Rettet NEMO
Schutz der Meere vor Phosphor

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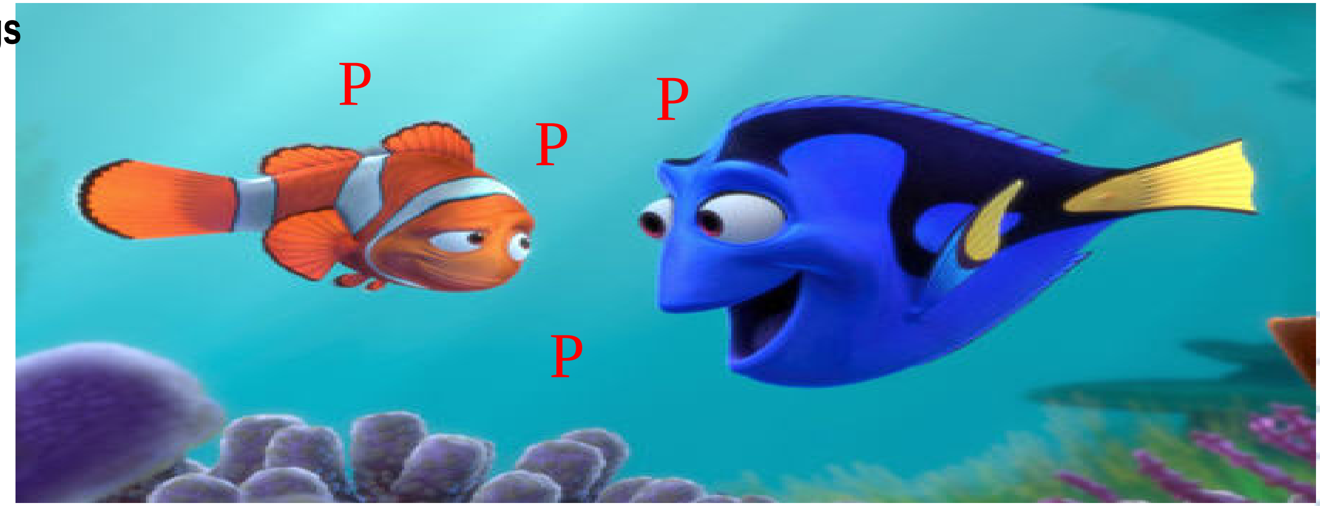
Save NEMO

Protecting the seas against Phosphorus loadings



Why concerned about P ?
Why does it affect us ?

Everything is linked to everything !

Essential to food production:

More food – more P inputs; - *unless* …….

Essential to water quality;

More P inputs – more P losses; - *unless* ……..

BUT, Unfortunately

Available P resources are limited

- *Managing P is really a question of the future of mankind*

Phosphorus in agriculture
Key issues in the context of protecting our water resources

- **Different sources**

  - Urban and rural waste water

  - Agriculture

- **Different processes and pathways**

  Point sources

  Diffuse sources

  Soil erosion

  Surface runoff

  Leaching

- **The ”water and environmental issues” cannot be solved without the agricultural sector onboard**

- **But – no simple solutions**

Protection of our Water Resources
A recognized key issue

Regional initiatives

- OSPAR (1988) – reductions in the order of 50 % - nutrient inputs to the North Sea
- HELCOM (1988) – reductions in the order of 50 % - nutrient inputs to the Baltic Sea

The EC Water Framework Directive

- Achieving good ecological status within 2015
- Implementing River Basin Management Plans

Common for all;

Agricultural nutrient losses – a key challenge

Agriculture delivers

- *36 000 tonnes of Phosphorus*
- *1100 000 tonnes of Nitrogen*

To the Baltic Sea - EVERY YEAR

A ”bird´s eye view” on the Baltic Sea – July 13, 2005

Unfortunately – a typical situation – created by humans and catched by ”modern” technogy

- Massive and frequent algae blooms throughout the Baltic Sea, including

  Cyanobacterial blooms and other toxin producing algaes

Problems are not solved

They are still present

Improvements are inconsistent

DUE TO

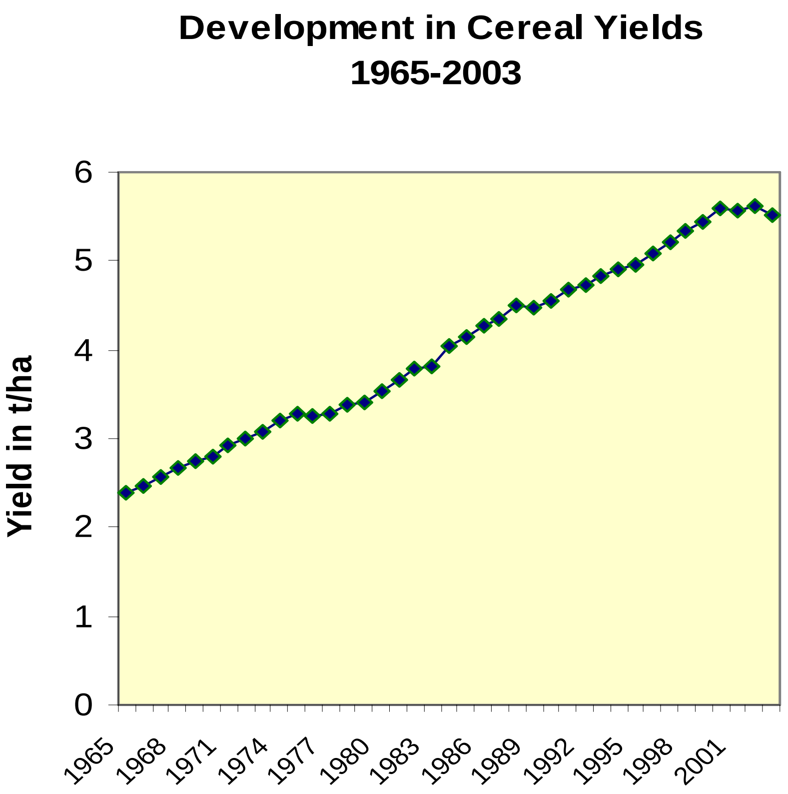
Insufficient measures ? !

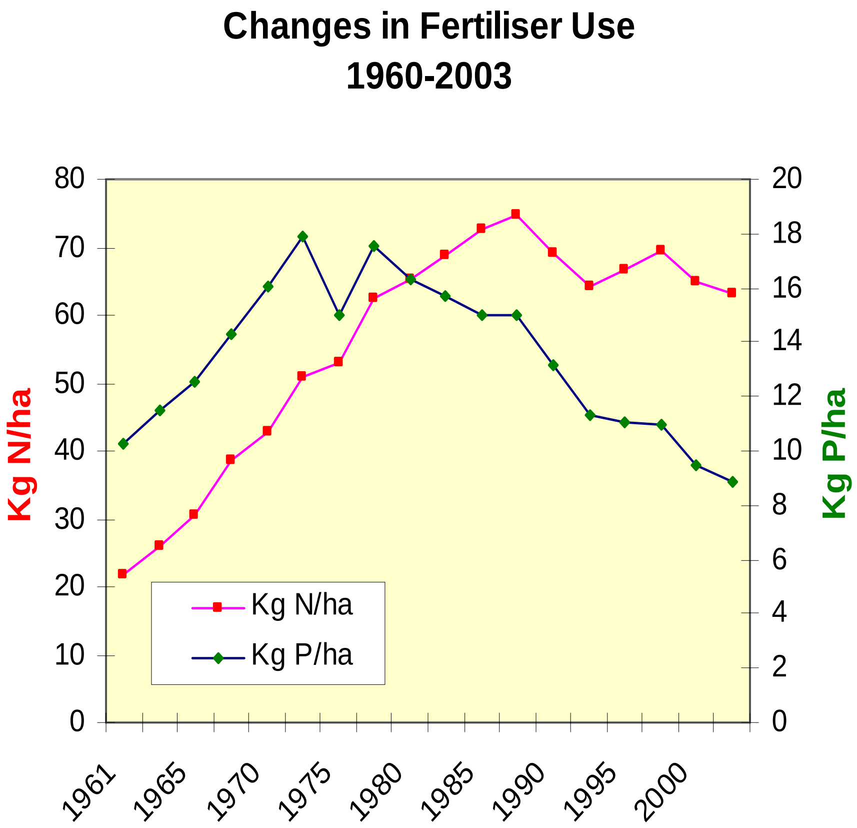
<u>BUT – bear in mind</u>

Complex processes
Variability problem
Time lags – delay in responses

Crop Yields and Fertiliser use - EU 15

Left: *Cereal yields, t/ha – 5 yr sequential avg*
Right: *N and P fertilisers, kg/ha (FAO-STAT)*





Intensification of Livestock Productions

Relative to population increases;

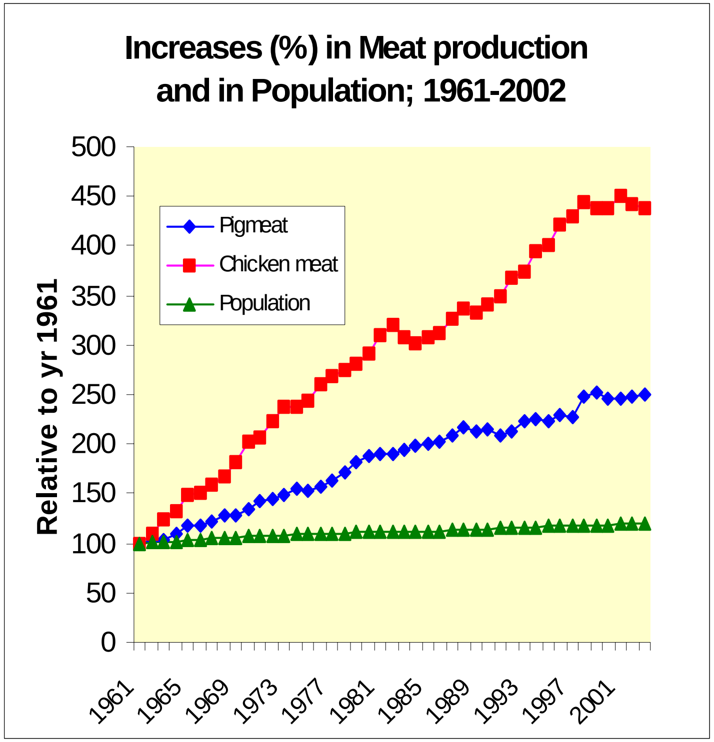
- **Poultry: 4.5 times**
- **Pigs: 2.5 times**

Pre-conditions

- **Intensified crop production**
- **Import of feed concentrates**

Concequences;

- **High nutrient supluses with serious impacts on the environment** *(domestic - on-site)*
- **Additional** *"external and off-site"* **impacts linked to the "external" feed production**

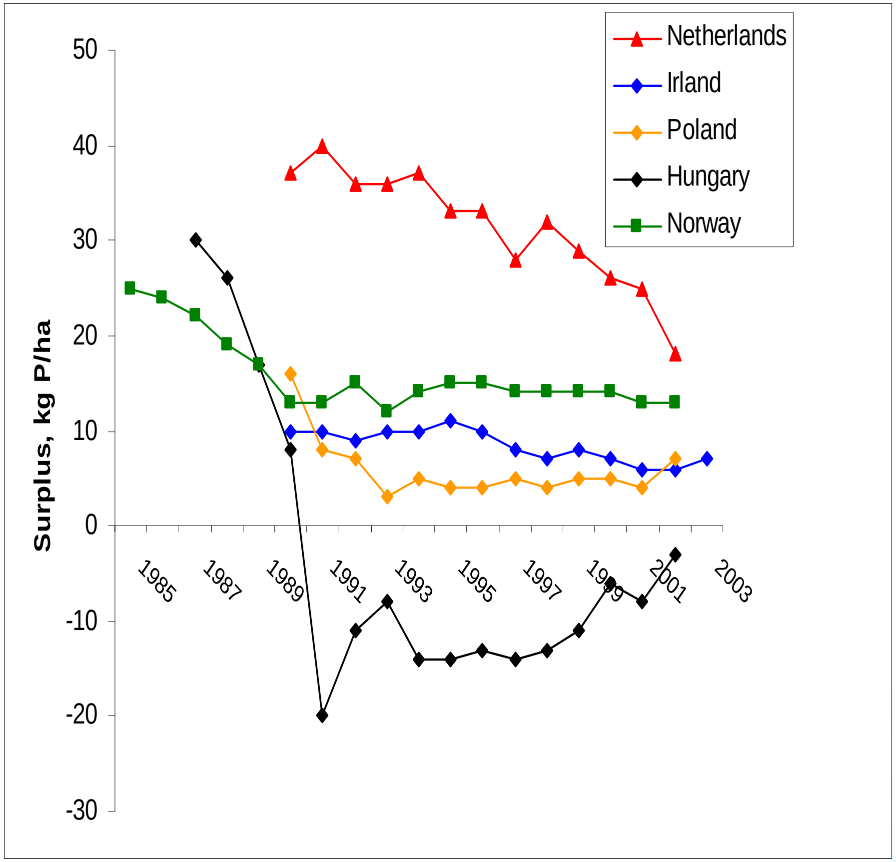


Still substantial P surpluses

But, decreasing trends

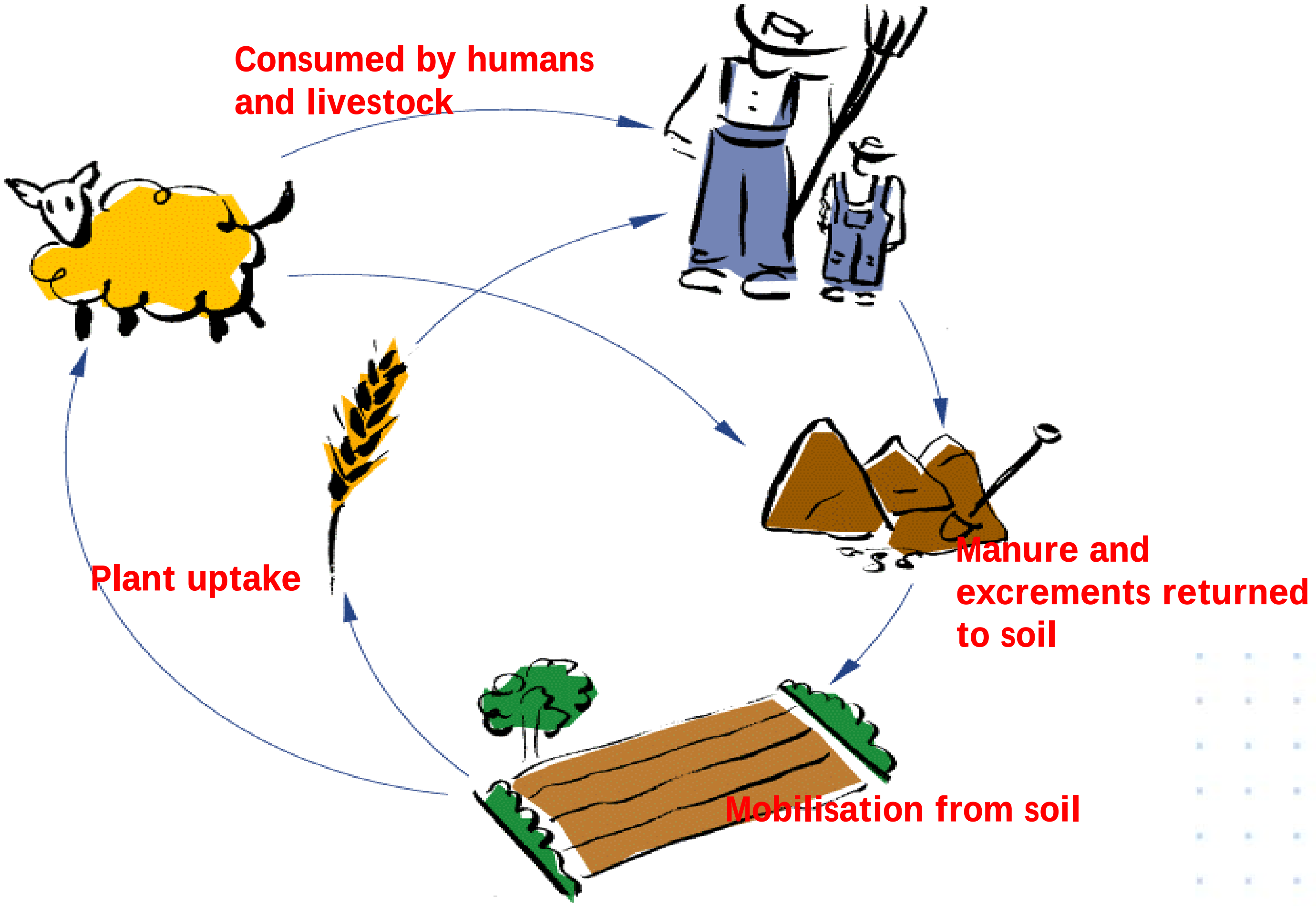
	1990-92	2000-02
	Kg P ha Agr land	
Denmark	17	11
United Kingdom	9	4
Netherlands	38	23
Belgium	40	24
EU-15	11	7

7 kg P/ha = 1000.000 Tonnes P

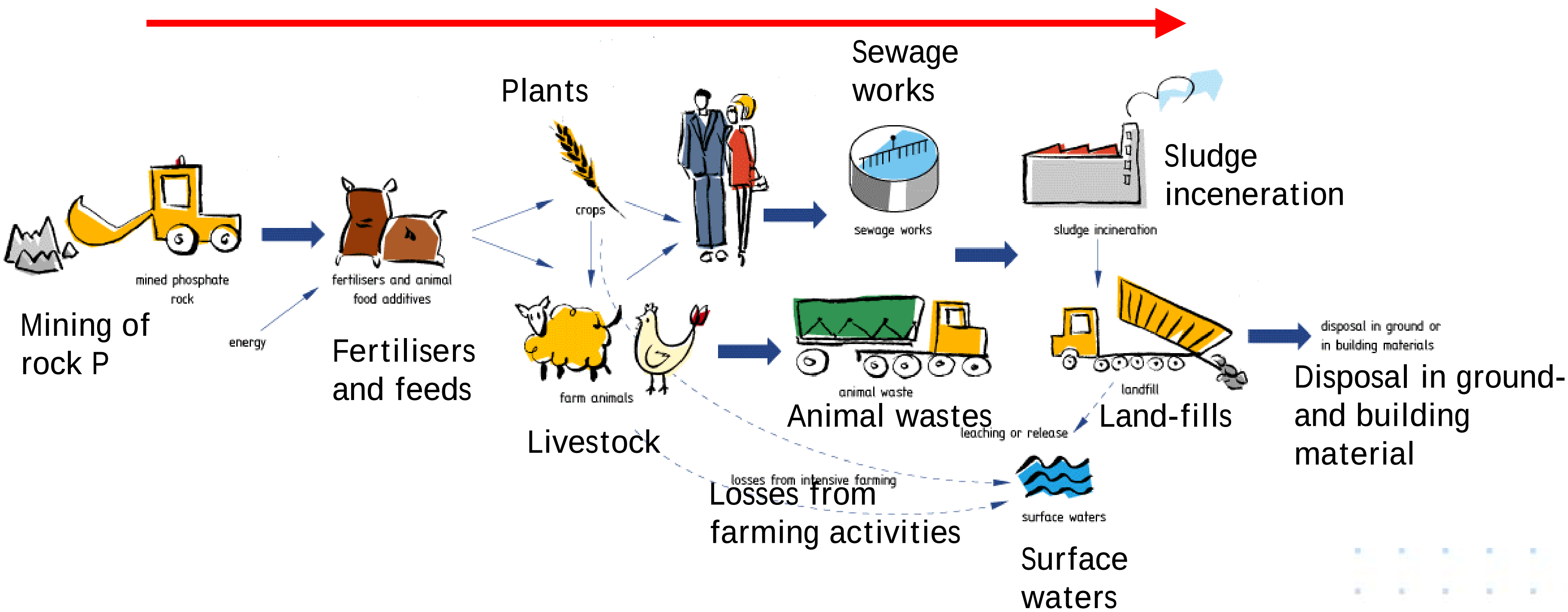


We have left the old, closed P cycle

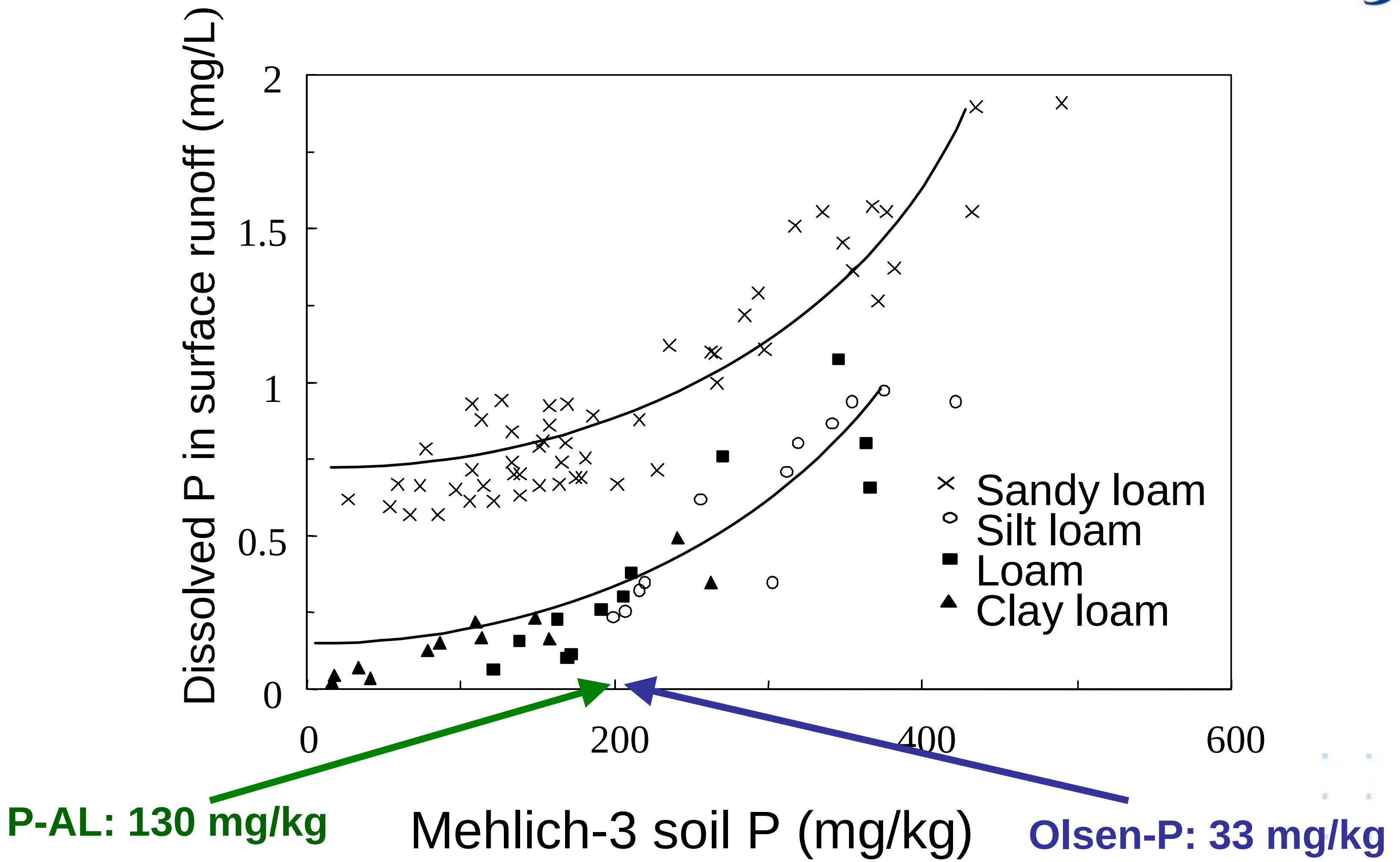
Derived from soil
Returned to soil



And moved to a more one-way direction flow of P



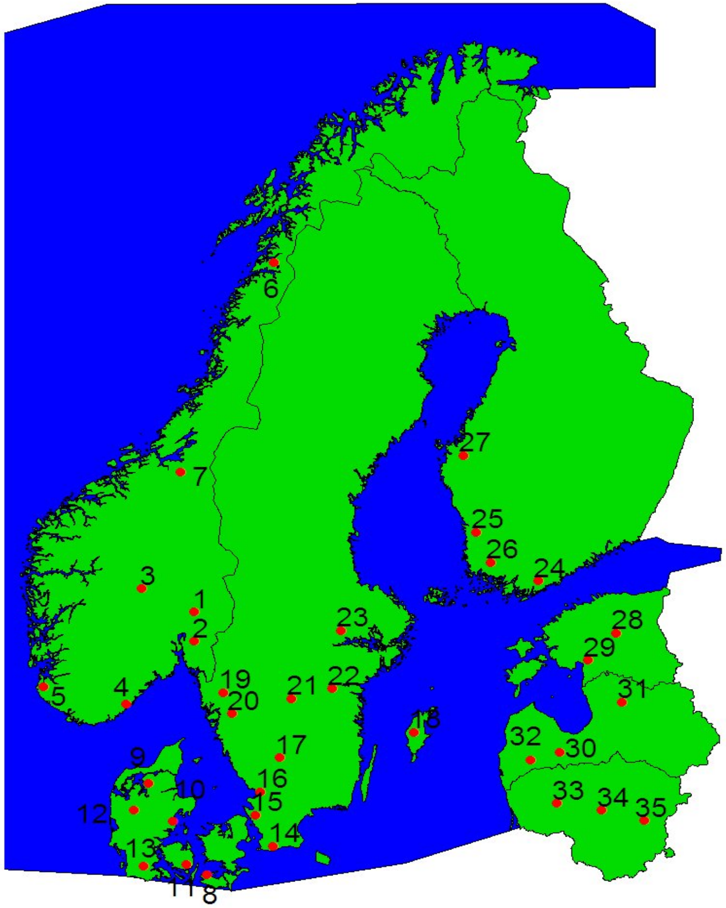
Soil P status – influence on P loss



(Adapted from Sharpley et al., 2001)

P losses – extremely variable

Observations in 35 micro-watersheds in Nordic/Baltic countries; 1993-2002



Huge spatial variability;

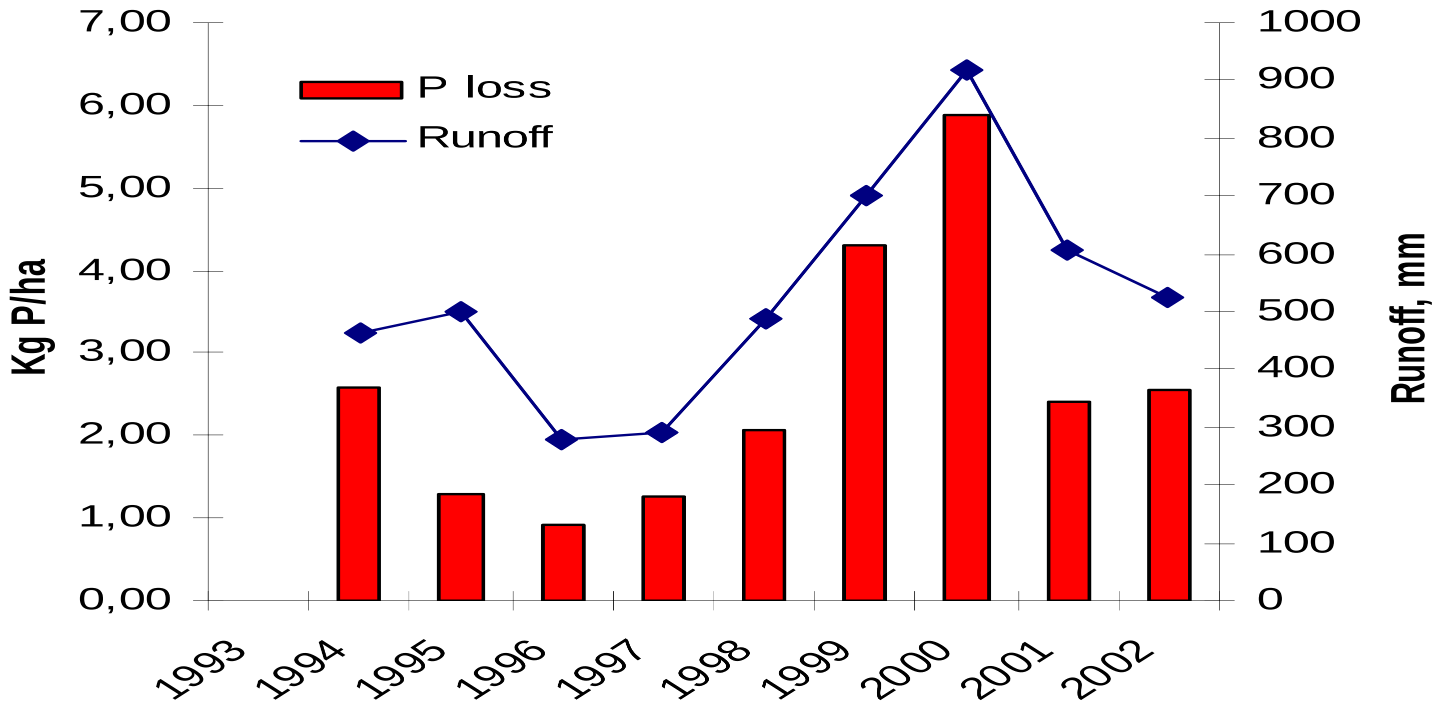
- **Lowest mean Loss: 0.17 kg P/ ha**
- **Highest mean Loss: 2.58 kg P/ ha**

Huge annual variability;

- **Normal range 1:5**
- **Highest range: 1:15**

Runoff and P losses - individual years

Exemplified by data from a Norwegian catchment, 1994-2002



Intensive Livestock farming – potential hot spots

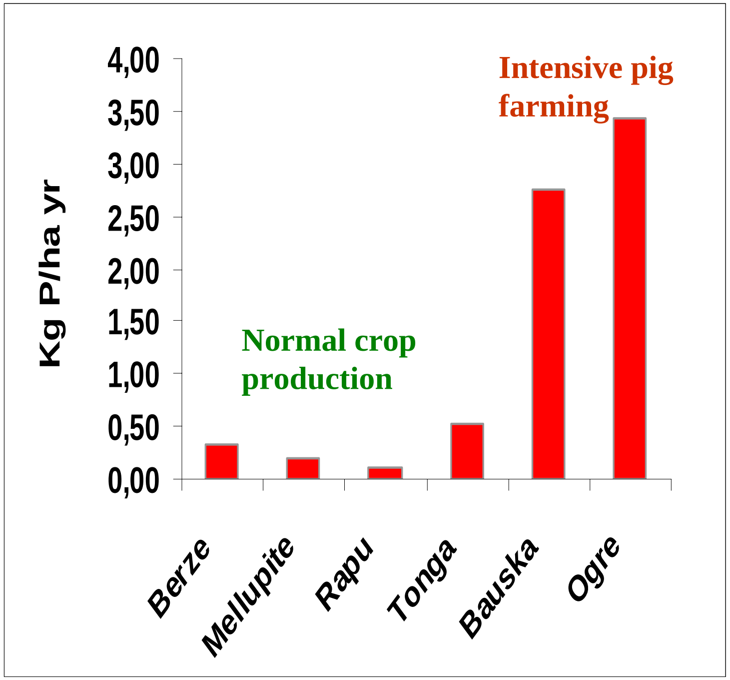
Examples;

Measured P losses from different type of farming in Latvia and Estonia

Area with <u>intensive pig production;</u>

5-20 times higher P loss

than from Areas with only <u>arable farming</u>



Phosphorus – not just Phosphorus

1 kg P from one source does not necessarily equal 1 kg from another source

For example, the bio-availability of;

- **Sediment P resulting from soil erosion; 2-20 %**
- **Leachate P from fertilsers and manure; 40-100 %**

Consequences:

Managing P in the context of integrated land and water resource management

The scene is set by the EC Water Framework Directive

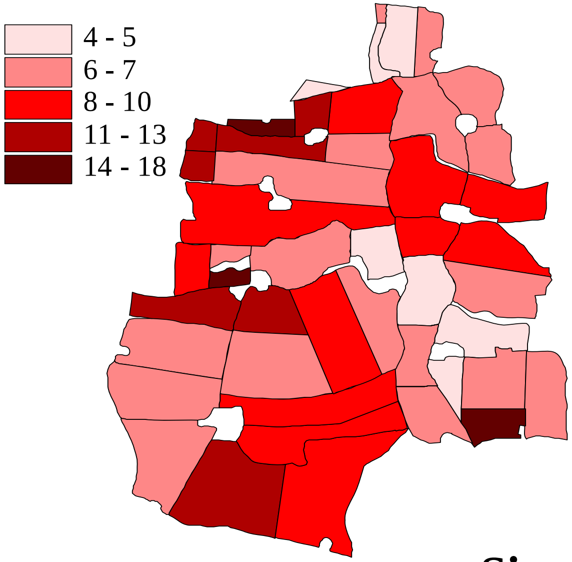
- Identifying vulnerable water recipients
- Identifying P loss risk areas or hot spots
- Identifying and quantifying causes and effects, - i.e. understanding processes and mechanisms
- Identifying adequate measures
- Implement the measures

AND THEN; - Wait for the results to occur

Managing P and P Losses:

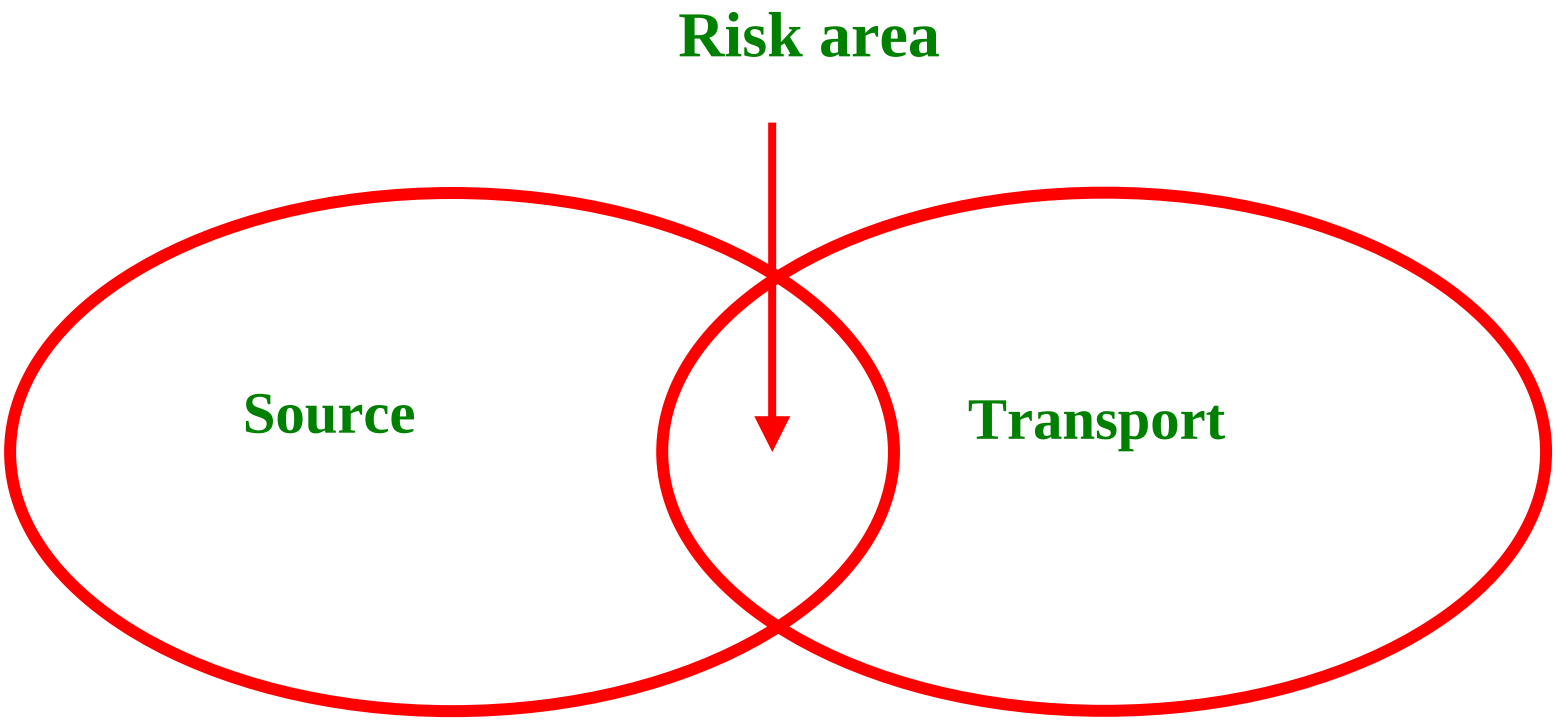
⇨ *Variability Management*

⇨ *Risk Management*



- **Simplify Spatial Information**
- **Identify risk factors**
- **Quantify risks into a managable tool: P-Index**

Identifying Risk Areas
Water Pollution



The question of SUSTAINABILITY

- *Reducing* the losses
- *Improving* the P utilisation efficiency
- **Closing the P cycle**

- **Extremely challenging**

  Balancing
  - More food
  - Decreasing P resources

Solutions and strategies

Long-term perspectives

- Balanced fertilisation- stop the P accumulation in soils

- Balanced livestock production

- Controlling soil erosion

Adequate incentives

- Work with – not against – the farmer