System merits or failures? Policies for transition to sustainable P and N systems in the Netherlands and Finland

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RESEARCH PROBLEM

- Current N and P systems waste valuable resources, pollute surrounding waters, and threaten food security
- Agrifood systems cause 74% and 80% of N and P flows
- Unsustainability of present situation in terms of food supply:

Dietary recommendations

2390 kcal cap^{-1} d^{-1}

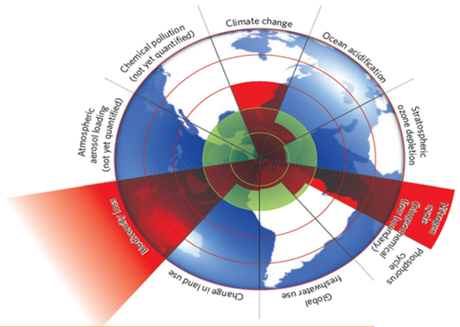
Current supply

3240 kcal cap^{-1} d^{-1}

Food supply within PBs

250-710 kcal cap^{-1} d^{-1}

- Hence, transition to sustainable nutrient systems is imperative for both future food security, and maintenance of critical resources and ecosystem services
- First, in the 60-70s, the problems of unsustainable N and P flows surfaced into attention as eutrophication, and recently also as an issue of resource scarcity (‘peak phosphorus’) and less so, as disturbance of biophysical processes
- As N and P flows are tightly interrelated and instrumental to agrifood systems, agrifood systems give frame to the socio-techno-economic institutions influencing on the N and P flows
- Since the identification of the problems in the 60-70s policies have occurred at various scales and strengths, yet the problem has turned out to be more persistent and broader in scale



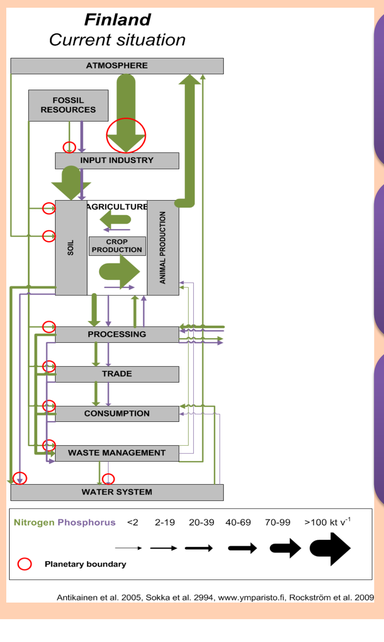
APPROACH AND AIM

Aim

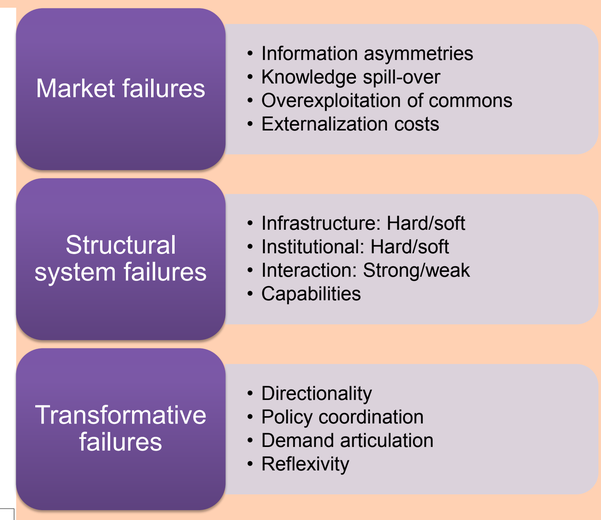
- Connecting the biophysical flows to socio-economic policies and institutions that drive them
- Identifying failures (or merits) that prevent from (or promote) transformative change towards more sustainable P and N systems

Approach

- We construct in-depth case studies of how nutrient related policies have been institutionalized in the two countries, the Netherlands and Finland
- We then compare and analyse the two case studies through policy failure framework, introduced by a.o. Woolthuis et al. (2009) and Weber and Rohracher (2012)



Antikainen et al. 2005, Sokka et al. 2994, www.ymparisto.fi, Rockström et al. 2009



THE NETHERLANDS

Agricultural system			
Land use:	Cereals 12%	Grass 53%	
Arable land:	1 858 000 ha		
Average cattle farm size:	Dairy: 75 animal/farm	Pigs: 243 animal/farm	Overall: 121 animal/farm
Consumption of inputs:	17 800 M€ (67,3% of total production costs)	Fertilizers and soil improvements 2,8%	Energy 14,7%
Output:	20 790 M€	6% of GDP	
Nutrient balance:	N: 210 kg/ha	P: 20 kg/ha	
Fertilizer consumption:	310 kg/ha		
Nutrient runoff:	N: 427 kton/a	176 kton/a	

Institutionalization

1970-80s: Problem identification phase:
- Severe eutrophication problems
- Water Boards and Water Act
- Oversupply of manure → problem of transport logistics → technological problem

1980-90s: Problem politization phase:
- Ministry of Environment pushing for stricter regulation → clash between the two interest groups
- Environmental and agricultural interest groups start cooperation → committee on ’manure problems’
- Gradually tightening regulation from 1984 → still strong belief in technological solution, without putting pressure on extensification of livestock production
- Manure Law → Soil protection Act → levies on dairy, manure and feestock production

1990-00s: Managerial problem phase:
- Shifting to managerial market-based approach
- Tradeable manure production rights → manure registration system → manure caps
- Transportation agreements between nutrient surplus and nutrient deficit farms
- MINAS 1998-2005: Farm based accounting of inputs and outputs → result-based approach
- MINAS faced many rounds of corrections → frustration amongst actors grew
- Nitrate Directive → stricter implementation than anticipated → clash with European Commission, as targets are not sufficiently met with managerial approach

2000-2014: Stakeholders ’owing the problem’ phase:
- Policies have had positive impact on water quality until 2003, ever since, targets have not been met
- From 2006-2010 P and N in manure increased
- Nutrient Platform – bottom-up, multistakelder platform – value chain approach
- Phosphorus value chain agreement
- Integrating agrilculture into the bio-based economy-initiative

FINLAND

Agricultural system			
Land use:	Cereals 46%	Grass 5%	
Arable land:	2 293 000ha		
Average cattle farm size:	Dairy: 24 animals/farm	Pigs: 60 animal/farm	Overall: 60 animals/farm
Consumption of inputs:	3 366 M€ (67,4% of total production costs)	Fertilizers and soil improvements 13,4%	Energy 16,1%
Output:	3 980 M€	1% of GDP	
Nutrient balance:	N: 60 kg/ha	P: 8 kg/ha	
Fertilizer consumption:	189 kg/ha		
Nutrient runoff:	N: 30 kton/a	P: 1,8 kton/a	

Institutionalization

1970-80s: Problem identification phase:
- Baltic Sea pollution was perceived as a problem of municipalities and industry, particularly pulp and paper industry
- Helsinki Convention (1974) was the first transnational environmental agreement to protect the Baltic Sea
- Strict regulation on industries and municipalities prompted development of wastewater technology

1980-90s: Problem politization phase:
- Ministry of Environment is founded → pressure on agricultural interest groups → beginning of agri-environmental agenda-setting
- Producers’ interest group (MTK) accepts the pollution impact of agriculture sector
- Ambitious nutrient pollution reduction targets in agriculture are set
- Problem of overproduction and overfertilization → fertilizer tax, compulsory set-aside land

1990-00s: Managerial problem phase:
- Finland joins EU and CAP (1995) → producer prices crash → protection of livelihood becomes priority
- Agri-environmental subsidy scheme → compensation for income loss → compromise between agriculture and environmental interests → environmental interest groups’ position is legitimized
- Agri-environmental subsidy scheme becomes the main policy tool → measure-based payments
- Voluntary participation (over 90% of farmers and over 95% of land)
- A list of optional measures

2000-2014: Problem of ownership phase:
- Agri-environmental subsidy scheme has become rigid and standardized → multiple goals → agricultural and environmental interest groups have demarcated territories of agency
- Program has achieved some improvement but not sufficiently and it has become increasingly complex for actors
- Regional segregation has intensified the problem of nutrient management → high nutrient surplus areas
- Circular economy initiative aims to solve the problem by creating new market opportunities

CONCLUSIONS

- **Cooperation and shared vision between agricultural and environmental interest groups is essential**
- **Reflexivity in the policy implementation → measuring impacts and actors’ reactions → time to adjust → corrections**
- **Accounting of inputs and outputs at the farm levels necessary for effective N and P management**
- **Self-organization of practitioners and bottom-up movement**
- **Multi-lateral approach accommodating both the resource- and pollution management perspectives**
- **Coherence between policy goals and policy instruments, also between sectors**
- **Internalization of externalized costs**
- **Balance between hard and soft institutions**

The Netherlands

Merits?

- Reflexivity and directionality: Target-oriented and flexible approach (although abandoned later)
- Hard institutions: Farm-based accounting of nutrient inputs and outputs

Failures?
- Overexploitation of commons
- Externalization of costs related to unsustainable N and P use
- Policy coordination: Mismatch between policy goals and policy instruments
- Capabilities: Enforcement actors’ lack of capabilities and resources
- Interaction: Strong lobbyists protecting one’s interests
- Demand articulation: Lack of market pull for sustainable N and P products

Finland

Merits?

- Capabilities: Broad participation in environmental protection scheme
- Soft institutions: Normalization of agri-environmental management

Failures?
- Externalization of costs related to unsustainable N and P use
- Reflexivity and coordination: Multiplicity of policy goals causing complexitites at the implementation and lack of flexbility
- Hard institutions: Regional differences not accounted for in the policy instruments’ design
- Hard institutions: Environmental payments originated from being income loss compensation
- Policy coordination and directionality: Incoherence between different policies

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