

Sustainable recycling of phosphorous

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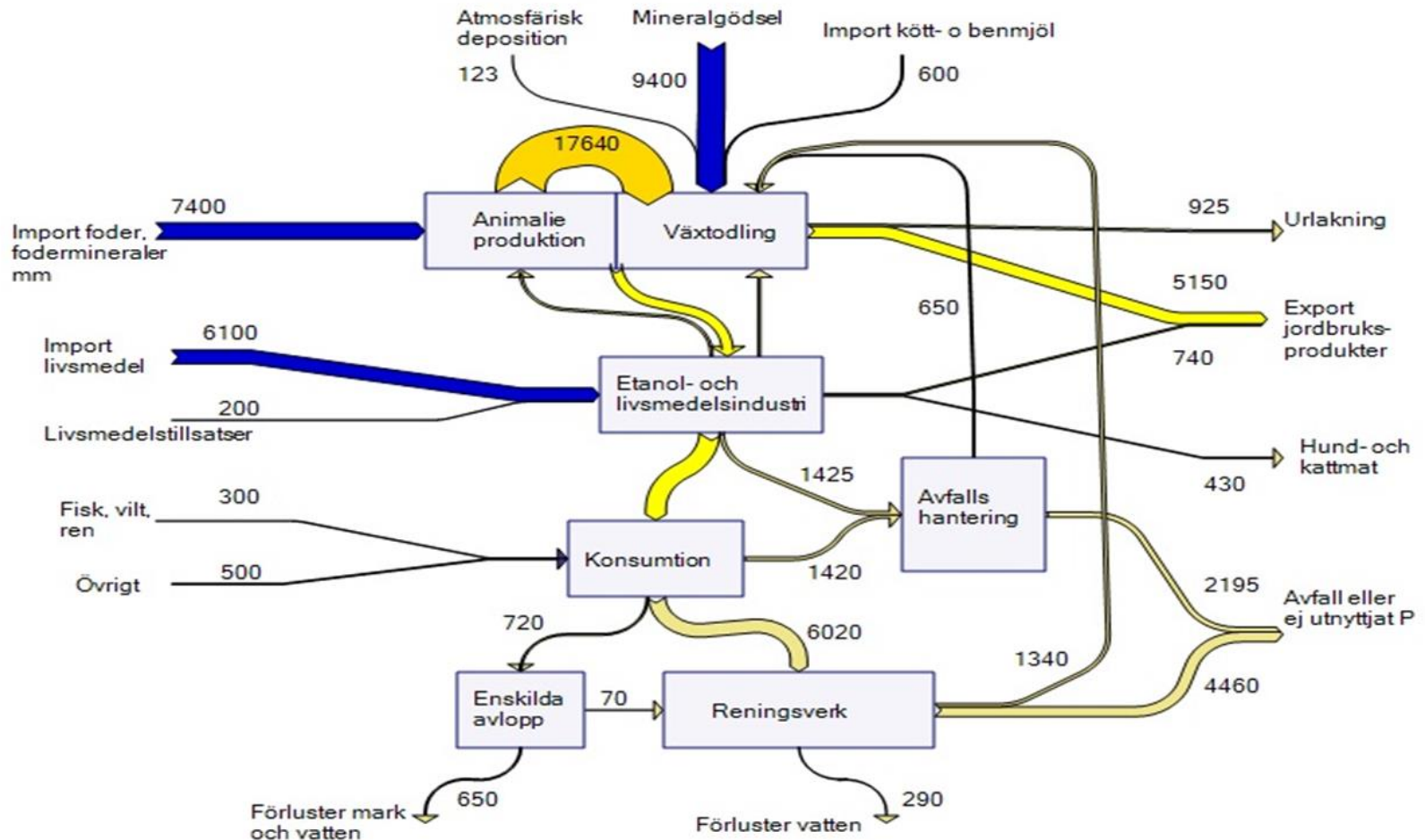
Government commission presented by Swedish EPA on September 2013

- Phosphorous resources and potential in Sweden
- **Proposal regulation use waste components from sewage, biofertiliser and compost**
- Proposal for milestone target

Starting points

- Resource-efficient eco-cycle
- A non-toxic environment

Mapping phosphorous resources in Swedish agriculture



(Källa: Linderholm & Mattsson 2013)

Proposal for regulation of production, marketing, transfer and use of waste components and treated food waste, biofertiliser and compost

- The aim is waste components that have such low concentrations of pollutants that phosphorous can be recycled on land where phosphorous is needed without endangering people's health or the environment.

What is regulated?

- Hygienic treatment of waste components (from sewage) used on all types of land (not biofertiliser and compost)
- Concentration and supply of metals and organic
- Preventive measures
- Traceability and monitoring

Not included

- Waste fractions (from sewage) from single houses
- Biofertiliser containing more than 80 per cent manure

Hygienic treatment

- Hygienic treatment of waste components (from sewage) used on all types of land
- Claim for reduction of E.coli, viruses and parasites

Godkända metoder för hygieniserande behandling av avloppsfraktioner

- Termisk torkning
- Värmebehandling
- Kompostering i reaktor
- Kompostering i strängar
- Kalkbehandling
- Ureabehandling

Proposal limits

- Metals in waste fractions (from sewage), biofertiliser and compost
- Organic compounds in waste fractions (from sewage)
- Metal concentration in the soil
- Amount of metals that may be applied on land
- Amount of nutrients (N and P) that may be applied on land

Limit concentration of metals in waste components (from sewage), biofertiliser and compost

Metals	1998:944 (20 §)	2015		2023		2030	
	mg/kg TS	mg/kg TS	mg/kg P	mg/kg TS	mg/kg P	mg/kg TS	mg/kg P
Pb	100	35	1 600	30	1 400	25	900
Cd	2	1	40	0,9	35	0,8	30
Cu	600	600	21 400	550	19 600	475	17 000
Cr	100	60	2 100	45	1 600	35	1 200
Hg	2,5	1	40	0,8	30	0,6	20
Ni	50	40	1 400	35	1 200	30	1 000
Ag	-	5	180	4	150	3	100
Zn	800	800	28 600	750	26 800	700	25 000

Limit concentration for organic compounds in waste components (from sewage)

Metals	2015		2023		2030	
	mg/kg TS	mg/kg P	mg/kg TS	mg/kg P	mg/kg TS	mg/kg P
BDE-209¹	0,7	25	0,5	20	0,5	20
Dioxin²	20 ³	700 ⁴	15 ³	550 ⁴	10 ³	350 ⁴
Klorparaffiner⁵	4	150	3	100	2	70
PCB₇⁶	0,06	2	0,05	1,8	0,04	1,4
PFOS⁷	0,07	3	0,05	2	0,02	1

1) 2, 2', 3, 3' 4, 4' 5, 5', 6, 6'-dekabromdifenyleter

2) Polyklorerade dibenso-p-dioxiner och dibensofuraner (PCDD/PCDF), Anges som toxicitetsekvivalenter (TEQ)

3) ng TEQ/kg TS

4) ng TEQ/kg P

5) Kortkedjiga klorparaffiner (SCCP) C10-C13

6) Polyklorerade bifenyler. Summa av kongenerna 28, 52, 101, 118, 138, 153, 180

7) Perfluoroktansulfonat

Amount of metals that may be applied on land

Metals	1994:2* (g / ha och år)	2015** (g / ha och år)	2023** (g / ha och år)	2030** (g / ha och år)
Pb	25	25	25	20
Cd	0,75	0,55	0,45	0,35
Cu	300	300***	300***	250***
Cr	40	40	40	35
Hg	1,5	0,8	0,6	0,3
Ni	25	25	25	25
Ag	-	3	3	2,5
Zn	600	600	550	550

* Sju års giva

** I genomsnitt per år för ett obestämt antal år

*** I åkermark med en kopparhalt om mindre än 7 mg/kg TS tillåts högst 600 g/ha och år

Supply of nutrients on farmland

The supply may not exceed

- Tot-P 22 kg per hectare and year
- Ammonium nitrogen 150 per hectare and year

Also regulated

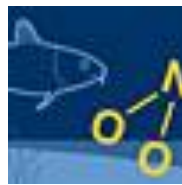
- Preventive measures
- Content declaration
- Informing inspection authority of spreading on land
- Producenter obliged to take notes on the use
- Surveillance by Swedish EPA

Consequences

- Less risk of increased content of metals or organic compounds in soil
- Less risk for spreading of infectious substances
- May limit the amount of phosphorous and nitrogen that may be recycled
- Incineration of sewage sludge
- Biogas production may be hampered if the biofertiliser does not comply with the limits

Proposal for milestone target

- The eco-cycle of nutrient materials should be resource-efficient and free of undesirable materials to the extent possible. The application and removal of nutrient materials should be in balance in forests and agriculture. Waste management systems should be developed to facilitate sustainable recycling of nutrient materials.



Förslag till etappmål för hållbar återföring av fosfor och andra växtnäringsämnen

- At least 40 percent of the phosphorous in waste will be utilised and recycled as nutrients for fields without entailing exposure to pollutants that pose the risk of injuring people or the environment.
- At least 10 percent of the nitrogen in waste will be utilised and recycled as nutrients for fields without entailing exposure to pollutants that pose the risk of injuring people or the environment.
- Stable manure will be utilised on farmland so that the application of nutrient materials is in balance with their removal.
- At least 50 percent of food waste from households, institutional kitchens, shops and restaurants will be sorted and treated biologically so that nutrients are utilised, of which at least 40 percent is treated so that energy also can be utilised. (Already decreed by the Swedish government.)

THANK YOU!



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