

[håkan jönsson
erik steen jensen]

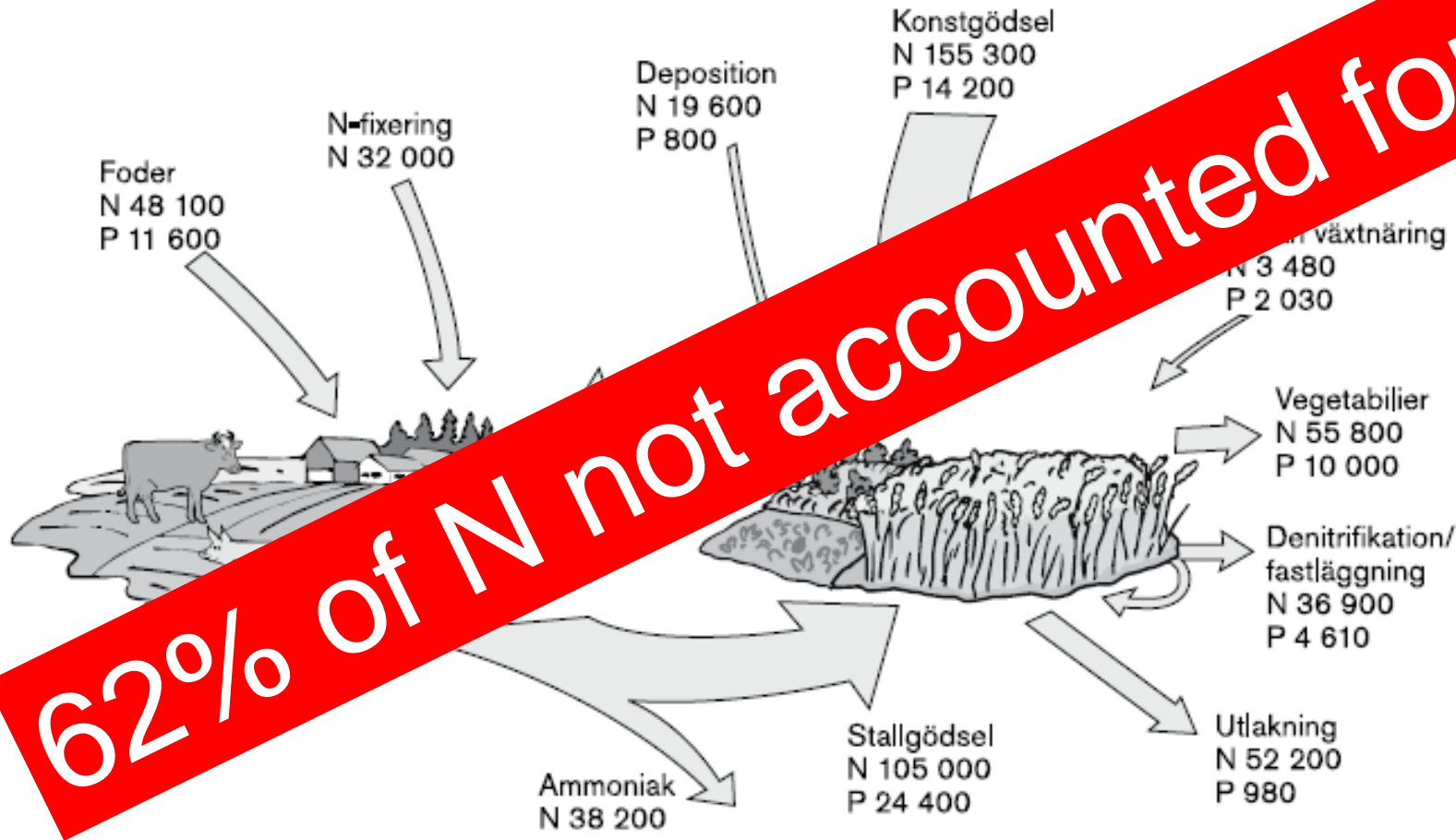
Working group

- Sara Hallin, microbiology (coordinator)
- Ing-Marie Gren, economy and policies
- Göran Bergkvist, plant and soil science
- Håkan Jönsson, recycling technology
- Ingrid Strid, agricultural systems
- Maria Wivstad, systems and nutrient balances
- Erik Steen Jensen, agroecology

Synthesis article

Restraining reactive nitrogen losses from agriculture

Nitrogen (and phosphorus) inputs-outputs in Swedish agriculture (ton N yr⁻¹)



Reactive N creation 2050 ? Tg N year⁻¹

	1860	Early-1990s	2050
<i>Nr creation</i>			
Natural			
Lightning	5.4	5.4	5.4
BNF-terrestrial	120	107	98
BNF-marine	121	121	121
Subtotal	246	233	224
Anthropogenic			
Haber-Bosch	0	100	165
BNF-cultivation	15	31.5	50
Fossil fuel combustion	0.3	24.5	52.2
Subtotal	15	156	267
Total	262	389	492

We know so much about nitrogen cycling in ecosystems, but why can we not solve the problem with increasing reactive nitrogen losses?

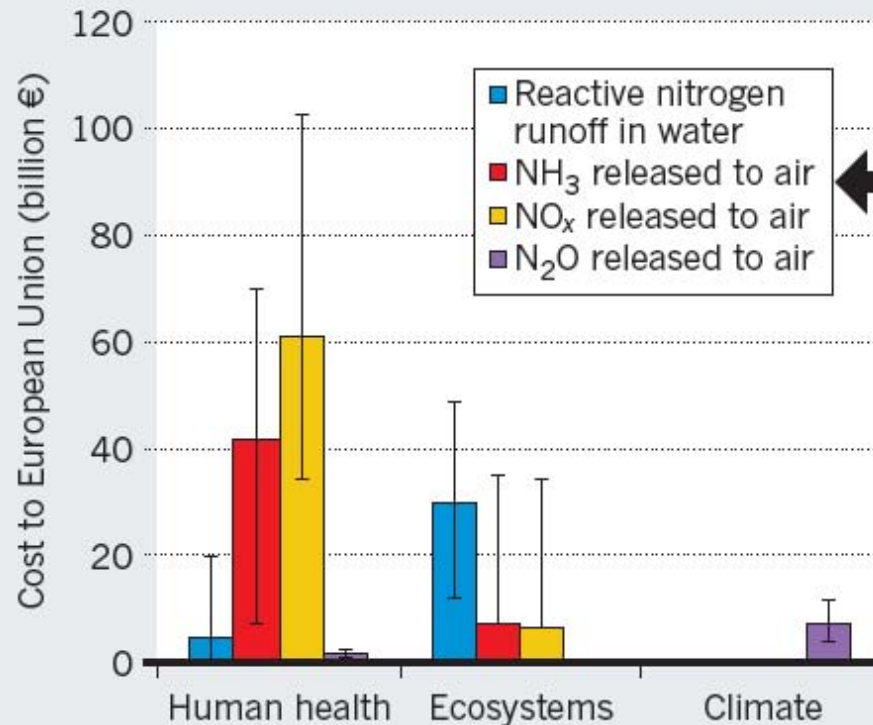
Goal of synthesis article:

synthesize knowledge on how minimize Nr losses from food systems (incl. humans) to the environment and
highlight research needs

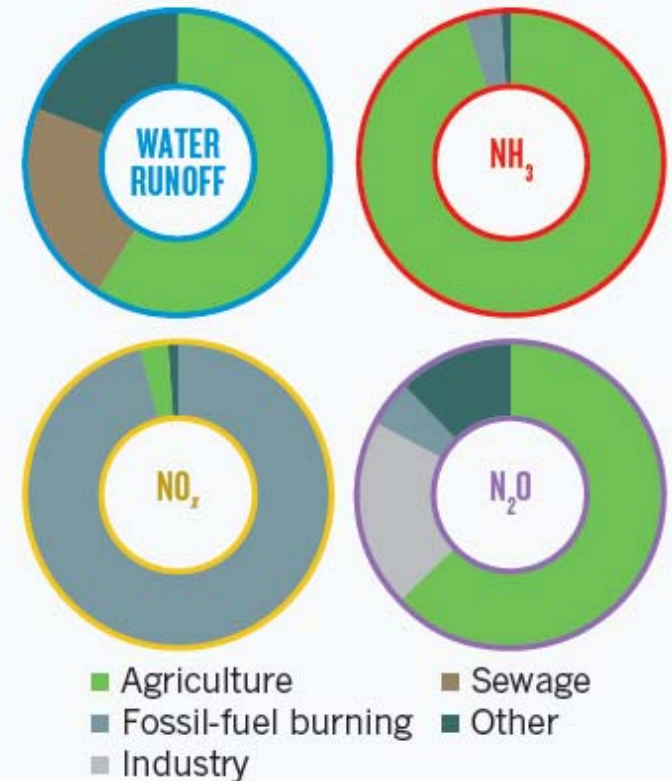
Time perspective 2050 –
Agriculture in developed countries

DAMAGE COSTS OF NITROGEN POLLUTION

Agriculture and fossil-fuel burning load the environment with reactive nitrogen, affecting water, soils and air.



MAIN NITROGEN SOURCES



Sutton et al. 2011.

European N Assessment. Nature 472,159-161

ENA “Key actions” for better management of the nitrogen cascade

- N-use efficiency in crop production
- N-use efficiency in animal production
- Recycling from waste and wastewater systems
- Human consumption patterns: e.g. lowering the consumption of animal protein

”Beyond” ENA ”key actions”

- We will present critical issues and challenges for each of the ENA key actions,
- Taking account that actions will affect each other and cannot be isolated (systems consideration)
- Choosing measures and policies for curbing nitrogen emissions

Aims of this session

- Discussion groups on which solutions, challenges and interactions related to key actions should be addressed in the synthesis article, and
- Identify research needs to be specified

