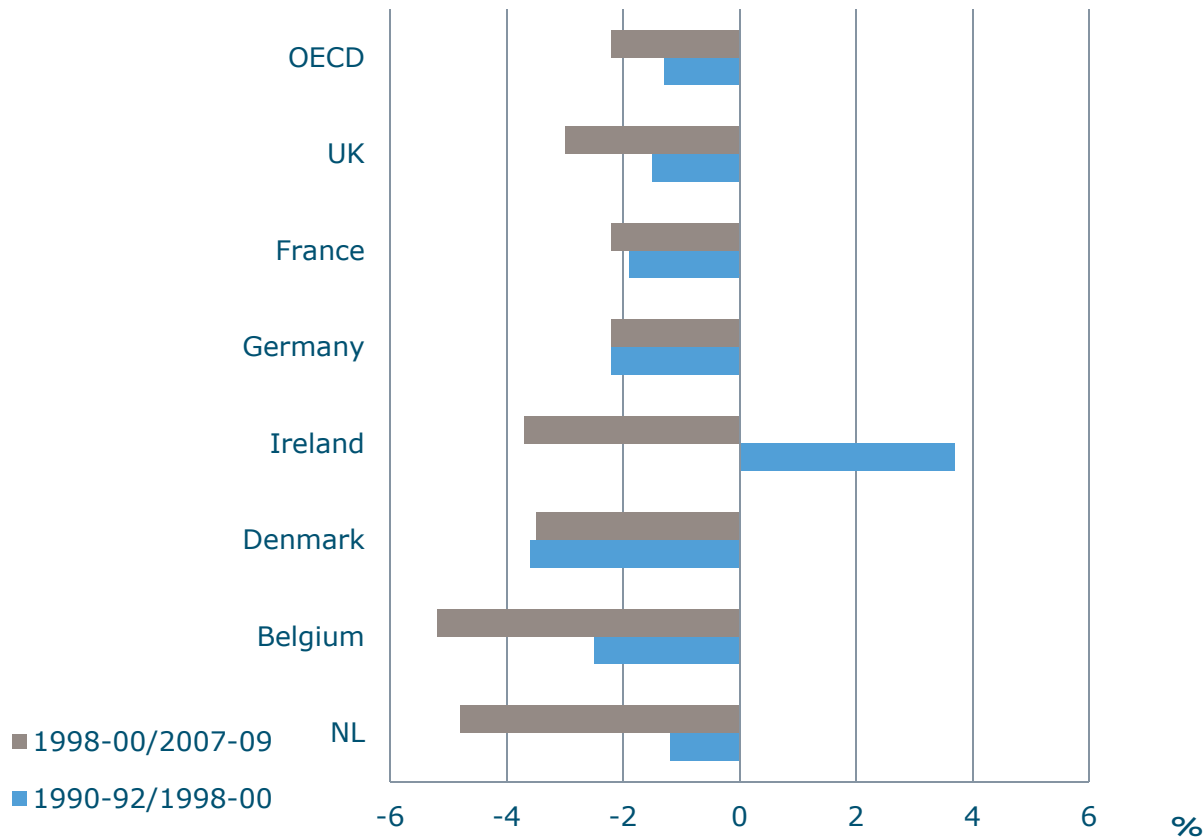
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# The rise and fall (and re-rise) of MINAS

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- 1998 introduced for farms with more than 2.5 animals per ha, later for all farms (including arable)
  - Surplus per ha is indicator for efficiency
  - Certain level is unavoidable (e.g. a loss rate of 5 kg)
  - The remaining surplus was taxed (prohibitively)
- 2003: EU Court of Justice (*NL vs. Eur. Commission*) ruled out MINAS as being incompatible with N-directive:
  - Loss rates / ha incompatible with use-rates of manure
  - Too high loss rates were “only” taxed, not forbidden
- 2006: Back to manure application and max. livestock / ha
- 2015: end of quota. Introduction “P-Cycle Manager”

# Nitrogen reduction in %/year (per ha)



Source: OECD

Decrease in use of N and P

Clear substitution in arable farming and dairy farming: more use of manure, replacing fertilizers

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# Concluding remarks

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- Great management tool
- Economic instrument (improves manure market) that gives farmers insight and more options for farm specific measures (like substitution fertilizer /manure) than a mandate / maximum animals per ha.
- But administrative burden for everybody in the chain
- And enforcement can be complex
- It does not punish high efficient farms, and forces inefficient ones to change
- It works if the manure market between livestock farms and arable land is in balance. Not if production has to be cut back considerably (too high negative manure price)

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# Thank you for your attention

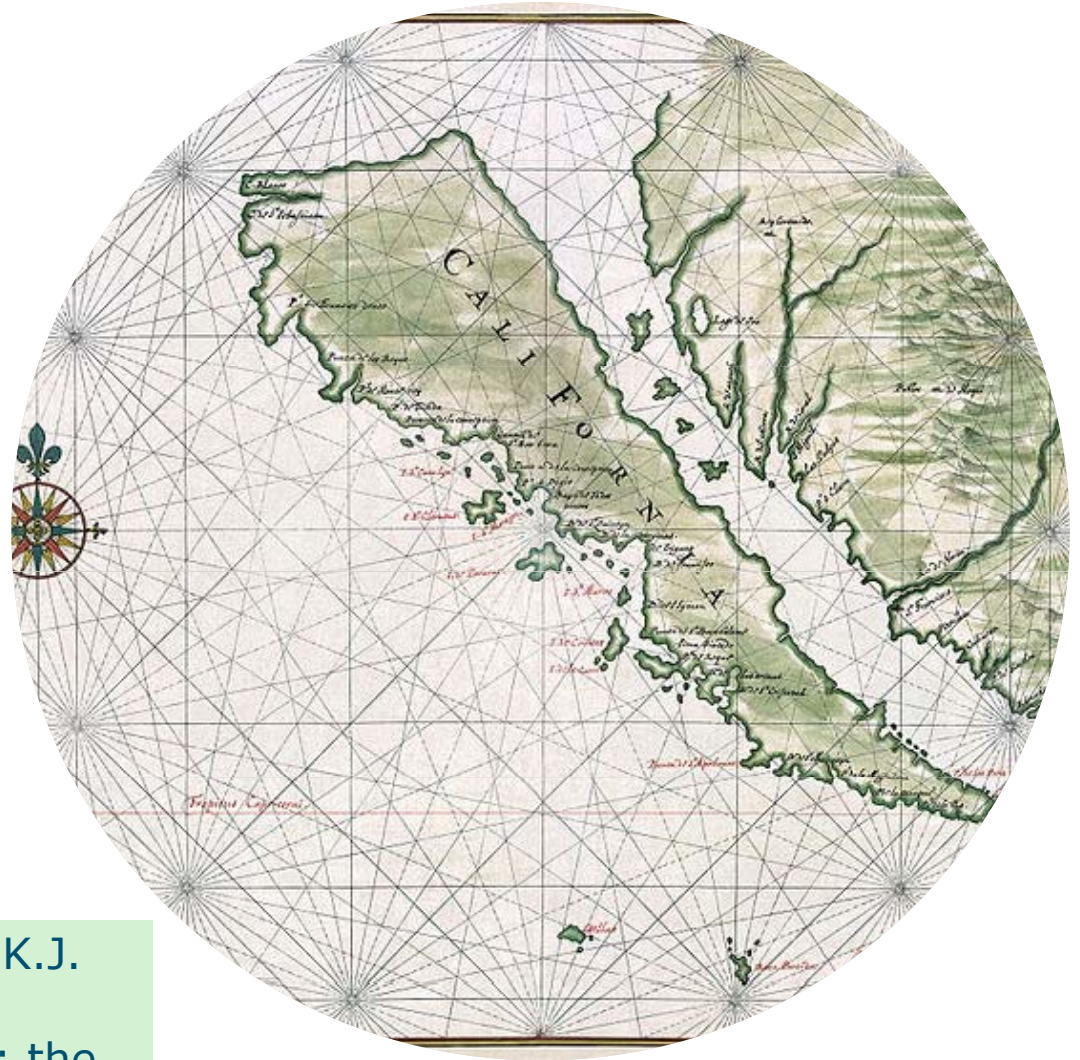
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See: J.A. Breembroek, B. Koole, K.J. Poppe and G.A.A. Wossink:  
Environmental Farm Accounting : the  
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System. *Agricultural Systems* 51